

Spring  
2022

**Trine University**  
**Course Catalog**  
**Spring 2022**

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# Calendar

## Main Campus & College of Graduate and Professional Studies (CGPS)

**\*\*All Graduate classes, regardless of format, follow the 8-week Face to Face summer schedule as detailed in course syllabus\*\***

<b>Fall Semester 2021</b>	
August 23	Classes begin
August 30	Last Day to drop a course at 100% refund Last day to add a course
September 6	Labor Day (no classes)
September 13	Last day to drop a full semester course at 50% refund
October 6	Last day to drop a Term 1 online course - no refund
October 14	Midterm Grades due from for full semester courses from faculty by midnight
October 15	Midterm Grade Reports for full semester courses posted (mailed to first-year students)
October 16	Term 1 online ends
October 18-19	Fall Break (no classes)
October 25	Term 2 online begins
November 1	Last day to drop a Term 2 online course at 100% refund Last day to add a Term 2 online course
November 17	Last day to drop a full semester long course – no refund
November 24-26	Thanksgiving Break (no classes)
December 8	Last day to drop a Term 2 online course – no refund
December 10	Last day of classes
December 13-18	Finals Week
December 18	Fall Semester Ends
<b>Spring Semester 2022</b>	
January 10	Classes Begin
January 17	Martin Luther King Jr Day (no classes)
January 18	Last day to drop a course at 100% refund Last day to add a course
January 31	Last day to drop a full semester course at 50% refund
February 23	Last day to drop a Term 1 online course - no refund
March 3	Midterm Grades due from for full semester courses from faculty by midnight
March 4	Midterm Grade Reports for full semester courses posted (mailed to first-year students)
March 5	Term 1 online ends
March 7-11	Spring Break (no classes)
March 14	Term 2 online begins
March 21	Last day to drop a Term 2 online course at 100% refund Last day to add a Term 2 online course
April 13	Last day to drop a full semester course - no refund
April 15	Good Friday (no classes)
April 27	Last day to drop a Term 2 on line course - no refund
April 29	Last class day
May 2-7	Finals Week
May 7	Spring Semester Ends
May 7	Commencement
<b>Summer Semester 2022</b>	
May 16	Classes begin - 12-Week, First 6-Weeks, Term 1 online

May 20	Last day to drop a course at 100% refund Last day to add a course
May 30	Memorial Day (no classes)
June 17	Last day to drop a course (First 6-Weeks) - no refund
June 23	Last Class Day - First 6-Weeks
June 24	Finals - First 6-Weeks No 12-Week Classes
June 25	Term 1 online ends
June 27	Classes begin - Second 6-Weeks and Term 2 online
July 1	Last day to drop a course at 100% refund (Second 6-Weeks)
July 4	July 4th Holiday Observed (no classes)
July 22	Last day to drop a course (12-Week) - no refund
July 29	Last day to drop a course (Second 6-Weeks) - no refund
August 4	Last Class Day - 12-Week and Second 6-Weeks
August 5-6	Finals - 12-Week and Second 6-Weeks
August 6	Term 2 online ends
August 6	Summer Semester Ends

# President's Welcome Message

Dear Trine Student,

Welcome to the Trine University family! It is our mission to promote your intellectual and personal development through professionally focused and formative learning opportunities, preparing you to succeed, lead and serve. We have taught generations of successful learners and plan to do so for years to come. With an educational heritage spanning over 135 years, we will hold you to the same rigorous academic standards we have set for those who came before you.

Our expectations for academic excellence will serve you well, even before you graduate, as many of you will find jobs and internships with companies who know our reputation. After graduation you will find that having Trine University on your resume will carry immense clout with employers. More than 1,900 respected businesses, companies, and organizations around the world seek out our graduates because of the quality of a Trine education. Our job-placement numbers speak for themselves. We have consistently placed over 99 percent of our graduates in graduate school or found meaningful employment within six months of graduation. Our graduates also go on to pursue doctorates at schools such as Yale, Stanford, University of Michigan and Case Western, to name a few.

In the last decade we have experienced transformable changes. The changes will continue because of the vision of our administration, faculty, staff, trustees, community and – most importantly – **you**. We focus on your future. You are our most valuable asset and, quite frankly, the reason we're here.

Your professors will expect active participation, collaboration, theoretical study and creativity. Not only will you learn how to do, you'll also learn what to do. We are giving you the tools – quality teaching, labs, resources, technology, support – to be successful in your college career. It's up to you to use them. We believe in you and look forward to the day we receive word that you got your dream job or were accepted to graduate school.

That's why we're here – to help prepare you to succeed, lead and serve.

Please feel free to stop by my office anytime. My door is always open.

Pride in Who We Are. It's A Trine Thing.

Sincerely,

Earl D. Brooks II, Ph.D.  
President, Trine University

# Trine University Profile

## Disclaimer

The information contained in this catalog is subject to change. It is the responsibility of the student to ensure that information, particularly in regard to fees, is current. Up-to-date information is available through academic advisors or on the Trine University Web site at [trine.edu](http://trine.edu).

## Description

Trine University is a private, comprehensive, career-oriented, degree granting institution. It offers degrees from associate to the doctoral level through six schools—Allen School of Engineering and Computing, Franks School of Education, Jannen School of Arts and Sciences, Ketner School of Business, Rinker-Ross School of Health Sciences, College of Health Professions, and the College of Graduate and Professional Studies/TrineOnline (CGPS). The University is governed by a self-perpetuating Board of Trustees.

## Mission Statement

Trine University promotes intellectual and personal development through professionally focused and formative learning opportunities, preparing students to succeed, lead and serve.

## Vision

Trine University will be recognized as a premier university, characterized as engaged, dynamic, growing, and adding value.

-Adopted on May 7, 1999 and revised April 30, 2004, September 2006, and October 2010

## Corporate Status

Trine University is an educational corporation organized and existing under the laws of the state of Indiana. The correct corporate name of the institution is Trine University, Incorporated. The University was founded in 1884 as Tri-State Normal College. The governing body of the University is the Board of Trustees, which has an authorized membership of 27 trustees, each of whom serves without compensation and none of whom may be employed by the University in any administrative or teaching capacity. Two of the trustees are authorized to be elected by the alumni. Consistent with this form of organization and non-profit operation, Trine University has been granted exemption from federal income tax by the Commissioner of Internal Revenue, Treasury Department under Section 501 (c) (3) of the Internal Revenue Code. Contributions to the University are deductible to the extent provided by law; bequests, legacies, devises or transfers to the University are deductible in arriving at the value of the net estate of a decedent for estate tax purposes in the manner and to the extent provided by law; gifts of property are deductible in computing net gift for gift tax purposes in the manner and to the extent provided by the Internal Revenue Code.

## Accreditation

Trine University is regionally accredited by the **Higher Learning Commission**, [www.hlcommission.org](http://www.hlcommission.org). Telephone 312.263.0456. By Indiana law, Trine is an “approved postsecondary educational institution” under Indiana code 1C 21-7-13-6. Indiana Commission for Higher Education, [www.che.in.gov](http://www.che.in.gov). In accordance with the assumed practices of the Higher Learning Commission, the minimum program length for associate degrees is 60 semester credits. For bachelor’s degrees the minimum is 120 semester credits, and for master’s degrees it is 30 semester credits beyond the bachelor’s degree. Further, Trine University deigns the minimum program length for minors as 15 semester credit hours.

Trine University’s programs in biomedical engineering, chemical engineering, civil engineering, computer engineering, electrical engineering, and mechanical engineering (as delivered on the main campus) are accredited by the **Engineering Accreditation Commission of ABET**, [www.abet.org](http://www.abet.org). Other engineering programs are not accredited by ABET.

All teacher preparation programs are accredited by the **Council for the Accreditation of Educator Preparation (CAEP)** <http://caepnet.org> and the **Department of Education/Office for Education Development (DOE/OELD)** [www.doe.in.gov/licensing](http://www.doe.in.gov/licensing).

All BSBA degrees offered by the Ketner School of Business and the College of Graduate and Professional Studies are accredited by the **Accreditation Council for Business Schools and Programs (ACBSP)**, [www.acbsp.org](http://www.acbsp.org). Accredited majors include: accounting, applied management, business administration, finance, golf management, human resource management, management, marketing, and sport management. Associate degree programs in accounting and business administration are also accredited.

The **Doctor of Physical Therapy** Program at Trine University is accredited by the Commission on Accreditation in Physical Therapy Education (CAPTE), 1111 North Fairfax Street, Alexandria, Virginia 22314; telephone: 703-706-3245; email: [accreditation@apta.org](mailto:accreditation@apta.org); website: [www.capteonline.org](http://www.capteonline.org).

The ARC-PA has granted Accreditation-Provisional status to the Trine University **Physician Assistant Program** sponsored by Trine University. Accreditation-Provisional is an accreditation status granted when the plans and resource allocation, if fully implemented as planned, of a proposed program that has not yet enrolled students appear to demonstrate the program's ability to meet the ARC-PA Standards or when a program holding Accreditation-Provisional status appears to demonstrate continued progress in complying with the Standards as it prepares for the graduation of the first class (cohort) of students. Accreditation-Provisional does not ensure any subsequent accreditation status. It is limited to no more than five years from matriculation of the first class.

The (baccalaureate degree in nursing/master's degree in nursing/Doctor of Nursing Practice and/or post-graduate APRN certificate program) at (institution) is pursuing initial accreditation by the Commission on Collegiate Nursing Education ([www.ccneaccreditation.org](http://www.ccneaccreditation.org)). Applying for accreditation does not guarantee that accreditation will be granted.

## Title IX Notice of Non-Discrimination

Trine University does not discriminate on the basis of race, color, national or ethnic origin, sex, disability, veteran status or age in the administration of any of its educational programs, admissions policies, scholarship and loan programs, athletic and other school-administered programs, or in employment. The University is required by Title IX not to discriminate in such a manner. The University has designated Jamie Norton as its Title IX coordinator, and as the person to whom questions regarding Title IX and the nondiscrimination policies should be directed. Questions regarding Title IX may also be referred to the Department of Education Office of Civil Rights. Ms. Norton may be contacted as follows:

Jamie Norton  
Assistant Vice President for Human Resources  
Trine University  
Shambaugh Hall, Room 322  
One University Avenue  
Angola, Indiana 46703  
260.665.4847  
[nortonj@trine.edu](mailto:nortonj@trine.edu)

The University has also designated the following persons as deputy Title IX coordinators to whom questions or complaints may be directed:

Francisco Ortiz  
Dean of Students  
Trine University  
University Center, Room 207  
One University Avenue  
Angola, Indiana 46703  
260.665.4171 (Direct)  
[ortizf@trine.edu](mailto:ortizf@trine.edu)

Jacqueline Delagrange  
Chair, Department of Criminal Justice  
Trine University  
Best Hall, Room 1151  
One University Avenue  
Angola, Indiana 46703  
260.665.4187 (Direct)  
delagrangej@trine.edu

Stephanie George  
Assistant Director of Human Resources  
Trine University  
Shambaugh Hall, Room 322  
One University Avenue  
Angola, Indiana 46703  
260.665.4991  
georges@trine.edu

In addition, the University has designated Abby Salge as its section 504 coordinator. Ms. Salge is available to respond to inquiries regarding the University's responsibilities under section 504 of the Rehabilitation Act of 1973, and may be contacted as follows:

Abby Salge  
Director of Learning Assistance  
Trine University  
University Center, Room 227  
One University Avenue  
Angola, Indiana 46703  
260.665.4590  
salgea@trine.edu

### **Accessibility Statement**

All students learn differently, and it is our goal at Trine to assist students in achieving success. If a student plans to request academic accommodations, please see additional information found here: <https://www.trine.edu/academics/success/disability-accommodations.aspx>

### **Americans with Disabilities Act (ADA) Compliance**

It is the policy of Trine University not to discriminate against qualified individuals with disabilities and to provide reasonable accommodations, as required by law, to students who may be affected by the policies set forth above. If a student believes that he or she is a qualified individual with a disability who may need a reasonable accommodation, please see additional information found here: <https://www.trine.edu/academics/success/disability-accommodations.aspx>

### **Financial Information**

Selected financial data are available from the institution's annual report. That report may be obtained from the office of the President or of the Vice President for Finance.

### **Campus Security**

A copy of the annual campus security report is available by September 1 of each year at trine.edu. It contains statistics, policies, and a description of programs that promote campus safety as well as drug prevention program information.

## Locations

### Main Campus

Founded in 1884 as Tri-State Normal College, Trine University main campus sits on 450 acres in the heart of Steuben County and offers traditional face-to-face undergraduate courses. Five academic schools comprise over 35 majors and 40 minors, including accredited CAEP education and ABET engineering programs.

Trine University  
One University Avenue  
Angola, IN 46703  
trine.edu

### The College of Graduate and Professional Studies (CGPS)

CGPS is designed to provide quality, continuous higher education learning opportunities for adults who want to advance in their careers and keep pace with the growing complexities of today's career environment.

The College of Graduate and Professional Studies serves multiple student populations:

- Domestic, non-traditional students
- International students in graduate programs
- Students at overseas global partnerships locations.

In order to meet the needs of domestic non-traditional students, classes have moved almost entirely to an online format. These students are part of CGPS's TrineOnline initiative. International graduate students holding an F1 visa, are also part of CGPS but must meet on-site residency requirements. Global partnerships locations also offer primarily face-to-face classes.

Detroit Regional Office  
1000 Republic, Suite 520  
Allen Park, MI 48101  
online@trine.edu

Fort Wayne Regional Office  
9910 DuPont Circle Drive East, Suite 130  
Fort Wayne, IN 46825  
online@trine.edu

Phoenix Regional Office  
Maricopa County Medical Society Building  
326 Coronado Rd, Suite 108  
Phoenix, AZ 85004  
623-223-7173

TrineOnline  
online@trine.edu  
877-701-3343

### The College of Health Professions

The College of Health Professions is located in Fort Wayne, Indiana. The Parkview Hospital Randallia Campus site provides state-of-the-art laboratories and classroom technologies as well as partnerships with Lutheran and Parkview Health systems. The Fort Wayne Regional Office also houses seated classes for the College of Health Professions programs.



College of Health Professions  
1818/1819 Carew St.  
Ft. Wayne, IN  
260-203-2914  
[trinefortwayneadmissions@trine.edu](mailto:trinefortwayneadmissions@trine.edu)

Fort Wayne Regional Office  
9910 DuPont Circle Drive East, Suite 130  
Fort Wayne, IN 46825

# Admission

Trine University admits applicants on the basis of scholastic achievement and academic potential; selection is made without regard to race, religion, color, gender, sexual orientation, or age. Admission into Trine University is not an entitlement; attendance at Trine University is a privilege. Prospective students are encouraged to visit main campus. An admission counselor will make arrangements for a visitor to meet faculty, students, coaches, and financial aid personnel. Prospective students may visit classes and have a guided tour of campus facilities. Students who wish to arrange a campus visit should call or e-mail the Trine University Office of Admission at 260.665.4100, [admit@trine.edu](mailto:admit@trine.edu).

Trine University accepts an online application only. It can be accessed via the Internet at [trine.edu](http://trine.edu). No application fee is required.

## Undergraduate

### Application Procedures and Requirements

In addition to a completed application form, applicants must provide the following items:

- Evidence of graduation from school or an acceptable score on the General Education Development (GED) examination or High School Equivalency (HSE).
- Official high school transcripts must be sent from the originating high schools or official documentation from GED or HSE provided directly to the Office of Admissions or admission counselor of the education center they plan to attend.
- Transfer students must submit official transcripts from all post-secondary schools they attended. Official transcripts must be sent directly to the Office of Admission or the admission counselor of the education center they plan to attend.

Results from the American College Aptitude Test (ACT) or the Scholastic Aptitude Test (SAT) are optional and not required if the applicant has been out of high school for five years or more.

### Recommended High School Preparation

All prospective students should have satisfactorily completed a minimum of the following high school courses: four years of English and three years each of science, social studies, and mathematics.

### Stem Focused Applicants

All prospective STEM majors are advised to have completed two years of algebra, one year of geometry, and a semester of trigonometry. Prospective engineering majors in addition should have completed one year each of chemistry and physics.

### Math and English Placement

Faculty advisors recommend beginning mathematics and English courses based upon a student's SAT and/or ACT exam results and high school GPA.

### Surgical Technology and RN-BSN

Please see the link for admission information on following programs: Surgical Technology and RN-BSN.

## Graduate

### Admission Requirements

1. **Degree and GPA Requirements.** Except for the Dual Undergraduate/Graduate program applicants (See Student Classifications below), students seeking to enroll in graduate studies must have:
  - a. A 3.0 GPA *and*,
  - b. A bachelor's degree from an approved institutionally-accredited university in an appropriate academic field, *or*
  - c. a bachelor's degree from an approved institutionally-accredited university in a related field and significant major-specific professional experience, *or*
  - d. A bachelor's degree from a non-approved institutionally-accredited university in an appropriate or related field and a combined GRE verbal/quantitative score of 300. (A GMAT score of 570 or higher may substitute for the GRE at the discretion of the Department Chair, Program Director, or Dean.) The scores must not be more than five years old from July 1 of the application year. An *official copy* must be sent to the Graduate School directly from Educational Testing Service. Note: GRE scores are considered alongside several other factors during the application review process. Admission will not be exclusively decided based on the student's GRE score.
  
2. **International Students.**
  - a. Applicants whose native language is not English must provide evidence of one of the following: a 79 on the internet-based Test of English as a Foreign Language (TOEFL), an overall 6.5 on the International English Language Testing System (IELTS), a PTE score of 25 or a Duolingo score of 95.
  - b. Applicants must also have earned at least a 3.0 GPA. If their undergraduate coursework was not completed at an American institution, their transcripts will need to meet internationally accepted standards or be reviewed by professional credential evaluators.
  - c. Some graduate programs may have additional admission requirements.
  - d. Please note that additional non-academic documents such as a passport are required. Complete information can be found on the international admission requirements page.
  
3. **Application Requirements.** Prospective graduate students are required to submit the following documents as part of their application package:
  - a. Completed graduate application
  - b. Official academic transcripts from each previous undergraduate and graduate institution attended (except Trine University). Transcripts from prospective students will be evaluated by the Program Chair/Director in consultation with the school Dean to determine if additional undergraduate coursework is required to adequately prepare for the rigors of graduate coursework.
  - c. Personal narrative that explains the student's interest in pursuing a graduate level education.
  - d. The applicant's resume or vita indicating positions held that demonstrate task commitment, knowledge and skill relevant to the applicable course of study.

*Note: Additional program-specific admission requirements may exist. Some graduate programs may have additional admission requirements. Please refer to admission requirements for the specific program. Admittance to any graduate program is valid for one year from the time of admission to enrollment.*

- Please see the link for admission information for the following graduate programs:

- Doctor of Physical Therapy
- Master of Physician Assistant Studies
- Master of Science in Nursing
- Master of Science in Speech-Language Pathology
- Master of Education in Early Childhood Montessori Education

4. **Conditional Admission.** In order to be considered as a candidate for conditional graduate admission, students who have not earned a cumulative GPA of 3.0 in an undergraduate degree program must submit the following materials to the Program Chair/Director in addition to required application materials:

a. Applicants will be asked to describe the challenges or extenuating circumstances that led to the student earning less than 3.0 GPA in undergraduate work in their personal narrative. Students must include a description of specific strategies they will use to ensure academic progress within their graduate degree program.

b. Upon receipt of all the materials, the conditional application will be reviewed by the Department Chair/Program Director and a recommendation will be made to the appropriate Dean for conditional admission. A student admitted conditionally will become a graduate student in good standing upon completion of four graduate level courses maintaining a B or better grade in each course. Conditional graduate students not garnering a grade of B or better in each of their first four courses will be dismissed.

### **Shared Progress**

The institution's policy and practice assure that at least 50% of courses applied to a graduate program are courses designed for graduate work, rather than undergraduate courses credited toward a graduate degree. Trine University allows well prepared advanced students to substitute its graduate courses for required or elective courses in an undergraduate degree program and then subsequently count those same courses, with a "B" or better earned, as filling graduate requirements in a related graduate program. For the DPT and the PA programs the first three years GPA will be for the undergraduate course, the final three years will be on the graduate degree.

### **Payment of Educational Costs**

Payment of tuition and fees is due at the Business Office on the date indicated on the student's bill. Any student with outstanding financial obligations to the University will not be permitted to register for any subsequent semester or receive a transcript or diploma until the obligation is fulfilled. Students maintaining a balance owed to the University will be assessed late fees and will be responsible for collection and/or attorney costs if such efforts should become necessary.

## **Dual Undergraduate/Graduate Student Classification**

These programs offer the opportunity for undergraduate students to begin work towards a graduate degree.

- **College of Health Professions 3 + 3 Degree Paths**

Trine University offers a direct admit six year plan of study to qualified students. Dual undergraduate/graduate enrollment status is granted to those student who have completed the first 3 years of the 3+3 Doctor of Physical Therapy degree program or the 3+2.5 Master of Physician Assistant degree program. These students will be graduate candidates in year four. Students who do not meet this standard will not be given graduate status. Students will be awarded each degree upon completion of its respective degree requirements. All institutional scholarships for undergraduate programs will not be available during years four, five, and six when they are considered a graduate student. Students are encouraged to investigate alternative funding opportunities to complete graduate school during these last years.

### **Doctorate of Physical Therapy (DPT) Direct Entry Admission**

### **Master of Physician Assistant (PA) Direct Entry Admission**

- **4+1 Integrated Undergraduate/Graduate**

The 4+1 undergraduate/graduate enrollment status is granted to those who concurrently seek a bachelor's and master's degree from the Allen School of Engineering and Computing, Ketner School of Business, or Jannen School of Arts & Sciences. These students will be changed to graduate status after earning their required undergrad credit hours, at which time they must have a cumulative grade point average of at least 3.0. Students who do not meet this standard will not be given graduate status and will be awarded the bachelor's degree when the bachelor's degree requirements are met. Students will be awarded each degree (BS and MS) upon completion of its respective degree requirements.

The following bachelor degrees are available to start on the 4 + 1 degree path: Accounting, Biomedical Engineering, Chemical Engineering, Civil Engineering, Criminal Justice, Communication, Electrical Engineering, Golf Management, Management, Marketing, Mechanical Engineering, or Sport Management.

All institutional scholarships for undergraduate programs will not be available once the student is considered a graduate student. Students are encouraged to investigate alternative funding opportunities to complete graduate school.

- **Graduate**

### **Special Graduate Student**

Special Graduate Student status maybe granted to those students who wish to (1) audit a course, (2) seek certification in specialized areas, or (3) enroll in certain courses but do not plan to pursue a graduate degree program.

For degree-seeking students who audit courses, a fee of ½ the normal rate is charged per credit hour. For special graduate students who are non-degree seeking, full tuition will be charged.

### **Dual Concentration Master's Degree Students**

Students are permitted, but not required, to enroll in multiple concentrations while completing their master's program. If the student seeks to complete a second concentration as a continuation of his or her master's program, and does not choose to receive his or her degree prior to continuing with the second concentration, the student still must receive a 3.0 GPA or higher to graduate from the program. If the student's GPA falls below a 3.0 while the student is completing the second concentration, the student will not receive his or her degree, even if the student had the requisite GPA at the end of completing the first concentration.

Students are also advised to check with the financial aid department prior to pursuing a second concentration to ensure the student understands any impact a second concentration may have on financial aid.

## **Transfer Student Admission**

A transfer student follows Trine University's general application admission procedures, however results from the American College Aptitude Test (ACT) or the Scholastic Aptitude Test (SAT) are not required. Students are eligible for admission from regionally accredited institutions of higher learning, and those approved by the University. Trine University encourages applications from community college graduates. Trine University offers transfer scholarships to qualified full-time, main campus applicants. Trine University offers a number of "two-plus-two" degree program options. Graduates of two-year programs in applied science should anticipate a minimum of six semesters to complete a bachelor's degree in engineering.

Transfer students applying to the Allen School of Engineering and Computing must have a minimum cumulative grade point average of 2.5 and a grade of "C" or better in Calculus I, Chemistry I, and College Composition.

Transfer students applying to the Franks School of Education must have a minimum cumulative grade point average of 3.0 and a grade of "C" or better in a mathematics course, a social sciences or humanities course, and English Composition 1.

Transfer students applying to the Rinker Ross School of Health Sciences must have a minimum cumulative grade point average of 2.5 and a grade of "C" or better in a mathematics course, a social sciences or humanities course, and English Composition 1.

Transfer students applying to the Ketner School of Business and the Jannen School of Arts and Sciences must have a minimum

cumulative grade point average of 2.25 and a grade of “C” or better in a mathematics course, a social sciences or humanities course, and English Composition 1.

Transfer students applying to the College of Graduate and Professional Studies/TrineOnline must have a minimum cumulative grade point average of 2.5. Students cannot be on academic probation from the previous institution(s).

For more information contact your admissions representative.

## International Student Admission

International students who wish to study full-time on the main campus may apply for admission as freshmen or as transfer students. The application deadline for fall admission is June 1 and for spring admission November 1. By following these deadlines, the prospective student will have ample time for long distance correspondence, obtaining a US visa, and making travel arrangements. An international applicant to Trine University is required to submit the following materials:

### Application Form

A completed Trine University International online application must be submitted to the Office of Admission. Prospective students may apply online at trine.edu. (No application fee required.)

### Financial Guarantee

US Department of Homeland Security regulations require that students demonstrate their ability to finance the first year of education before receiving the I-20 AB form. A financial guarantee (bank statement) must be submitted before the I-20 AB form is issued.

### Academic Records

The student must send complete, official academic records, in English, to: Trine University Office of Admission, and should include courses taken, grades received and degrees or certificates earned. An explanation of the coding system used to evaluate the student’s work should accompany the records. Transfer students should have official transcripts sent from each institution of higher education attended, in English, as described above. Course descriptions and/or syllabi from those institutions must also be included. If the transfer student is presently residing in the United States, a photocopy of the current I-20 must be enclosed.

### Test Scores

Applicants whose native language is not English must provide evidence of one of the following: a 79 on the internet-based Test of English as a Foreign Language (TOEFL), an overall 6.5 on the International English Language Testing System (IELTS), a PTE score of 58 or a Duolingo score of 95.

Awarding of transfer credit is contingent upon demonstration of knowledge on placement examinations to be given upon arrival on campus.

## Readmission

### Readmit

Students who have attended Trine University but withdrew for more than one semester (not including summer) must go through the readmission process. *Available for associate, bachelor's or master's programs.*

- Submit a Readmission application.
- Submit official transcripts from any institutions attended after Trine University's last date attended.
- The readmit committee will determine the outcome of the readmit request.

### **Dismissed Student Readmit**

If you were dismissed for academic or other disciplinary reasons, you must submit a Dismissed Student Readmission application along with a statement of explanation 3-4 paragraphs in length explaining why you were/are not meeting academic standards. It should also outline a plan for future success. The readmit committee will determine the outcome of the readmit request.

### **Re-Entry**

Students who have attended Trine University but withdrew for only one semester (not including summer) should contact their respective campus for re-entry.

## **Dual Enrollment Program for High School Students**

Trine University provides an opportunity for high school students to earn dual credit (college and high school credit simultaneously). Courses are offered in the following ways: on Trine University campuses and online (blended with Trine University students), and on the campuses of participating high schools (strictly for high school students through the concurrent enrollment program).

To qualify for Dual Enrollment, students must meet the following requirements: submit an official Dual Enrollment application and a current high school transcript, be in good academic standing in high school (GPA of B or higher or by recommendation of the high school guidance counselor), successfully completed the sophomore year of high school, and be currently enrolled in a public, private, or home school.

Courses on campus and online are offered throughout the calendar year, and students may register for any courses in which they meet the prerequisites. Courses on high school campuses are offered during the school year, and high schools only offer specific courses. Tuition is set at a significantly reduced rate. Students taking courses on the campuses of Trine University or online must provide the books specified by the course syllabus; students enrolled in the concurrent enrollment program generally rent books through their regular high school book rental program (this is decided by the participating high school).

A high school student in the non-degree Dual Enrollment Program may earn up to 90 credit hours. If the student completes all academic course requirements to earn an associate degree, the student will be awarded an associate degree on the condition the student attends Trine University directly after high school graduation and successfully completes one semester as a full-time degree-seeking student

All Dual Enrollment students must sign enrollment forms which cover the policies and procedures related to Dual Enrollment participation. Dual Enrollment students are registered students with the university and must abide by policies stated in the Trine University Student Handbook.

Trine University Dual Enrollment is a member of the National Alliance of Concurrent Enrollment Partnerships (NACEP).

More information is available at [trine.edu](http://trine.edu) or by calling the Dual Enrollment office at 260.665.4819.

## **Non-Degree Students**

A person may apply as a non-degree student without showing evidence of a high school diploma or an acceptable score on the GED test. Non-degree students who later apply for degree status must meet the degree requirements of the program to which they seek admittance.

An applicant may be admitted to Trine University as a non-degree student in certain programs. The non-degree student is limited to a maximum of 30 semester credit hours attempted. To continue taking courses after 30 credit hours are earned, the non-degree student must apply for and be accepted to degree status. Students wishing to change from non-degree status to a degree program should apply for admission through the Office of Admission.

For information regarding Dual Enrollment as a high school student please reference Dual Enrollment Program for High School Students.

## Non-Degree Senior Citizens

Trine University offers free tuition for persons 60 years of age or older who reside in Steuben County to take undergraduate courses for credit and/or non-credit. Enrollment is granted on a space-availability basis.



# Transfer Credit

Credits earned at an approved institution where the work completed is of similar rigor and content to the course offerings available at Trine University, with grades of “C” or better, may be transferred to Trine University. An evaluation of transfer credit shall be made when the University receives an official transcript of the completed coursework. To facilitate the evaluation, the applicant should provide the Office of Admission with a catalog or guide which contains descriptions of the courses completed elsewhere.

**Evaluation Process** - Please note, not all accepted credits may count towards the specific degree requirements of the chosen major.

- **Main Campus** - In determining transfer credit for the main campus, the Director of Transfer Pathways and Evaluations evaluates all transfer credit. The Director then sends the accepted credit to the Department Chair who approves and returns it to the Director who forwards to the Registrar. The Registrar approves the credit and adds it to the records.
- **TOL** - In determining transfer credits for TOL, the Director of Transfer Pathways and Evaluations evaluates all transfer credit and sends it to the Dean of TOL for approval, the Dean then returns to the Director who forwards to the Registrar. The Registrar approves the credit and adds it to the records.
- **Graduate** - In determining transfer credits graduate programs, a graduate student must have successfully completed one (1) semester of course work at Trine before they can apply for a transfer credit evaluation with the Director of Graduate Programs. Once the Director has received their request he/she will evaluate the requested course(s) for transfer. The Director forwards the evaluation to the Registrar. The Registrar approves the credit and adds it to the records. The Doctorate of Physical Therapy, Master of Physician Assistant Studies, Master of Science in Nursing, and Master of Science in Speech-Language Pathology programs do not accept transfer credit.

## Academic Residency/Transfer Credit

- **Undergraduate** - Undergraduate students are eligible to transfer in up to 45 semester credits for an associate’s degree or up to 90 semester credits towards a bachelor’s degree which can include prior college coursework, experiential learning, college level examinations, or military coursework. Only course credits will transfer, not the grade, and, therefore, will not impact the student’s GPA. Thirty (30) of the last sixty (60) credits must be earned through Trine University. A student must be enrolled in at least one (1) Trine courses that last semester prior to graduation.
- **Graduate** - A maximum of 6 semester hours of graduate course credit **may** be counted toward completion of a graduate degree at Trine University with a grade of B or above and with the approval of the program Chair/Director and Dean. All other courses must be taken at Trine University. Transfer credit will not include a grade and, therefore, will not impact the student’s GPA. Courses used to satisfy the requirements of a bachelor’s degree cannot be applied to a master’s degree. The final 15 credit hours must be received within Trine University. This transfer credit policy does not apply to the Doctorate of Physical Therapy, Master of Physician Assistant Studies, Master of Science in Nursing, and Master of Science in Speech-Language Pathology programs.

## Credits by Examination - Standardized Testing

Students may earn credit through selected nationally recognized tests up to 30 credits including: College Level Examination Program (CLEP), Defense Activity of Non-Traditional Education Support (DANTES), certain other tests approved by American Council on Education and Trine University examinations by department.

## Credits from Prior Credit Bearing Coursework

Credits earned from an approved college/university and completed with a grade of "C" or better may be transferred.

## Credits from Military Coursework

Credit is awarded for coursework offered by the military as recommended by the American Council on Education in its Guide to the Evaluation of Educational Experiences in the Armed Services.

### University Credit by Exam

A student may earn credit by taking an examination for approved courses administered by the appropriate academic department. Students should contact the academic department to determine the availability of tests. A fee is associated. University Credit by Exam application forms are available in the Office of the Registrar.

There is no credit by examination in the Trine graduate programs.

## Awarding of Credit by Examination (AP, CLEP, IB, PLTW)

### Advanced Placement (AP) Examination

An applicant who achieves a score of 3, 4, or 5 on the College Entrance Examination Board's Advanced Placement (AP) Examination may be granted credit. Results of the examination should be sent to the Office of the Registrar.

AP COURSE/EXAM	SCORE	TRINE EQUIVALENT COURSE	CREDIT HOURS
<b>Arts</b>			
Art History	3, 4, 5	Humanities Elective	3
Music Theory	3, 4, 5	MUS 103	3
Studio Art 2-D Design	3, 4, 5	Humanities Elective	3
Studio Art 3-D Design	3, 4, 5	Humanities Elective	3
Studio Art Drawing	3, 4, 5	Humanities Elective	3
<b>English</b>			
English Language & Composition	3, 4, 5	ENG 143	3
English Literature & Composition	3, 4, 5	ENG 153	3
<b>History &amp; Social Sciences</b>			
Comparative Govern. & Politics	3, 4, 5	POLS 113	3
European History	3, 4, 5	HIS 203 and HIS 213	6
Human Geography	3, 4, 5	GEO 303	3
Macroeconomics	3, 4, 5	ECO 223	3
Microeconomics	3, 4, 5	ECO 213	3
Psychology	3, 4, 5	PSY 113	3
U.S. Government & Politics	3, 4, 5	POLS 113	3
United States History	3, 4, 5	HIS 103 and HIS 113	6
World History	3, 4, 5	HIS 203 and HIS 213	6
World History: Ancient	3, 4, 5	HIS 203	3
World History: Modern	3, 4, 5	HIS 213	3
<b>Math &amp; Computer Science</b>			
Calculus AB	3	MA 173	3
Calculus AB	4, 5	MA 134	4
Calculus BC	4, 5	MA 134 and MA 164	8
Calculus BC subscore	4, 5	MA 134	4
Computer Science Principles	3, 4, 5	CSIT 103	3
Computer Science A	3, 4, 5	CS 1113 or INF 143	3
Statistics	3, 4, 5	MA 253	3
<b>Sciences</b>			
Biology	3, 4, 5	BIO 114	4
Chemistry	3, 4	CH 104	4
Chemistry	5	CH 155H	5
Environmental Science	3, 4, 5	BIO 214	4
Physics 1	3, 4, 5	PH 154	4

Physics 2	3, 4, 5	PH 164	4
Physics C: Mechanics	3, 4, 5	PH 224	4
Physics C: Electricity & Magnetism	3, 4, 5	PH 234	4
<b>World Language &amp; Culture</b>			
Chinese Language & Culture	3, 4, 5	Humanities Elective	6
French Language & Culture	3, 4, 5	FRN 113 and FRN 123	6
German Language & Culture	3, 4, 5	GER 104 and GER 114	8
Italian Language & Culture	3, 4, 5	Humanities Elective	6
Latin	3, 4, 5	Humanities Elective	3
Spanish Language & Culture	3, 4, 5	SPN 113 and SPN 123	6
Spanish Literature & Culture	3, 4, 5	SPN 113 and Humanities Elective	6

*Transfer credit subject to Department approval*

## CLEP and Dantes Testing

Trine University awards credit based upon the College Level Examination Program's (CLEP) general and subject-matter examinations as well as all DANTES examinations. Trine University is not a testing site for either examination program.

Trine University accepts the American Council on Education's recommended passing score in effect at the time of the administration of the examination. Upon achieving a score considered passing by Trine University, CLEP or DANTES credit will be listed on the student's transcript for the number of semester hours recommended in the official CLEP or DANTES publications.

<b>CLEP EXAM</b>	<b>SCORE</b>	<b>TRINE EQUIVALENT COURSE</b>	<b>CREDIT HOURS</b>
<b>Business</b>			
Financial Accounting	50	AC 203	3
Information Systems	50	BA 113	3
Intro Business Law	50	LAW 203	3
Principles of Management	50	Electives	3
Principles of Marketing	50	MK 203	3
<b>Composition &amp; Literature</b>			
American Literature	50	ENG 2113	3
Analyzing & Interpreting Literature	50	ENG 153	3
College Composition	50	ENG 143	3
College Composition Modular	50	ENG 143	3
English Literature	50	ENG 2013	3
Humanities	50	Humanities Elective	3
<b>World Languages</b>			
French Language, Level 1	50	FRN 113	3
French Language, Level 2	59	FRN 113 and FRN 123	6
German Language, Level 1	50	GER 104	4
German Language, Level 2	60	GER 104 and GER 114	8
Spanish Language, Level 1	50	SPN 113	3
Spanish Language, Level 2	63	SPN 113 and SPN 123	6
<b>History &amp; Social Science</b>			
American Government	50	POLS 113	3
History of the United States I	50	HIS 103	3
History of the United States II	50	HIS 113	3
Human Growth & Development	50	Psychology Elective	3

Intro to Educational Psychology	50	Psychology Elective	3
Introductory Psychology	50	PSY 113	3
Introductory Sociology	50	SOC 103	3
Principles of Macroeconomics	50	ECO 223	3
Principles of Microeconomics	50	ECO 213	3
Social Sciences & History	50	Social Science Elective	6
Western Civilization I	50	HIS 203	3
Western Civilization II	50	HIS 213	3
<b>Science &amp; Mathematics</b>			
Biology	50	BIO 114	4
Calculus	50	MA 134	4
Chemistry	50	CH 104	4
College Algebra	50	MA 113	3
College Mathematics	50	Math Elective	3
Natural Sciences	50	Science Elective	3
Precalculus	50	MA 124	4

*Transfer credit subject to Department approval*

## International Baccalaureate

Transfer credit may be awarded for International Baccalaureate Higher Level courses with a score of 5 or higher. Results of the examination should be sent to the Office of the Registrar.

<b>IB HIGHER LEVEL COURSE</b>	<b>SCORE</b>	<b>TRINE EQUIVALENT COURSE</b>	<b>CREDIT HOURS</b>
<b>Arts</b>			
Dance HL	5, 6, 7	Elective	3
Film HL	5, 6, 7	FLM 203	3
Music HL	5, 6, 7	Humanities Elective	3
Theatre HL	5, 6, 7	THE 103	3
Visual Art HL	5, 6, 7	ART 253	3
<b>Language Acquisition</b>			
Classical Language HL	5, 6, 7	Humanities Elective	6
Language B HL	5, 6, 7	Humanities Elective	6
<b>Language and Literature</b>			
Language A: Literature HL	5, 6, 7	ENG 143	3
Language A: Language and Literature HL	5, 6, 7	ENG 143 and ENG 153	6
<b>Individuals and Societies</b>			
Business Management HL	5, 6, 7	BA 123	3
Economics HL	5, 6, 7	ECO 203 or ECO 213	3
Geography HL	5, 6, 7	GEO 213 or EAS 213	3
Global Politics HL	5, 6, 7	Social Science Elective	3
History HL	5, 6, 7	Social Science Elective	6
History Africa and Middle East	5, 6, 7	HIS 203 and HIS 213	6
History Americas HL	5, 6, 7	HIS 103 and HIS 113	6
History Asia and Oceania	5, 6, 7	HIS 203 and HIS 213	6
History Europe	5, 6, 7	HIS 203 and HIS 213	6

Information Technology in a Global Society HL	5, 6, 7	Elective	3
Philosophy	5, 6, 7	PHL 203	3
Psychology	5, 6, 7	PSY 113	3
Social and Cultural Anthropology HL	5, 6, 7	Social Science Elective	3
<b>Mathematics</b>			
Mathematics HL	5, 6, 7	MA 113	3
Mathematics (Further) HL	5, 6, 7	MA 134	4
<b>Sciences</b>			
Biology HL	5, 6, 7	BIO 114	4
Chemistry HL	5, 6, 7	CH 104	4
Computer Science HL	5, 6, 7	Electives	3
Design Technology HL	5, 6, 7	Electives	3
Physics HL	5, 6, 7	PH 104	4
Sports, Exercise & Health Science HL	5, 6, 7	Elective	3

*Transfer credit subject to Department approval*

## Project Lead the Way Tuition Scholarships – Main Campus

- Value: \$500 annually (\$250 per semester) and may be renewed for up to three years for a total value of \$2,000 over four years. This scholarship may be stacked on top of other Trine University merit-based awards, but not to exceed tuition
- Renewal Criteria: must continue to pursue a Trine University engineering or technology degree and make satisfactory progress towards completing the degree.
- Eligibility: must have completed a minimum of two PLTW high school courses with grade of “B” or better in each course and provide a transcript documenting these courses from a PLTW certified high school.

<b>Program</b>	<b>Maximum Possible Trine Transfer Credit<sup>1</sup></b>	<b>Remarks<sup>2</sup></b>
<b>Engineering</b>		
Biomedical Engineering	3	Need to take any 2 of the PLTW courses from the list below
Chemical Engineering	7	2 credit hours of free electives per each PLTW courses listed below
Civil Engineering	3	Need to take IED, POE, and at least one CEA, ES or EDD to earn 3 credits as Professional Development Elective
Computer Engineering	3	Need to take IED, POE, EDD and DE (or CIM) to earn 3 unrestricted elective credits
Computer Science & Information Technology	6	CSA will transfer as CS 1113 CSP will transfer as CSIT 163
Design Engineering Technology	15	IED will transfer in as ETD 103 POE will transfer in as ETD 203 DE will transfer in as ETD 273 Up to 6 additional credits may be granted as unrestricted elective credits

Electrical Engineering	3	Need to take IED, POE, EDD and DE (or CIM) to earn 3 unrestricted elective credits
Mechanical Engineering	6	IED, POE and/or AE will count as a maximum of 6 unrestricted elective credits
Mechatronics & Robotics Engineering	6	IED, POE and/or AE will count as a maximum of 6 unrestricted elective credits
Software Engineering	3	Need to take IED, POE, EDD, and DE (or CIM) to earn 3 unrestricted elective credits
<b>Biomedical Sciences</b>		
Biology	8	2 credit hours of electives per PLTW course below
Chemistry	8	2 credit hours of electives per PLTW course below
Biochemistry	8	2 credit hours of electives per PLTW course below
Forensic Science	8	2 credit hours of electives per PLTW course below
Exercise Science	8	2 credit hours of electives per PLTW course below
<b><i>Transfer credit subject to Department approval</i></b>		

### Notes

<sup>1</sup> These are the maximum possible unrestricted electives in each major.

<sup>2</sup> Students must earn a “B” or better to earn credit.

### PLTW Engineering Courses

AE = Aerospace Engineering

CEA = Civil Engineering and Architecture

CIM = Computer Integrated Manufacturing

CSA = Computer Science A

CSP = Computer Science Principles

DD = Engineering Design and Development

DE = Digital Electronics

IED = Intro to Engineering Design

ES = Environmental Sustainability

POE = Principles of Engineering

### PLTW Biomedical Science Courses

BI = Biomedical Innovation

HBS = Human Body Systems

MI = Medical Interventions

PBS = Principles of Biomedical Science

## University Credit by Exam

A student may earn credit by taking an examination for approved courses administered by the appropriate academic department. Students should contact the academic department to determine the availability of tests. A fee is assessed. And application forms are available in the Office of the Registrar.

## Experiential Learning Policy (ELP)

Trine University recognizes that knowledge gained outside of a classroom may be relevant to your academic degree program.

Learning experiences gained through employment, non-collegiate, school-based education or other appropriate channels may be evaluated for course or elective credit.

To be **considered** for experiential learning, your prior experience must relate specifically to a course at Trine University through course competency evidence with mapping of course learning outcomes or free electives in your program.

An experiential learning portfolio is required as evidence that verifies mastery of course learning outcomes through documentation. If your experiential learning portfolio demonstrates that your prior experience(s) meets all course learning outcomes, your experiential learning will allow you to earn full credit for the course or elective.

Please note, some programs with special accreditation will limit or exclude credit for experiential learning.

### **What is required in the experiential learning portfolio?**

1. Experiential Learning Student Form (found in myPortal)
2. Resume: A professional resume documenting the student's professional career
3. Autobiography
4. Course competency evidence with mapping of course learning outcomes
5. Documentation that supports and provides evidence of course learning outcome mastery, examples of documents are listed below.

Documents that can aid in awarding experiential learning credits:

1. HR documentation: Human Resource performance information such as job descriptions and performance evaluations, if available. A job description provided by Human Resources does NOT substitute for the required information. Performance evaluations will be copies of the originals kept by the employer and must show signatures to be considered as proof of performance.
2. Letters from current and past employers verifying job responsibilities.
3. Copies of articles, special awards and letters of recommendation.
4. Samples of writing and/or computer skills including letters, brochures and programs.
5. Photocopies of licenses and certificates of completion for non-credit work.

### **Experiential Learning Portfolio Evaluation**

Experiential Learning Portfolios are reviewed by the Registrar and the school Dean. Review of the portfolio can take up to 30 days before a decision is provided to the student.

Students may only transfer up to 15 semester credits for an associate's degree, up to 30 semester credits towards a bachelor's degree, and 0 credits towards master's degree from an experiential learning portfolio. Most general education coursework cannot be awarded transfer credit from an experiential learning portfolio.

# Tuition and Fees

## Payment of Education Costs

For updated payment of costs please go to [trine.edu/costs](http://trine.edu/costs).

Payment of tuition, fees, and room and board is due at the Business Office on the date indicated on the student's bill. Any financial aid awarded will be deducted from the student's charges each semester. Each student is responsible for purchasing books using funds from personal and/or financial aid sources. Any student with outstanding financial obligations to the University will not be permitted to register for any subsequent semester, or receive a transcript or diploma until the obligation is fulfilled. Students maintaining a balance owed to the University will be assessed late fees and will be responsible for collection and/or attorney costs if such efforts should become necessary.

\*Please see specific program for additional fees.

### Flat Rate Tuition

A flat rate tuition charge is assessed to each main campus student registered for the full-time load of 12–18 credit hours per semester. Individual credit hour charges are applied to overloads and loads less than full-time.

### Auditing Fee

A fee is charged per credit hour for auditing courses. To learn the amount of this fee, call the Business Office.

### Course Fees

Additional fees may be incurred for online courses and other specialized courses.

### Engineering and Science Fee

A fee is charged for all engineering and science majors.

### Enrollment Deposit

All admitted domestic applicants must confirm their intention to enroll by paying a \$300 Enrollment Deposit. A portion of the fee (\$150) will be used as a housing deposit. Enrollment deposits are fully refundable before May 1. Request for an extension must be made in writing.

### Discounted Tuition

Discounted tuition may be available to students who have graduated from specific colleges that have prearranged agreements with Trine University. Certain criteria apply to receiving and continuing to receive the discount to these eligible students.

An eligible student must meet the qualifying criteria:

- Graduated from an approved college with an associate's degree and cumulative grade point average of 3.0 or better.
- Maintain a 3.0 while at Trine University
- Complete 30 hours at Trine University and fulfill all program requirements
- May be a full or part-time student
- Please note: To qualify for graduation honors a student must complete 40 hours at Trine University.

The discount may be used for a second bachelor's degree if all other requirements are met. The discount may not be applied to



Trine University's graduate programs.

### **International Fee**

All entering international students are assessed a one-time non-refundable fee upon enrollment for an orientation program and specialized programs and services. A portion of the fee will be used as a housing deposit. For additional fees related to international students please see International Admissions.

### **Student Fee**

A fee is charged for all full-time students.

### **Monthly Payment Plan**

A monthly payment plan service is available through a national organization specializing in education financing. Parents desiring information concerning the monthly payment plan may request a pamphlet from the business office, or at [trine.edu](http://trine.edu).

## **Other Costs**

### **Books and Supplies**

Book and supply expenses vary depending on the number of courses taken and the major and are the personal obligation of each student.

Book and supply expenses vary depending on the number of courses taken and the major, and are the personal obligation of each student. Students can order books from the Trine University bookstore through the online order process by clicking on "Bookstore" at the bottom of the Web page at [trine.edu](http://trine.edu). Students may also visit the bookstore in person or call the bookstore at 260.665.4153.

### **College of Graduate and Professional Studies Laptop Computer/Tablet Requirement**

All students enrolled in CGPS are required to have or purchase a laptop computer or tablet that meets the CGPS minimum specifications before attending their first class.

All students are required to sign a "Laptop/Tablet Policy - Statement of Understanding" and a copy is maintained in the student's file. The statement of understanding informs students of the requirement to have or purchase a laptop computer or a tablet and convey for use to all classes.

To assist students, all locations have available wireless internet access.

### **Miscellaneous Fees**

A student is responsible for any additional fees such as fines, parking tickets, and equipment breakage.

### **Main Campus Room and Board**

A 19-meal per week plan or a 10-meal per week plan is required for all students residing in the units or apartments. Villa students and commuter students have the option of a 50-meal per semester plan; however they may also opt into the other plans. When the University is in session, three meals are available daily Monday through Friday. Brunch and evening meals are available Saturdays and Sundays.

### **Personal Expenses**

Expenditures for personal items such as travel, membership fees and similar expenses should be included when prospective students are estimating total costs of their university experience.

### **Personal Insurance**

Trine University is not responsible for the damage and/or loss of a student's personal property of any type. This includes, but is not limited to, personal electronic devices, printers, stereo equipment, microwaves, refrigerators, etc. All damage or loss incurred to a student's personal property is solely the responsibility of the student. The causes of this damage can be, but are not limited to, theft, power outages, power surges, etc. It is recommended that all students verify that their personal property is covered by personal insurance. If this is not the case, it is recommended that students acquire renter's insurance, which can be obtained through parents' homeowners insurance company and/or agent.

## Refunds

### Main Campus

Refunds of tuition and room and board follow the schedule below. The international fee and enrollment fee are not refundable.

#### Tuition Fall and Spring Semester

- Week One—100%
- Weeks Two & Three—50%
- Week Four—0%

#### Tuition Summer Semester

- Week One—100%
- Week Two—0%

#### Room and Board

- Week One—Prorated at \$50/day
- Weeks Two & Three—50%
- Week Four—0%

In the rare case an "exception" to the refund policy is granted, a \$50 administration fee may be assessed.

Please note: If a student receiving financial aid withdraws during the semester, that aid is subject to the federal refund calculation.

Any student who is dismissed or suspended for misconduct shall not be entitled to any refund. No refund is provided at any time on fees, books and supplies, or personal expenses.

### College of Graduate and Professional Studies

Refunds of credit balances due to excess financial aid or overpayment will be refunded after the drop/add period. A student withdrawing from a course may be eligible for a full or partial refund of tuition, depending on when the official withdrawal takes place.

A student is not officially withdrawn until the necessary withdrawal forms, complete with the required signatures, is filed with the Office of the Registrar. Nothing other than an official withdrawal permits refunds. Refunds follow the schedule below.

#### Tuition Adjustment

- Week One—100%
- Week Two—0%

In the rare case an “exception” to the refund policy is granted, a \$50 administration fee may be assessed.

Please note: If a student receiving financial aid withdraws during the semester, that aid is subject to the federal refund calculation.

Refunds are processed through the Business Office approximately one month after a student officially withdraws and all charges/credits are posted.

Any student who is dismissed or suspended for misconduct shall not be entitled to any refund. No refund is provided at any time on fees, books and supplies, or personal expenses.

For students at the Arizona location - Three-Day Cancellation: An applicant who provides written notice of cancellation within three days (excluding Saturday, Sunday and federal and state holidays) of signing an enrollment agreement is entitled to a refund of all monies paid. No later than 30 days of receiving the notice of cancellation, the school shall provide the 100% refund.

## Withdrawal

If a student decides to drop or withdraw after registering for classes:

- The student is responsible for completing the proper paperwork and filing it with the Office of the Registrar or the Educational Center Director. By failing to do so, the student accepts financial responsibility for all charges incurred on their account.
- The student may be eligible for a full or partial refund of tuition and room and board, depending on when the official withdrawal takes place.
- It may result in a change in the total amount due for the semester.
- It may result in a loss of financial aid from a federal, state or institutional source.
- Failure to attend classes does not constitute a drop/withdrawal.

## Teach Out Plan (Closing an Education Center)

In the case of closing an education center, Trine University is committed to providing students with a Teach Out Plan that is congruent with the expectations of the Higher Learning Commission.

# Financial Aid

## Purpose

The mission of the Trine University Financial Aid Office is service-oriented and geared to providing access, choice, and education for interested students. To accomplish its mission, Trine University offers a variety of financial counseling and planning programs for students with economic need.

The Office of Financial Aid provides assistance to students and their families to make a college career at Trine University affordable. It is important to reward students for exceptional academic accomplishments. To provide such assistance allows students to attend who might not otherwise have the opportunity.

Most scholarships are merit-based. They are based on academic achievement. However, other grants and loans are awarded based upon financial need as determined by the federal and state governments after completion of the Free Application for Federal Student Aid (FAFSA).

The Office of Financial Aid provides a convenient location and several options of access for students and/or their families. The office offers walk-in counseling, telephone counseling, and can be contacted via email.

The Office of Financial Aid is located in Forman Hall, and has a street address of Office of Financial Aid, One University Avenue, Angola, Indiana, 46703.

Normal hours of operation are Monday through Friday, 8 a.m. to 5 p.m. The Office of Financial Aid can be reached by phone at 1.800.347.4878, option 2, by email at [finaid@trine.edu](mailto:finaid@trine.edu), and accepts faxed documents at 260.665.4511.

Provided here is an overview of Financial Aid policies. For detailed information please see the Student Handbook, MyTrineFA site and/or the financial aid section of the Trine website for additional information or contact the Financial Aid Office toll free at 800.347.4878, option 2.

## Application Procedures

All students applying for financial aid must complete the Trine University Online Application for Admission to be accepted into a degree-seeking program and complete a Free Application for Federal Student Aid (FAFSA) at [www.fafsa.gov](http://www.fafsa.gov) with school code 001839.

The FAFSA for new applicants or returning applicants is the primary application for assistance. This can be filed on line at [www.fafsa.gov](http://www.fafsa.gov). It is used to determine eligibility for all Federal Title IV aid programs, such as Federal Pell Grant, Supplemental Educational Opportunity Grant, Federal Work Study Program, and Federal Direct Education Loan Programs. It is also the application for undergraduate Indiana residents to apply for tuition assistance programs from the State of Indiana.

The Trine University priority application filing deadline is March 1 of each academic year for fall/spring/summer enrollment; however, aid is awarded throughout the school year. Current students need only complete the FAFSA once each academic year before March 1 to reapply for all aid. The Trine University FAFSA filing priority deadline is March 1 to be eligible for all types of institutional aid.

The U.S. Department of Education's Central Processing System (CPS) reviews and analyzes the information provided on the FAFSA. The CPS uses this information to calculate an Expected Family Contribution (EFC). The EFC is the index of the family's financial strength and not necessarily the amount a family will have to pay towards college. Once Trine University receives this information, it will be used to create an electronic award notification.

## Satisfactory Academic Progress General Information

Trine is required to establish satisfactory academic progress standards (SAP) for its federal, institutional and state financial aid recipients in accordance with the US Department of Education regulations. These standards will ensure that only those

recipients who demonstrate satisfactory progress towards the completion of their educational programs (degrees) can continue to receive financial aid from all sources.

There are three areas that are evaluated after the end of each academic term; number of credit hours passed, cumulative grade point average (GPA) and maximum time frame for degree completion. For more information regarding the SAP policy access the FA Policies page on the Trine University website. A student must carry at least a 2.0 cumulative GPA to be eligible for financial aid.

## Loan Eligibility

A student may qualify for a federal direct loan. Eligibility is determined by the results of the FAFSA and the total number of hours enrolled each term. Maximum eligibility is determined based on a student's class year. Once a student accepts the loan there are three documents required in order to secure the funds to be disbursed: Master Promissory Note, Entrance Counseling and Financial Aid Awareness Counseling. A student must be enrolled in at least six credit hours to qualify for Federal Student Loans.

## Awarding Process

Each year Trine University awards over \$20 million of institutional funds in the form of scholarships and grants.

Awards are processed by the Office of Financial Aid in accordance with University policy and the regulations governing the various aid programs. The University policy is established at an institutional level, and the Office of Financial Aid is responsible for determining financial aid eligibility based on the results the Department of Education submits to Trine University after a FAFSA is processed. An award notification detailing the type and amount of each award is posted on line at MyTrineFA. Students are notified once the FAFSA is received.

Assistance awarded by Trine University may only be used for the costs of tuition, fees and room and board in University owned facilities during the academic year that it is issued.

Additional descriptions of aid programs and satisfactory academic progress standards are included in the Trine University Student Handbook and on the University website.

### **Main Campus Undergraduate Scholarships**

Trine University offers an extensive list of awards for prospective students. If you need additional information about awards offered, please contact your Admission Counselor or call the Office of Admission at 260.665.4100.

\*Please note, students enrolled in 3+3, 3+2, or some 3+1 programs are considered undergraduates in years one, two, and three. The fourth, fifth, and sixth year they are considered a graduate student. All institutional awards for undergraduate programs will not be available during years four, five, and six or when you are considered a graduate student.

### **Merit-Based Scholarships**

Merit-based scholarships are institutional awards available to full-time, main campus degree seeking students who have demonstrated outstanding academic achievement. Unless otherwise specified, academic awards are renewable for each year a recipient is enrolled (up to four years) while maintaining satisfactory academic progress. At the end of every semester hours earned (Pace) and cumulative GPA's are checked to verify eligibility.

If a student moves off campus, his/her need based grant/scholarships might be adjusted. Other aid can be affected as well. Starting August 2009, students are required to live in campus housing throughout their college career.

### **Academic Scholarships**

Scholarship grants to full-time, main campus degree seeking students are based on test scores, either SAT or ACT, and cumulative grade point averages (GPA). The ranges of awards are from \$500 up to full tuition for the academic year. Awards are renewable each year that a recipient is enrolled at Trine University as a full-time student (up to four years) and maintains a

satisfactory GPA. Additional details can be found on the Financial Aid website. Awards are available to incoming freshmen and transfer students, both commuters and residents.

### **Legacy Awards**

Awards of \$2,000 per year are available for full-time, main campus students who are children, grandchildren or siblings of Trine University alumni. This award may be placed on top of no more than two additional scholarships and cannot exceed tuition.

### **Need-Based Assistance**

Need-based assistance is available to qualified main campus students who file the Free Application for Federal Student Aid (FAFSA) by the Trine University priority filing deadline of March 1. State of Indiana information is taken from the FAFSA—no separate form is required.

### **Federal Grants**

Federal Pell Grants - \$605 to \$5645

Federal Supplemental Educational Opportunity Grants (FSEOG) - \$200 to \$4000

(Amounts vary depending upon federal funding.)

Note: The amount of *Federal Pell Grant* funds you may receive over your lifetime is limited by a new federal law to be the equivalent of six years of Pell Grant funding. Since the maximum amount of Pell Grant funding you can receive each year is equal to 100%, the six-year equivalent is 600%.

### **State Grants**

Freedom of Choice (FOC) - \$200-\$7410

Twenty-First Century Scholarship - Up to \$7528

Note: Students first entering college in the 2013-2014 academic year will be required to meet certain completion requirements to renew state financial aid awards in 2014-2015. Students receiving the Higher Education Award, the Freedom of Choice Award, or the 21<sup>st</sup> Century Scholars Award must complete at least 30 credit hours during their first year of college to remain eligible for the maximum financial aid award. A student who completes at least 24 credit hours during his first year will remain eligible for financial aid, but will receive an amount that is less than a student who completes 30 credit hours. More information about these requirements is available at [www.in.gov/ssaci](http://www.in.gov/ssaci).

### **Institutional**

Additional awards may be available to a student with extreme economic need, after his/her FAFSA has been received by the March 1 priority deadline. Eligibility requirements and responsibilities for need-based assistance are as follows:

- Student must be a U.S. citizen or an “eligible non-citizen.”
- Student must be accepted for admission to Trine University.
- Student must complete and submit the FAFSA by March 1.
- Student must submit documentation to complete his/her financial aid file by May 1.
- Student must be accepted as a regular student in an eligible program that leads to a degree or certificate.
- Student must be enrolled in the minimum number of credit hours needed to fulfill specific program requirements.
- Student must not be in default on any Title IV loan (Perkins, NDSL, Federal Stafford, GSL, and FSL) or owe a repayment on any Title IV grant (Federal Pell Grant or FSEOG) received for attendance at any institution.
- Student must be registered with the U.S. Selective Service System, if required by law.

## Federal Direct Loan Program

### Stafford Loans

Students apply for a Stafford loan by first completing the FAFSA. When the financial aid office reviews the FAFSA, the student's eligibility for the Federal Direct Loan is then determined. Upon acceptance of the Direct Loan, a master promissory note (MPN) and an entrance interview form need to be completed.

A Stafford loan can either be subsidized or unsubsidized. A student must be enrolled half-time (6 credit hours) to be eligible and the maximum amount a student can borrow is based upon grade level status.

A subsidized loan is awarded on the basis of financial need. A student must be enrolled half-time to be eligible. The student is not charged interest until repayment begins because the federal government "subsidizes" the interest. These loans have a 10-year payoff and a six-month grace period beginning after the student leaves college, either by graduation or withdrawal from the University. For Direct subsidized student loans borrowed on or after July 1, 2012 and before July 1, 2014, the interest subsidy will not be available during the six-month grace period. This means that interest WILL be charged during the grace period for subsidized loans borrowed during this time period.

If you are a first-time borrower on or after July 1, 2013, there is a limit on the maximum period of time (measured in academic years) that you can receive Direct Subsidized Loans. You may not receive Direct Subsidized Loans for more than 150 percent of the published length of your program. This is called your "maximum eligibility period." Your maximum eligibility period is based on the published length of your current program. You can find the published length of any program of study in the course catalog.

An unsubsidized loan is not awarded on the basis of need. A student must be enrolled half-time to be eligible. The student is charged interest from the time the loan is fully disbursed until it is paid in full. A student can choose to pay the interest while enrolled in school or defer those payments until repayment. These loans also have a 10-year payoff and a six-month grace period beginning after the student leaves college, either by graduation or withdrawal from the University.

### Parent Loans

The Direct Parent Loan for Undergraduate Students (PLUS) is designed to help parents assist their dependent children with their educational expenses. Parents will need to go through a pre-approval process, which is based on specific credit criteria. There is no grace period with a PLUS loan. The interest rate is fixed at 6.41%. Interest is charged from the date of the first disbursement until the loan is paid in full. The repayment period for a Direct PLUS Loan begins at the time the PLUS loan is fully disbursed, and the first payment is due within 60 days after the final disbursement. Parents must begin paying both principal and interest while the student is still in school. However, for Direct PLUS Loans with a first disbursement date on or after July 1, 2008, the parent may defer repayment either when the student on whose behalf the parent borrowed the loan is enrolled on at least a half-time basis or for an additional six months after the student ceases to be enrolled at least half-time.

## Enrollment Status

Each type of aid requires main campus, day program students to enroll for a certain number of credit hours per semester. Most federal aid requires at least half-time status (six credit hours); state, institutional and private aid requires full-time enrollment (a minimum of 12 credit hours).

All Trine University Institutional Awards are created for 12-18 credit hours. Schedule overloads, or 19 or more credit hours and additional course fees, are the responsibility of the student.

### Maintaining Eligibility

Currently enrolled students are required to maintain the appropriate grade point average for the award. Students must maintain satisfactory academic progress by completing the required number of credit hours each academic year (see the Trine University Student Handbook) and reapply for aid in the spring for the next academic year.

## Disbursement

All aid is disbursed equally between semesters. (Aid is generally not available during the summer.) Aid is credited to students' accounts in the Business Office. Student loans are credited only after they are disbursed to the student's account. Students who work on campus will receive paychecks every two weeks. (For more information, see the Trine University Student Handbook or trine.edu.)

### Appeals

Appeals to financial aid decisions can be filed with the Director of Financial Aid, who will present them to the financial review committee. Appeals must be filed in a timely manner.

### Refunds and Repayments

Students, who withdraw from the University or drop classes during the first 60 percent of a term, may be required to repay some or all of their financial aid. Refund and repayment amounts are calculated based upon a required federal formula to determine how much is to be refunded to the student or refunded back to various federal, state, and institutional programs. (See the Fees section for information about the Tuition Refund Schedule and Residence Refund Schedule.)

Return of Title IV federal regulations require the Office of Financial Aid to review the aid packages of students who officially withdraw or unofficially withdraw from Trine University if they receive any type of federal aid, including federal grants and loans.

Examples of these calculations can be seen in the Office of Financial Aid.

## Student Rights and Responsibilities

Trine University is committed to working with each student to provide the best financial aid package possible. At the same time, each student has the responsibility to apply for the aid and to meet and maintain eligibility requirements. Following is a list of basic rights and responsibilities of the students in regard to financial aid:

- Students must apply for financial aid.
- Financial aid information and counseling will be available.
- Students will be considered for financial aid on a first-come, first-served basis.
- Students will be notified electronically or via postcard of their eligibility for financial aid.
- Students will be informed of the specific type of financial aid, the amount of each type of aid and the conditions to renew each type.
- Students will have the opportunity to review with the Office of Financial Aid the process by which awarded aid was determined.
- Students may request an additional review of their aid package with the Director of the Office of Financial Aid.
- All students who receive financial aid are required to abide by the policies and regulations of Trine University.
- All Trine University financial aid policies and fund rules are either published on our website or available in our office. Aid recipients are required to be familiar with these policies. Information that is unclear should be brought to the attention of a financial aid staff member.
- The Office of Financial Aid will process financial aid requests without regard to race, religious affiliation, gender, age, or disability. All funds are subject to individual student need as well as the availability of funds.
- General information is communicated to students through their student e-mail account and financial aid information is



communicated through their MyTrineFa account. It is recommended that students review their accounts daily. \*\*For new students we use the email that was entered in on the FAFSA but after they receive their student email account we begin to communicate using that one.

- The student has the right to know what types of aid are available. That information is available on both our website and in our offices.
- Students are obligated to advise the Office of Financial Aid of any name, address, or phone number changes. Updating this information through the MyPortal will not update your financial aid records.
- Financial aid recipients are required to notify the Office of Financial Aid of any scholarships, loans, book allowances, employer assistance or other forms of assistance extended to them from sources outside the college. Adjustments of aid may occur as a result.
- The Office of Financial Aid reserves the right, on behalf of the Institution, to review and cancel any award at any time because of changes in a student's financial or academic status, state program rules, federal program rules or any other significant change. Students will be notified of any changes to their aid via an email communication to their Trine email account (refer to \*\* in #3 for new students). The email will include instructions on how to access MyTrineFA and review the changes. This will only show the changes made to your award notification and not your bill. If you want to know how this change will affect your bill you will need to log into your MyPortal account for that information.
- Financial aid is awarded to a student contingent upon maintaining standards set forth by the institution's Title IV Satisfactory Academic Progress (SAP) policies which complies with required Federal standards. Please refer to our website and/or student handbook for policy details.
- Disbursement of a student's financial aid award(s) (with the exception of CWS- College Work Study) will be in the form of a direct payment to the student's account in the Business Office. Work-study earnings are paid directly to the student on a bi-weekly basis via direct deposit after a job is secured and hours are worked.
- Financial aid will be awarded and disbursed based on full-time enrollment. Should the student register for less than a full-time course load or drop classes that adjust enrollment, costs and aid will be adjusted and an acknowledgement will be sent to the student via email communication. In some cases, students may be required to repay funds to the University.
- It is the student's responsibility to ensure that their tuition is paid in full by the due date either by financial aid, payment plan, cash or whatever resource they plan to use. Students can check their account status on My Portal.
- The student must complete all application forms accurately and submit them on time to the appropriate location.
- The student must provide correct information. The intentional misreporting of information on financial aid application forms is a violation of the law and is considered a criminal offense which could result in indictment under the U.S. Criminal Code.
- The student must return all additional documentation, verification, corrections, and/or new information requested by the Financial Aid Office in a timely manner. Any delay can affect eligibility for certain types of aid.
- A student receiving federal financial aid earns their aid based on the number of days that they attend class. A recipient who fully withdraws from Trine University before 60% of the term is completed will be subject to an aid recalculation based on the number of days attended. The unearned aid will be refunded to the appropriate federal financial aid program by the institution and the student will repay the institution.
- A student receiving state financial aid earns those funds based on their enrollment at the end of the 28th class day. Therefore state aid will be affected should the student drop all of their coursework or below full-time before that date.
- A student receiving a Federal Pell Grant earns those funds based on their enrollment as a first time bachelor degree seeking student. A student needs to begin enrollment in all of their coursework before Pell Grants will disburse to their student account. Therefore Pell Grants will be affected if you do not begin your enrollment in all of your coursework

and/or drop some or all of the coursework for which you enrolled in.

- A student may be awarded employment under the CWS – Federal Work Study Program. The amount of CWS aid shown on the award letter is the maximum amount of money the student can expect to earn during the academic year as a result of work performed. The student will only be paid for hours worked and obtaining work is contingent on finding CWS approved employment.
- Financial aid awards are made for one academic year only. One half of the award will be applied each semester. It is always the student's responsibility to apply annually for aid; applications submitted by March 1st will receive priority consideration. Renewal of aid depends upon the student maintaining Title IV Satisfactory Academic Progress, continued need for financial aid assistance and the availability of funds.
- Students planning to attend summer semester and wishing to receive financial aid must complete a Request for Summer Aid Form in addition to the FAFSA. Applications are available on-line and in the Office of Financial Aid following spring break.
- Students who are incarcerated in a state or federal correctional institution are required by Federal law to inform the aid office of their incarceration.
- The student is responsible for reading and understanding all forms that he/she is asked to sign and for keeping copies of the forms.
- The student must accept responsibility for all agreements that he/she signs.
- The student must be aware of and comply with the deadlines for application or reapplication for aid.
- The student should be aware of the school's refund policy
- Students receiving financial aid must inform the Office of Financial Aid about additional awards
- Students must maintain satisfactory academic progress toward academic goals.
- Students must maintain good social standing.
- Students must reapply for financial aid between January 1 and March 1.
- Students must report to the Office of Financial Aid when transferring to another school.
- If applicable, students must participate in the Federal Stafford Loan entrance and exit interviews.

# Student Services

In addition to the information regarding student services provided below, the Student Handbook provides a wide range of information for students.

## Housing Requirements

Trine University students, beginning with students entering in the fall of 2009, are required to live on campus. Students who are married, responsible for a dependent child, living at home with a parent or legal guardian (within 40 miles of Angola), or 21 years of age on or before the first day of fall classes may be waived from this requirement. Students with a cumulative GPA of a 2.0 or higher and have completed 60 credit hours and lived on campus for four semesters may be approved to move into a University recognized Sorority/Fraternity House or Christian Campus House. Students who are married and under 21 years of age on or before the first day of fall classes must show a marriage license and live with the spouse in a permanent location within 40 miles from Angola, IN. In addition, International students must show dependent I-20 or dependent DS-2019. Students who are responsible for a dependent child and under 21 years of age on or before the first day of fall classes must show a State issued birth certificate.

Students are required to be enrolled full-time (12 credit hours per semester) to reside in university housing. Students must have the written approval from the Dean of Student Services prior to moving off campus. Failure to receive approval or providing false information may lead to expulsion from Trine University.

All residential students: A signed Residential Room and Board Contract, Housing Information Form, and Housing Deposit are required before arriving on campus. The Residential Room and Board Contract is binding for the entire academic year. If the Residential Room and Board Contract is broken or if permission from the Dean of Students has not been given to be released from the contract, the Housing Deposit is forfeited and a contract release fee will be assessed.

Additionally, any student leaving on-campus housing without a contract release may be subject to billing for the entire contract period. Falsification of housing arrangements may lead to expulsion from the University.

University residence room contracts are available online. Students must complete and submit their housing contracts and non-refundable enrollment deposits to the Office of Admission by the National Candidate Reply Date of May 1 for full-time admission. Request for an extension must be made in writing. For more information on housing requirements the “Student Services” section on the web at trine.edu.

### Residential Facilities

Residential facilities at Trine University include men only traditional residence halls, women only traditional residence halls, and co-ed apartment buildings. Villas are available for juniors and seniors, and are assigned based on combined academics and social standing. Applications are processed in the spring for the next academic year.

Whitney Commons dining facility in the University Center serves all residential students. A commuter meal plan is available for students not living on campus. The campus Mail Center and student mailboxes are also located in the University Center and serve all of the residential facilities.

### Personal Property Insurance

Trine University will not reimburse students for damage to personal items as a result of theft, fire, flood, and other disasters. Personal items must be covered by personal insurance.

## Counseling Services

The purpose of Counseling Services is to provide students with short-term counseling that will enable them to overcome a variety of personal and interpersonal difficulties that may interfere with their pursuit of academic and career goals. Clinical

counseling services, as well as prevention, outreach, and consultation, are provided free on the residential Angola campus.

If your anxiety or worry is feeling overwhelming, seek additional help from our office [counseling@trine.edu](mailto:counseling@trine.edu) to find out more information or to schedule an appointment.

## University Disciplinary Review Board Process

Information regarding disciplinary processes can be found in the Student Handbook.

### Student Formal Complaint Procedure - “Notice of Complaint”

“Concerns” are issues that may be solved by informal means; “complaints” are formal issues that cannot be solved informally. Students are urged to have a direct and informal approach for settling concerns. Students are encouraged to voice concerns with the support, involvement and/or intervention of university personnel.

If concerns are not handled in a satisfactory manner, then students are urged to file a “Notice of Complaint.” The “Formal Complaint Form” tab is located on the students’ myPortal page along with all similar student information. It is convenient to all students, located in a place specifically designed for student information. Further information instructs students not to use the site for Title IX allegations and redirects them to the appropriate page.

### The Complaint Process

There are four steps to the complaint process:

#### 1. Notice of Complaint

The Notice of Complaint should be filed via the online form available on MyPortal. The complaint form includes all appropriate information for the complaint to be processed.

#### 2. Referral

Once submitted, the complaint is forwarded to the Office of Academic Affairs which determines which area of the University is involved. A representative from that Office forwards the complaint to the appropriate vice president or administrator for action. To ensure confidentiality, only the Office of Academic Affairs, members of the President’s cabinet, and the designated administrator have access to the complaint information.

#### 3. Solution.

The administrator meets with the student and discusses solutions to the complaint. All support materials must be provided to the administrator by the student. Action must be taken within 10 class days of receiving the notice. A response letter, indicating the solution to the complaint, will be sent by the administrator to the student. Information on the complaint database is also submitted.

#### 4. Appeal.

If the solution is not satisfactory, students may appeal the result within 10 class days of receiving the letter. If filing an appeal, the appeal must be filed within 10 class days of receiving the response letter.

## Campus Life

For information on the following, please see the current Student Handbook.

- Student Organizations
- Professional Societies & Fraternities
- Honor Societies & Fraternities
- Greek Life
- Special Interest Groups

- Athletics
- Intramural Sports

# Career Services

Career Services offers programs and services to assist students and alumni to make career decisions and pursue the skill development necessary to compete in a rapidly changing, competency-based, global workplace. Career planning is an on-going process that begins when the student is a freshman and continues throughout the student's senior year. The office of Career Services works collaboratively with academic departments, faculty members, student services, employers and other relevant constituents to enhance students' career development and participation in internships and other experiential education programs. Career Services accumulates and makes accessible information and resources pertaining to career exploration, workforce trends, the job search, employment opportunities, current salary trends, and graduate employment statistics. The resources of Career Services are available throughout the student's academic preparation and when the student becomes an alumnus.

**\*Job placement is not guaranteed to students upon graduation.**

## Employment Assistance

Students are offered advice and coaching for procuring major-related internships, cooperative education assignments, and full-time employment. Career Services facilitates communication between job seekers and employers, which includes hosting career fairs, networking events, guest speakers, and arranging student interviews for representatives of business, industry, and educational institutions who visit campus to recruit prospective employees. Career Services also reaches out to relevant individuals, campus offices, alumni, and external agencies to establish and maintain effective relations, disseminate information about programs and services, and increase experiential learning and employment opportunities for the benefit of Trine University students.

## Internships

Career Services advertises internship requests throughout the academic year on [www.trinecareers.org](http://www.trinecareers.org) and refers students to other internship resources that meet their individual needs. These major-related work experiences, which usually are limited to a three-month time period, build credentials that are essential to a graduate's job search. Internships for credit are also available for students who meet specific requirements within the student's discipline or major field of study.

## Cooperative Education Program

The Cooperative Education Program (co-op) is a course that promotes professional learning and enhances traditional university course and lab work. The Cooperative Education Program is designed to allow students to alternate full-time work with an employer and campus sessions. This experience not only better prepares the student for entry into his/her chosen field, it allows students the opportunity to network with professionals and make industry contacts. Another advantage is that co-op students can earn a salary while on work assignments, enabling them to finance a portion of their education. Students eligible for the Cooperative Education Program must have completed a minimum of 30 semester hours with a 2.4 cumulative grade point average and must meet criteria established by the prospective employer.

A student is considered a cooperative education student after having accepted employment with a cooperative education employer, after the Cooperative Education Director and Department Chair have approved the student's program, and after the student has registered for the course CO 050 Co-op Employment. Work experience prior to acceptance into the Cooperative Education Program cannot be applied to the program.

A cooperative education student must complete a minimum of three semesters of work assignments. Approval of any changes in the alternating employment/class schedule must be obtained in writing from the cooperative education company, the Cooperative Education Director, and the respective Department Chair. This approval should be obtained by mid-term of the semester before the proposed change. Consecutive work periods require separate registration.

A cooperative education student may have a second cooperative education employer only if a co-op position is terminated by the original employer or, in the extreme case, that no major-related experience or progression of responsibilities is occurring.

Verification of major-related experience and progression must be made in writing by the cooperative education student and confirmed by both the Cooperative Education Director and the respective Department Chair.

During or upon completion of the final work assignment, the student must enroll in CO 45X Co-op Work Experience. Students have the flexibility to choose a one, two, or three hour course. Through this course, the student will prepare and submit a comprehensive report on his/her work experience. Upon approval of the finished report, the student will be awarded one (1), two (2), or three (3) hours of academic credit depending on the course completed.

Upon satisfactory completion of both academic and co-op work experience requirements, the cooperative education student will be granted a baccalaureate degree with the inscription "Cooperative Education Program," as well as a designation on his/her transcript noting cooperative education participation.

## Work Study Employment

Federal Work-Study is awarded to undergraduate students who demonstrate financial need. The award ranges from \$250 to \$2,000 per year to help meet their costs of post-secondary education. Work Study is a federally-subsidized program in which wage costs are shared by the federal government and the university.

Work Study positions are hourly-wage jobs in which a student works for an employer according to a mutually agreed-upon schedule and is paid on a bi-weekly basis for the hours worked.

The Office of Financial Aid manages the work study program. There are many different jobs available through the Work Study Program ranging from information technology to athletics, from admission to campus operations. There are many different Work Study categories from which to choose, varying in the areas of interest, degree of difficulty, and wage rate. With a variety of positions available, it is hoped that students will find jobs which are both interesting and related to their career goals.

### **How to find a job**

Students participating in the work study program find positions available on campus with which they have interest in. Students are not assigned a position. This allows student to pursue areas of interest to them. All on-campus work study positions are posted on [www.trinecareers.org](http://www.trinecareers.org) before classes begin in the fall.

# Academic Information

## Classification of Students

For purposes of registration and determination of eligibility for certain student activities, the Registrar uses the following guidelines:

CLASS	CREDITS EARNED
Freshman	0–28
Sophomore*	29–59
Junior	60–89
Senior	90+

\*Students enrolled in associate degree programs remain sophomores when they have 60 or more credits earned.

### Undergraduate Course Load

A full-time undergraduate student is one who is carrying a minimum of 12 academic credit hours. If a main campus student wishes to register for more than 18 credit hours, he or she must have written permission as follows below. Additionally, undergraduates will be charged per credit hour for anything over 18 credits.

- 19–20 credits requires permission from the Department Chair
- 21–23 credits also requires permission from the school Dean
- 24 or more credits also requires permission from the vice president for academic affairs

### Graduate Course Load

The semester course load of a full-time graduate student is six (6) hours or more. The maximum load for a full-time master's degree student in College of Graduate and Professional Studies is twelve (12) credits hours in any semester. Any master's degree course load greater than twelve (12) credit hours must be approved by the Program Director.

## Credit Hour Policy (Definition of Credit Hour)

The number of credit hours a course is assigned is determined according to the federal semester credit hour definition in which:

1 credit hour = 1 hour\* of direct faculty instruction + a minimum of 2 hours out-of-class student work each week for ~15 weeks.

\*50 minute class periods are sufficient to meet this requirement.

For the most commonly-offered 3-credit hour course, it is expected that a student will receive the equivalent of 45 hours of instruction and spend a minimum of 90 hours on assigned class work for a total of 135 hours. Please see the chart below for additional credit hour expectations.

Credit Hours	Hours of Direct Instruction	Hours to Complete Additional Coursework	Total Hours
1	15	30	45
2	30	60	90
3	45	90	135
4	60	120	180
5	75	150	225

*Determining Credit Hours in Different Delivery Modes*



Trine University offers courses in multiple term lengths and through multiple delivery modes to meet the needs of various student populations. Definitions of those modes can be found elsewhere in the catalog. All courses, regardless of delivery mode, use a standard syllabus of record with standard learning outcomes. The assessment of these outcomes is one method by which the University ensures that instruction provided and student work produced is equivalent across delivery modes. The guidelines below are another.

*Note on Laboratory Courses:*

The policies below refer to standard, lecture or seminar-style courses. Laboratory courses and practica must meet a minimum of two hours per week, or require at least two hours per week of student work. Additional work may be required, as appropriate, at the discretion of the program supervisor.

*Guidelines for Delivery Modes*

- *Face-to-face:*
  - *15 week courses: Adhere to the policy above.*
  - *8 week courses:* Required readings, viewing of/listening to recorded lectures, or engagement in other online/electronic direct instruction methods is expected to equal 15 hours per credit hour. Students' work, including the completion of assessment activities and other assignments is expected to equal 30 hours per credit hour.
- *Online:* These courses can meet for 8 or 15 weeks. Required readings, viewing of/listening to recorded lectures, or engagement in other online direct instruction methods is expected to equal 15 hours per credit hour. Students' work, including the completion of assessment activities and other assignments is expected to equal 30 hours per credit hour.
- *Hybrid courses, distance learning courses, and those offered as independent study:* regardless of term length, are required to meet the policy expectation of 15 hours of direct instruction per credit hour, using any combination of face-to-face instruction and methods utilized in online courses. These courses are also expected to require 30 hours of additional student work per credit hour.

*Note on Undergraduate Summer Terms*

During the summer, one 12-week summer term and two 6-week summer terms are offered. Face-to-face, 12-week courses meet for a minimum of 3 hours per week. Six-week courses meet a minimum 6 hours per week.

It is expected that faculty will engage students through live platforms (phone calls, email, discussion board postings, virtual meeting software, etc.) in order to reach the requisite 15 hours of direct faculty-student interaction per credit hour. A 3-credit hour course (either 6 or 12 weeks in length) will require an additional 9 hours of live-platform direct instruction.

*Note on International Partnerships:*

Classes taught with international partner institutions through the Office of Global Partnerships adhere to the term lengths of those institutions. Standard Trine syllabi of record are used and standard learning outcomes assessed to ensure that instructional time and student work is substantially equivalent.

## Distance Learning

Trine University prides itself on the quality of the education we provide. All curricula, whether delivered online, seated or in hybrid format, follow the same approval process involving faculty, the Vice President for Academic Affairs, the President, and when appropriate the Board of Trustees. Trine courses, whether taken at one of our locations, on the main campus or online, are considered equal.

Seated courses are taught in a face-to-face classroom setting. The syllabus, course schedule, and other materials are to be posted online and students may be asked to submit some work electronically. However a number of distance learning modes are available. Distance Learning (DL) includes fully online or blended courses and is a formal educational process in which the

majority of the instruction (interaction between students and instructors and among students) in a course occurs when students and instructors are not in the same place. Instruction may be synchronous or asynchronous. Interaction between the instructor and the student is regular and substantive. Distance Learning (DL) includes various delivery methods.

### **Delivery Mode**

Delivery Mode is the primary method or technology used to deliver instructional information to the student and used for communication between the instructor and the students. At Trine University, courses are delivered in the following modes:

1. DL - Online courses are taught 100% online through the main use of asynchronous activities providing greater flexibility of schedule and convenience of access to students, while allowing them to meet the same learning outcomes and level of rigor achieved in seated courses. The delivery of online exams will follow university-approved processes. Some online courses also include the authentication of online test takers and the use of online proctoring tools or live local proctors.
  - a. Respondus LockDown Browser is a custom web browser that “locks down” the testing environment within Moodle LMS. Once inside LockDown Browser, students are prohibited by the software from printing, copying & pasting, visiting external websites, and accessing other software applications during the examination process. Any open software applications which LockDown perceives as intrusive to the exam process (i.e. Skype, AOL Instant Messenger, etc.) are required to be closed before the examination process is allowed to proceed.
2. DL - Hybrid courses take advantage of the best features of seated classroom instruction and online education. Students meet face-to-face for a portion of the course and complete the rest of their coursework online. A hybrid course is not simply an online course that requires in-class exams. Hybrid courses allow faculty and students both the opportunity to build strong personal relationships through face-to-face interaction and the opportunity to explore new types of learning activities that were not possible in seated courses. Dates, times and locations for face-to-face meetings will be published in the official course schedule.
3. DL - Video Conferencing courses are taught face-to-face (either in person or via videoconference) in classrooms specially equipped that allow live interaction between the instructor and students even though they may be in classrooms in different geographic locations or remote campuses. Dates, times, and locations for class meetings will be published in the official course schedule.

## **Academic Advising**

Each student is assigned a faculty advisor who assists the student in planning a program to meet graduation requirements and career goals. It is, however, the student’s responsibility for meeting the academic program requirements presented in the catalog.

## **General Education Requirements**

### **General Education Philosophy**

The purpose of the general education curriculum components is to provide the Trine University graduate with skills necessary to think critically and to communicate clearly with persons in all professions. The General Education requirements are designed to ensure breadth of knowledge and to promote intellectual inquiry.

### **Learning Outcomes**

1. Formal Writing: Communicate ideas using text, data, and images as appropriate, to effectively address specific audiences within their given context(s).
2. Interpersonal Communication: Communicate orally within various face-to-face interpersonal contexts employing relevant verbal and nonverbal strategies.
3. Data Literacy: Demonstrate data literacy, including how to read graphs and charts appropriately, draw correct conclusions from data, and recognize when data are being used in misleading or inappropriate ways.

4. Synthesis: Reflect on how mathematics, scientific, humanistic, and social science study work together to prepare them for leadership and service.

### General Education Distribution Requirements

The University believes that attainment of the skills described in the General Education Philosophy requires exposure to and some facility with the modes of inquiry practiced in multiple disciplines. Thus, all students, regardless of academic program, are required to take courses within the fields of Humanities, Natural Sciences, Social Sciences, and Mathematics. To determine which courses fall within each discipline, Trine has adopted the guidelines of the American Academy of Arts and Sciences' "Humanities Indicators" project. Trine differs from the Academy in classing history as a social science.

- **Humanities incorporates the following disciplines:** The academic study of the arts including art history; music; drama and cinema; communication; cultural, ethnic, and gender studies; English language and literature; and languages and literature other than English.
- **Natural Sciences address the following areas of study:** astronomy, chemistry, geography, geology, earth science, physics, anatomy and physiology, botany, biology, microbiology, and molecular bioscience.
- **Social Sciences incorporate the following disciplines:** economics, geography, government, international relations, political science, psychology, sociology, and urban studies.
- **Mathematics** courses include college level mathematics and statistics.

### CHAT (Culture, Humanities, and the Arts at Trine)

Main Campus graduation requirement: Students must attend eight university-approved CHAT events over the course of four years, or one per semester while enrolled, with no limitations on the number of events per semester. Transfer students are required to attend a prorated number of events, dependent upon the number of semesters they are enrolled, at one per semester.

The CHAT events requirement relates to the university's mission in that CHAT events are co-curricular experiences that cultivate the holistic development of students. Examples of CHAT events include the following:

- Multicultural events
- International events
- Musical performances, recitals, and concerts
- Dance performances
- Theater productions
- Art exhibits
- Readings in prose or poetry
- Humanities & Communication Department sponsored events
- Lectures, seminars, and symposia on a range of culturally-related themes
- University approved exhibits at cultural institutions

## All Bachelor Degrees General Education Requirements (30 hrs.)

Area	Credit Hours
<b>Communication (9 hrs.)</b>	
ENG 133 or ENG 143	3
HUM 203	3
COM 163 or SP 203	3
<b>Humanities &amp; Social Science (9 hrs.)</b>	
3 hours of Humanities	3
3 hours of Social Science	3
3 additional hours of Humanities or Social Science	3
<b>Mathematics &amp; Science (9 hrs.)</b>	
3 hours of Mathematics	3
3 hours of Science	3
3 additional hours of Mathematics or Science	3
<b>Other<sup>1</sup> (3 hrs.)</b>	
3 additional hours of general education courses	3
<b>TOTAL CREDIT HOURS:</b>	<b>30</b>

**Other<sup>1</sup>**

EXS 102 Lifetime Wellness may be used to satisfy two hours of “Other” General Education requirements.

HNR 121 Introduction to Honors Seminar may be used to satisfy one hour of “Other” General Education requirements.

BA 113 Business Computer Applications, CSIT 103 Introduction to Information Systems, or any approved computer literacy course may be used to satisfy three hours of “Other” General Education requirements.

**Foreign Language Policy**

In order for a student to register for a first-year foreign language course, the student must not be a native speaker of that language.

**CHAT (Culture, Humanities, and the Arts at Trine)**

Main Campus graduation requirement: Students must attend eight university-approved CHAT events over the course of four years, or one per semester while enrolled, with no limitations on the number of events per semester. Transfer students are required to attend a prorated number of events, dependent upon the number of semesters they are enrolled, at one per semester.

## Associate Degrees General Education Requirements (18 hrs.)\*

Area	Credit Hours
<b>Communication (6 hrs.)</b>	
ENG 133 or ENG 143	3
And one of the following:	
HUM 203	3
COM 163	3
COM 213	3
SP 203	3
<b>Humanities &amp; Social Sciences (6 hrs.)</b>	
6 hours, combined, of Humanities and Social Science	6
<b>Mathematics &amp; Science (6 hrs.)</b>	
6 hours, combined, of Mathematics and Science	6
<b>TOTAL CREDIT HOURS:</b>	<b>18</b>

\*Except those in Applied Science

#### Foreign Language Policy

In order for a student to register for a first-year foreign language course, the student must not be a native speaker of that language.

#### CHAT (Culture, Humanities, and the Arts at Trine)

Main Campus graduation requirement: Students must attend eight university-approved CHAT events over the course of four years, or one per semester while enrolled, with no limitations on the number of events per semester. Transfer students are required to attend a prorated number of events, dependent upon the number of semesters they are enrolled, at one per semester.

## Associate in Applied Science Degrees General Education Requirements (15 hrs.)

Area	Credit Hours
<b>Communication (6 hrs.)</b>	
ENG 133 or ENG 143	3
And one of the following:	
HUM 203	3
COM 163	3
COM 213	3
SP 203	3
<b>Humanities &amp; Social Sciences (3 hrs.)</b>	
3 hours of either Humanities or Social Science	3
<b>Mathematics &amp; Science (6 hrs.)</b>	
6 hours, combined, of Mathematics and Science	6
<b>TOTAL CREDIT HOURS:</b>	<b>15</b>

**Foreign Language Policy**

In order for a student to register for a first-year foreign language course, the student must not be a native speaker of that language.

**CHAT (Culture, Humanities, and the Arts at Trine)**

Main Campus graduation requirement: Students must attend eight university-approved CHAT events over the course of four years, or one per semester while enrolled, with no limitations on the number of events per semester. Transfer students are required to attend a prorated number of events, dependent upon the number of semesters they are enrolled, at one per semester.

## Humanities and Social Sciences for Bachelor and Associate Degrees General Education Requirements

General education requirements for all Bachelor and Associate Degrees include humanities and social science courses. Use the list below to complete the humanities and social science general education requirements.

HUMANITIES		SOCIAL SCIENCES	
ARC 293 Architecture Appreciation	HIS 253 Japanese People	COM 123 History of Media	POLS 113 Intro Government

ART 253 Art Appreciation	HNR X1X Humanities Seminar	ECO 203 Survey of Economics	POLS 313 Comparative Governments
CHN 113 Chinese I	HUM 23X Special Topics in Lang & Hum	ECO 213 Microeconomics	POLS 323 Contemporary World
CHN 123 Chinese II	HUM 300X Independent Study in Hum	ECO 223 Macroeconomics	POLS 333 State & Local Govern
COM 203 Media & Society	MUS 123 Music History I	ECO 323 Money & Banking	POLS 343 Amer Political Thought
COM 233 Intercultural Communication	MUS 223 Music History II	ECO 383 International Econ	POLS 363 US Foreign Policy
COM 363 Rhetoric & Persuasion	MUS 272 Music Appreciation	ECO 453 Bus/Public Policy	POLS 373 Political Psychology
ENG 153 Intro to Literature	MUS 273 Music Culture	EDU 222 Educational Psych Elem	POLS 403 Amer Constitutional Dev
ENG 233 Mythology	PHL 203 Intro to Philosophy	EDU 232 Educational Psych Sec	POLS 423 US as a World Power
ENG 253 Global Literature	PHL 213 Theories & Phil Soc Innovation	EDU 273 Issues Amer Education	PSY 113 Princ Psychology
ENG 263 Contemporary Themes in Lit	PHL 251 Ancient Greece	GEO 213 Physical Geography	PSY 223 Life Span Development
ENG 273 Creative Writing	PHL 313 Ethics	GEO 303 Human Geography	PSY 313 Topics in Psychology
ENG 333 Studies in Literature	PHL 323 Philosophy of Religion	GEO 313 Geography North Amer	PSY 323 Abnormal Psychology
ENG 363 English Language	PHL 333 Art, Society & Technology	GEO 323 World Geography	PSY 333 Psych of Personality
ENG 423 Drama	PHL 343 Logic	HIS 103 American History I	PSY 343 Social Psychology
ENG 433 Shakespeare	SPN 103 Spanish Conversation I	HIS 113 American History II	PSY 353 Child & Adolescent Psych
ENG 443 Poetry	SPN 113 Spanish Reading & Writing	HIS 203 World Civilization I	PSY 373 Political Psychology
ENG 2013 British Literature I	SPN 123 Spanish II	HIS 213 World Civilization II	PSY 383 Forensic Psychology
ENG 2023 British Literature II	SPN 203 Spanish III	HIS 251 Ancient Greece	PSY 3013 Health Psychology
ENG 2113 American Literature I	SPN 213 Spanish IV	HIS 263 Indiana History	PSY 3023 Cross Cultural Psychology
ENG 2123 American Literature II	SPN 303 Spanish Language	HIS 323 Contemporary World	PSY 403 Human Sexuality
ENG 3303 Bible as Literature	SPN 313 Spanish Writing & Conversation	HIS 343 American Political Thought	PSY 413 Psychology of Addiction
FLM 203 Film Appreciation	SPN 323 Spanish Culture	HIS 353 Civil War & Reconstruction	PSY 443 Adv Forensic Psych
FRN 113 French I	THE 103 Intro to Theatre	HIS 363 US Foreign Policy	SI 213 Theories & Phil Soc Innovation
FRN 123 French II		HIS 403 Amer Constitutional Dev	SM 223 History of Physical Ed & Sport
GER 104 German I		HIS 423 US as a World Power	SM 393 Sport Psychology
GER 114 German II		HIS 433 American Revolution	SOC 103 Princ Sociology

GER 203 German III		HIS 443 Readings in American His	SOC 313 Topics in Sociology
GER 213 German IV		HIS 453 Readings in World His	SOC 323 The Family
		HIS 400X Independent Studies His	SOC 333 Art, Society & Technology
		HNR X2X Social Science Seminar	SOC 343 Social Psychology
			WS 103 Intro Women's Studies

## Academic Opportunities

### Honors Program

The mission of the Trine University Honors Program is to provide support, resources, and academic experiences to high achieving and highly motivated students, thus allowing them to grow intellectually and become active independent learners. A student in the Honors Program would be exposed to a breadth of teaching methods and topics and, through this exposure, will have a more fulfilling and varied educational experience.

#### Admission Requirements

First-year students accepted to any Trine University program with a minimum SAT of 1220/ACT 27 and a High School GPA of 3.750 or higher may be invited into the Honors Program. The Honors Program Director will review qualifications of incoming freshmen and will make recommendations for admittance, which will then go before the Honors Program Advisory Board for final approval. Current Trine University freshmen or sophomores may also apply for admission into the Honors Program. These students must notify the Honors Program Director of their intentions, have a current Trine University GPA of 3.500 or higher, and must submit a letter of recommendation from a Trine University faculty member. Decisions regarding admission will be made on a case-by-case basis as space allows.

#### Program Requirements

Students accepted into the Honors Program will need to earn 22 Honors Program Points and satisfy the basic requirements for each category listed below. In addition, students also must maintain a 3.500 GPA to successfully earn an Honors Degree.

#### HNR 121 Introduction to Honors Seminar (1 pt)

Honors students are required to take this course their first semester in the Honors Program.

#### Honors Courses/Contract Courses (13 - 16 pts)

Honors students are required to compile at least 13 points with any combination of dedicated HNR courses, honors sections of regularly offered courses, or contract courses in their departments. Contract courses are a regularly offered Trine University course in which the instructor and honors student agree on additional requirements to enrich the experience. For HNR courses and honors sections of courses, the credits for each course will directly correlate to the number of points earned. Contract course points will vary depending on the degree of extra work involved. Students must take courses in at least two of the three categories listed above.

#### Enrichment Experiences (4 -6 pts)

Honors students are required to participate in extracurricular activities that enrich classroom learning. These activities are varied in scope and will center on the students' interests. Students are required to earn at least one enrichment experience point per year to total a minimum of four points before graduation.



### **Honors Project (4 pts)**

Honors students are required to complete an Honors Project during their senior year. Activities that qualify for an Honors Project include an original Honors Thesis, a semester of study abroad, or elaboration of a capstone project to include Honors Program requirements. Honors Projects will culminate in a written paper as well as a presentation at the Honors Symposium held at the end of the spring semester.

### **Academic Performance**

To participate in the Honors Program, a student must maintain a 3.500 cumulative grade point average at the end of each academic year. A student whose GPA falls below 3.500 will be placed on probation in the Honors Program and will have one semester to raise his/her GPA. A student may only be placed on probation once. If the GPA would fall below 3.500 a second time, the student would be removed from the Honors Program.

## **ROTC – Air Force Reserves Officer Training Corps**

The Air Force Reserves Officer Training Corps (ROTC) is an educational program designed to give men and women the opportunity to become Air Force officers while completing their degrees. The Air Force ROTC Program develops leadership and management skills students need to become leaders in the 21<sup>st</sup> Century. In return for challenging and rewarding work, ROTC offers the opportunity for advancement, education and training, and the sense of pride that comes from serving your country. Upon completion of the Air Force ROTC program, students are commissioned as second lieutenants in the United States Air Force. Following commissioning, there are excellent opportunities for postgraduate study in a wide variety of academic fields.

In accordance with the Crosstown Agreement with Detachment 225 at the University of Notre Dame, Trine University students may participate in ROTC by travelling to South Bend one afternoon and evening per week for coursework. For more information contact John H. Paek, Major, USAF; 574.631.4676.

## **Study Abroad Program**

Travel opportunities offered through Trine University open students' eyes, hearts, and minds to the world beyond campus. Exploring diverse cultures, living away from home, and viewing the world from a fresh perspective helps Trine University students integrate their academic studies and international experiences into a larger perspective of the world.

Through Trine University's direct affiliation with International Studies Abroad (ISA), students can participate in affordable summer, semester, or year-long programs in Argentina, Australia, Belgium, Brazil, Chile, China, Colombia, Costa Rica, Czech Republic, Dominican Republic, England, Fiji, France, Germany, Greece, India, Ireland, Italy, Japan, Jordan, Morocco, New Zealand, Peru, Scotland, South Africa, South Korea, Spain, Thailand, and Turkey. Internships and study plus internship abroad combo options are also available at selected destinations. Further details including the cost, duration, dates, institutions, and course can be accessed at <https://studiesabroad.com>.

In addition, Trine University has institutional agreements with universities in Italy, France, Bulgaria, Honduras, China, Greece, and Japan. Most study abroad programs require that the student's cumulative grade point average be at least 2.5 and some require at least 3.0.

For further information regarding all opportunities and scholarships, please visit <https://trine.edu/academics/academic-programs/study-abroad.aspx>.

## **Class Attendance and Excused Absences**

### **Main Campus**

Students are expected to attend all class and laboratory sessions. Absences may be permitted for reasonable causes, including but not limited to, illness, disabling injury, death or serious illness in the immediate family. Participation in University-

sponsored activities shall also constitute a reasonable cause for absence from class. Written documentation of the reason for absence may be required and, in the case of University-sponsored events, such documentation will be provided by the University sponsor.

It is the student's responsibility to discuss pending absences (field trips, athletic competitions, etc.) with his/her professor prior to the missed class period. The faculty member may require the student to complete any work due prior to the absence. Class or team lists distributed via e-mail do not excuse a student from class or laboratory sessions, but rather provide confirmation to the faculty member that the activity is indeed University-sponsored.

If there is a death in the immediate family, please contact the Office of Student Success and Retention. Under these circumstances a student will be excused from class attendance for up to seven calendar days. When the student returns to class he/she should confer with the professor.

It is the instructor's responsibility to present a class attendance policy to each class at the beginning of the semester. Decisions regarding submittal of assignments will be at the instructor's discretion, but students may not be penalized for absences due to reasonable cause.

Online courses follow the CGPS attendance policy.

## College of Graduate and Professional Studies

### Trine Online (TOL)

In the case of an online class active participation as gaged by the instructor is required. Once a student misses three sessions of any one class, prior to the withdrawal deadline, he/she will be dropped from the course with a "W". Only in the event of rare and unusual circumstances, with formal documentation, will a student be allowed to continue.

### Graduate

All students are expected to abide by the attendance policy set forth by the instructor in each class. Attendance may be registered at the beginning, end of class or on return from break; and may be deducted for tardiness. Lack of attendance may impact course grades and Academic standing. Should more than 2 unexcused absences accumulate the student will be academically dropped from the course. When possible, students must provide advance notice of absences, as well as relevant documentation regarding absences, to the instructor as soon as possible following the illness or event that led to the absence. Any arrangement to make up work because of class absence is the responsibility of the student. The instructor, who will explain the evaluation (grading) statement at the beginning of the term, determines the effect of absences upon grades.

Students enrolled in hybrid/seated classes that require only one meeting day per semester/term are required to attend the entire day scheduled for the seated component of the course. Students who are absent from this scheduled meeting for any portion of the day will be administratively withdrawn from the course.

This policy does caution that within the University there are several categories of students that are expected to exhibit behavior that conforms to the group to which they belong. These units include, but are not limited to, ROTC cadets, academic honor societies, veterans, athletes, medicine, and nursing majors. Membership within these units implies that the student agrees to fulfill the obligations of the organization.

## Grades and Grading Information

### Undergraduate Grading System

The grading system with honors points is as follows:

A	Excellent	4.0
B+	Very Good	3.5
B	Good	3.0
C+	Above Average	2.5
C	Average	2.0
D+	Below Average	1.5
D	Poor (lowest passing grade)	1.0
F	Failure	0.0
FI	Failure (original grade of I)	0.0
TR	Transfer Credit	not figured into GPA
S	Satisfactory (grade of C or higher)	not figured into GPA
U	Unsatisfactory (grade of D+ or lower)	not figured into GPA
I	Incomplete	not figured into GPA
IP	In progress (grade deferred)	not figured into GPA
W	Withdrawal before completion of 80% of the semester	
WP	Withdrawal after completion of 80% of the semester with passing work at the time of withdrawal	

The grade point average is calculated by dividing the honor points by the GPA hours.

### Grade of Incomplete

(Issued only under special circumstances)

Incomplete (“I”) is a temporary grade used by the instructor in cases where a student is unable to complete course requirements because of circumstances beyond the student’s control such as illness, family emergency or other similar circumstances. It is assigned only if the student has satisfactorily completed the major portion of the course requirements and has convinced the instructor of his or her ability to complete the remaining work without registering for the course again. An instructor who assigns a grade of “I” submits to the Department Chair or regional director a formal statement of requirements that must be satisfied for removal of the incomplete grade. A copy of the statement of requirements, including deadlines for their completion, shall be made available to the student.

It is the student’s responsibility to contact the instructor to make arrangements for completing the remaining work. The required work should be completed and a grade reported by the end of the student’s next semester in residence, but in no case later than one calendar year following the receipt of the “I” grade.

An “I” grade not removed for the main campus within one year from the end of the semester in which the “I” grade was issued will be converted to an “FI” grade by the Registrar. For undergraduates in CGPS an “I” grade not removed within eight weeks in which the “I” grade was issued will be converted to an “FI” by the Registrar. An “I” grade may not be removed by registering again for the course.

If the instructor giving the “I” grade is no longer a member of the faculty, the student should contact the Department Chair or regional director who will act on behalf of the former instructor. In the case of a graduating senior, if an “I” or “IP” grade is not removed until after the start of the next semester, the graduation date will reflect the new semester.

### Grade of “In Progress”

The “IP” (In Progress) grade is to be given only in courses so designated by the respective schools. The “IP” grade is designed for courses which require more than one term or semester for completion. An “IP” grade not removed within the agreed upon timeframe will be converted to an “F” by the instructor. An “IP” grade may not be removed by registering again for the course.

Course repeat means that a student may retake a course at Trine University for a better grade. When a student has repeated a course, the honor points for the higher grade are substituted in the cumulative grade point average.

The student’s record will not show additional hours attempted for the repeated course. Additional earned hours are given if a student passes a class where an “F” or “U” grade was originally received. Courses which are repeated remain on the student’s permanent record (transcript).

### **Course Repeat**

A student may retake a course at Trine University. The number of repeated courses may be limited by financial aid, individual departments, and scheduling constraints may impact the length of the program.

Whenever a course is repeated, the higher grade and credits earned completely replace the previous grade in the satisfaction of requirements and computation of cumulative grade-point average. All entries remain a part of the student’s permanent academic record.

### **Failing Grades**

Credit for a course failed at Trine University may not be obtained by examination.

### **Withdrawal from Class**

A student may withdraw from class through 80 percent of the semester, provided the student obtains the proper form from the Registrar and obtains academic advisor approval. International students must also have the approval of the Registrar or Designated School Official (DSO) if they will be dropping below 12 credit hours.

All students dropping below full-time status must have the approval of Financial Aid. The completed form shall be submitted to the Registrar before 80 percent of the semester is completed.

No classes shall be dropped after the completion of 80 percent of the semester except for circumstances beyond the control of the student, such as illness, family emergency, or other similar circumstances. Permission to withdraw after the completion of 80 percent of the semester must be obtained from the Chair of the student’s department, Dean, and VPAA. If permission is granted, a grade of “WP” will be issued if the student was passing at the time of withdrawal.

A grade of “F” will be issued if the student was failing and will count toward the student’s cumulative and semester grade point averages. Any deviation from the policy will be considered an unofficial withdrawal, and a grade of “F” will be issued.

### **Grade Appeals**

The awarding of grades is the prerogative of the classroom instructor. Faculty members are responsible for informing students of their grading policy. Grades become official when they are reported to the Registrar. If a faculty member discovers incorrectly reported grades, the error should be reported to the Registrar immediately. The appropriate Department Chair/Program Director must approve any adjustment of grades.

A student who disagrees with an assigned grade will take the following steps:

1. Approach the professor and explain the problem.
2. If the professor and student do not come to an agreement, the student should write a letter to the Department Chair/Program Director.
3. If the Department Chair/Program Director mediation does not resolve the issue, the student should file a written appeal to the appropriate academic Dean. For this appeal to succeed, new evidence or a different interpretation of existing evidence

would need to be presented by the student.

4. If the Dean mediation does not resolve the issue, the student can make a final appeal by filing a written appeal to the Vice President for Academic Affairs (VPAA). The appeal should set forth in detail the basis for the review and should be done by the midterm of the first regular term following the Trine University assignment of the grade. The student is responsible for presenting evidence to support his/her position. The ensuing decision of the VPAA is final. Records of each case shall be maintained in the office of the VPAA.

## Graduate Grading System

The grading system is as follows\*:

A	Excellent	4.0
B+	Very Good	3.5
B	Good	3.0
C+	Above Average	2.5
C	Average (lowest passing grade)	2.0
F	Failure	0.0
I	Incomplete	not figured into GPA
IP	In progress (grade deferred)	not figured into GPA
TR	Transfer Credit	not figured into GPA
S	Satisfactory (grade of C or higher)	not figured into GPA
U	Unsatisfactory (grade of D+ or lower)	not figured into GPA
W	Withdrawal before completion of 80% of the semester	
WP	Withdrawal after completion of 80% of the semester with (passing work at the time of withdrawal) issued only under special circumstances and with the approval of the Department Chair/Program Director.	

\*Except the Master of Physician Assistant Studies Program

### Master of Physician Assistant Studies Grading System

Effective beginning with the Fall 2020 Cohort the Master of Physician Assistant Studies Program will use an "Honors/Pass/Fail" grading system for all phases of the curriculum.

H	Honors	95% and above
P	Pass	81% and above
F	Fail	80% or below
I	Incomplete	not figured into GPA
IP	In Progress (grade deferred)	not figured into GPA
W	Withdrawal before completion of 80% of the semester	
WP	Withdrawal after completion of 80% of the semester with (passing work at the time of withdrawal) issued only under special circumstances and with the approval of the Department Chair/Program Director	

The grade point average is calculated by dividing the honor points by the GPA points.

### **Incomplete Grade Policy**

Incomplete (I) is a temporary grade used by the instructor in cases where a student is unable to complete course requirements because of circumstances beyond the student's control such as illness, family emergency or other similar circumstances. Incomplete grades are rarely assigned and only if the student has completed 75% of the course requirements, has a "C" or higher, and has convinced the instructor of his or her ability to complete the remaining work without registering for the course again. An instructor who assigns a grade of "I" submits to the Program Chair/Director a formal statement of requirements that must be satisfied for removal of the incomplete grade. A copy of the statement of requirements, including deadlines for their completion, shall be made available to the student.

It is the student's responsibility to contact the instructor to make arrangements for completing the remaining work. The required work should be completed and a grade reported by the end of the student's next semester in residence, but in no case later than one calendar year following the receipt of the "I" grade. An "I" grade not removed within one semester in which the "I" grade was issued will be converted to an "FI" grade by the Registrar. An "I" grade may not be removed by registering again for the course.

If the instructor giving the "I" grade is no longer a member of the faculty, the student should contact the Program Chair/Director who will act on behalf of the former instructor. In the case of a graduating senior, if an "I" or "IP" grade is not removed until after the start of the next semester, the graduation date will reflect the new semester.

### **In Progress Grade Policy**

The "IP" (In Progress) grade is to be given only in courses so designated by the respective schools. The "IP" grade is designed for courses which require more than one semester for completion. An "IP" grade not removed within one year from the end of the semester in which the "IP" grade was issued will be converted to an "F" by the Registrar. An "IP" grade may not be removed by registering again for the course.

### **Satisfactory**

The "S" (Satisfactory) grade indicates that credit has been given for completion of degree requirements other than academic coursework. In graduate programs, this symbol may be used for clinical practicums and internships.

When an "S" (Satisfactory) grade is earned for courses in which credit toward graduation is received, the credit will be counted, but there will be no quality points given. The institutional grade average will thus be determined by the total quality points for those courses in which "A" through "F" grades were given divided by the number of credit hours in which those grades were given.

## **Unsatisfactory**

The “U” (Unsatisfactory) grade indicates unsatisfactory performance in an attempt to complete degree requirements other than academic coursework. In graduate programs, this symbol may be used for clinical practicums and internships.

## **Course Repeat**

A student may retake a course at Trine University; however, no more than two courses may be retaken during the student’s course of study. The number of repeated courses may be further limited by individual departments, and scheduling constraints may impact the length of the program.

Whenever a course is repeated on a credit basis, the higher grade and credits earned completely replace the previous grade in the satisfaction of requirements and computation of cumulative grade-point average. All entries remain a part of the student’s permanent academic record.

## **Failing Grades**

Credit for a course failed at Trine University may not be obtained by examination.

## **Withdrawal from Class**

A student may withdraw from class through 80 percent of the semester, provided the student obtains the proper form from the Registrar and obtains academic advisor approval. International students must also have the approval of the Registrar if they will be dropping below 9 credit hours.

All students dropping below full-time status must have the approval of the Director of Financial Aid. The completed form shall be submitted to the Registrar before 80 percent of the semester is completed.

No classes shall be dropped after the completion of 80 percent of the semester except for circumstances beyond the control of the student, such as illness, family emergency, or other similar circumstances. Permission to withdraw after the completion of 80 percent of the semester must be obtained from the Program Chair/Director of the student’s department. If permission is granted, a grade of “WP” will be issued if the student was passing at the time of withdrawal.

A grade of “F” will be issued if the student was failing after completing 80 percent of the semester, and whereby no “WP” was awarded.

Any deviation from the policy will be considered an unofficial withdrawal, and a grade of “F” will be issued.

## **Grade Appeals**

The awarding of grades is the prerogative of the classroom instructor. Faculty members are responsible for informing students of their grading policy. Grades become official when they are reported to the Registrar. If a faculty member discovers incorrectly reported grades, the error should be reported to the Registrar immediately. The appropriate Department Chair/Program Director must approve any adjustment of grades.

A student who disagrees with an assigned grade will take the following steps:

1. Approach the professor and explain the problem.
2. If the professor and student do not come to an agreement, the student should write a letter to the Department Chair/Program Director.
3. If the department Chair/program Director mediation does not resolve the issue, the student should file a written appeal to the appropriate academic Dean.

If the Dean mediation does not resolve the issue, the student should file a written appeal to the Vice President for Academic Affairs (VPAA). The appeal should set forth in detail the basis for the review and should be done by the midterm of the first

regular term following the Trine University assignment of the grades. The student is responsible for presenting evidence to support his/her position. The ensuing decision of the VPAA is final. Records of each case shall be maintained in the office of the VPAA.

### **Student Grievance Procedure**

Students are encouraged to voice concerns they have and should attempt, in the first instance, to resolve a concern by using a direct and informal approach. Concerns may be addressed with the support, involvement or intervention of university faculty and / or staff members. It is advisable to voice concerns as soon as possible and to seek informal resolution, if possible.

If, however, a student feels that a complaint has not been dealt with satisfactorily he/she should use the appropriate process to have the issue addressed and are encouraged to submit a Formal Complaint Form.

**Step One:** Complete a Notice of Complaint form found on the Trine University myPortal – Student Page, under Miscellaneous Student Forms - Formal Complaint Form. The student will need to provide the date of the incident and a thorough explanation of what happened. The student complaint must be submitted within 30 business days of the incident.

**Step Two:** The vice president for academic affairs (or designee) will review the complaint and forward the complaint to the appropriate University administrator who will be responsible for meeting with the concerned student and investigating the complaint. Action must be taken within 10 business days.

**Step Three:** After completing the investigation of the incident, the University administrator will render a decision in writing to all entities involved in the grievance process within 5 business days. That decision is considered final. A summary of the findings will be submitted to the office of the VPAA for archiving purposes.

Students who are not satisfied with the results of the complaint process can contact the following entities:

Indiana Commission for Higher Education  
101 W. Ohio Street, Suite 300  
Indianapolis, IN 46204  
Phone: 888.528.4719  
Website: <https://www.in.gov/che/student-complaints/>

Higher Learning Commission  
230 South LaSalle Street, Suite 7-500  
Chicago, IL 60604  
Phone: 800.621.7440  
Website: <https://www.hlcommission.org/Student-Resources/complaints.html>

For students at the Arizona location: If the student complaint cannot be resolved after exhausting the Institution's grievance procedure, the student may file a complaint with the Arizona State Board for Private Post-Secondary Education. The student must Contact the State Board for further details.

The State Board address is:  
1740 W. Adams Street, #3008  
Phoenix, AZ 85007  
Phone: 602/542-5709  
Website: [www.azppse.gov](http://www.azppse.gov)

### **Assessment**

The academic assessment process at Trine University is designed to measure the abilities and knowledge of students graduating from all degree programs. It also measures student satisfaction with the program. Sometimes students will be asked to reply to surveys or questionnaires that rate the quality of instruction, the level of satisfaction with career preparation, and the overall satisfaction of the Trine experience. Occasionally, anonymous samples of student coursework will be used in an assessment process.



Trine University is committed to providing quality educational experiences for our students. The information gathered through the assessment process provides information for continual improvement of our programs.

## **Academic Standing**

Graduate students in the Masters programs must maintain a 3.0. Students whose cumulative GPA drops below a 2.7 will be dismissed from Trine University. Students whose cumulative GPA falls between a 2.7 -2.99 will be given a probationary notice and asked to submit a self-assessment. This will only be permitted once and the student must then achieve a 3.0 by the end of the following semester. A student who is dismissed may apply for readmission immediately by contacting the Program Director and completing the re-admit form, providing a 3-4 paragraph written statement explaining why he/she was not meeting academic standards and outlining a plan for his/her future success. The re-admit form requires students to submit a plan for raising their cumulative GPA back to 3.00.

The Graduate Council will determine the outcome of the re-admit request.

Students whose cumulative GPA is below 3.0 and are on academic probation due to GPA, will not be eligible to participate in Curricular Practical Training (CPT) during the semester of probation. Students will regain eligibility once the academic probation has been lifted and they are in good academic standing of a 3.0 or higher.

## **Course Audit**

To audit is to take a course for no credit. A course may be audited only if space is available in the course. The approval of the student's academic advisor is required. A change to credit status is permissible if completed during the normal add period. Auditors shall receive a grade of "AU." At the discretion of the instructor, an auditor may participate in class discussion and take examinations. An auditing fee will apply.

## **Academic Record and Transcripts**

### **The Academic Record**

A report of the student's grades earned in all courses taken during a semester is posted online at the end of each term. Grade reports for first year main campus students are mailed to permanent addresses for domestic students and to local addresses for international students.

A permanent record of all the student's courses, credits and grades earned is kept in the Office of the Registrar. The student should maintain a record of courses, credits and grades each term and check from time to time to see that this record agrees with the University version. The official record may also help the student determine eligibility for any activity that requires meeting specific scholastic standards.

### **Transcripts**

While attending Trine University a current student may obtain unofficial (personal) copies of his or her University transcript at no charge through the student portal. All official transcripts which bear the Registrar's signature and school seal can be requested at [trine.edu/transcripts](http://trine.edu/transcripts).

Holds prevent the release of transcripts. Holds may include, but is not limited to, financial indebtedness, student services obligations, or parking citations.

Trine University will not release copies of transcripts from another institution.

## **Scholastic Awards - Undergraduate**

### **Scholastic Awards at the end of Each Semester**

#### **The President's List**

A student whose semester grade point average is 3.750 or better, while carrying at least 12 undergraduate credit hours, will be placed on the President's List.

#### **The Dean's List**

A student whose semester grade point average is between 3.500 and 3.749, while carrying at least 12 undergraduate credit hours, will be placed on the Dean's List.

#### **Scholastic Awards at Graduation**

##### **Gold Keys**

Gold Keys are awarded to bachelor degree students who are named to the President's List in four consecutive semesters. Students must be enrolled in a minimum of 12 undergraduate credit hours to be named to the President's List.

##### **Presidential Gold Keys**

Presidential Gold Keys are awarded to students who earn a Gold Key and then are named to the President's List an additional four consecutive semesters. Presidential Gold Key awardees must be enrolled in a minimum of 12 undergraduate credit hours.

##### **Silver Keys**

Silver Keys are awarded to associate degree students who are named to the President's List for two consecutive semesters. Students must be enrolled in a minimum of 12 undergraduate credit hours to be named to the President's List.

## Changing a Major

### Main Campus

To change a major, students must get the approval of both their current Department Chair and the Chair of the new department.

A student who changes a major is subject to the program requirements in effect at the time of the major change.

When a student changes his or her major, all transcripts, including the Trine University transcript, are evaluated by the new Chair. If the change of major is from one school to another, from a four-year to a two-year program, or from a two-year to a four-year program, courses with less than a "C" grade may be dropped from the student's cumulative totals, if the courses are not required in the new major. This includes students in the Allen School of Engineering and Computing who change from an engineering major to Design Engineering Technology. Dropped courses may not be repeated in the new major.

In cases where a student is readmitted to a school in which he or she was previously enrolled, all grades earned during enrollment in that school must be included in the cumulative grade point average.

Students wishing to change from non-degree status to a degree program should apply for admission through the Office of Admission.

### College of Graduate and Professional Studies

To change a major, students must get the approval of the Education Center Director or assigned faculty advisor. Admission requirements for each major are available from the Education Center Director. A student who changes a major is subject to the program requirements in effect at the time of the major change.

When a student changes his or her major, all transcripts, including the Trine University transcript, are re-evaluated. When changing majors, courses with grades of less than a "C" can be dropped from the GPA calculation if one of the following two conditions is met:

1. When changing majors from one category of degrees to another category as follows:

**Category 1:** Business degrees

**Category 2:** Arts & Sciences degrees

**Category 3:** Engineering and Technology degrees

2. When changing from a four-year program to a two-year program or from a two-year program to a four-year program  
Additional conditions:

- If courses are not required in the new major.
- Dropped courses may not be repeated in the new major.
- In cases where a student is readmitted to a degree program in which he or she was previously enrolled, all grades earned during enrollment in that degree program must be included in the cumulative grade point average.

## Main Campus Conditional Students Declaring a Major

Students who do not meet the requirements for admission directly into one of the Trine majors may be granted admission as a “Conditional” student.

The following requirements must be met before the student can be moved into their desired major:

*Allen School of Engineering and Computing:*

- Minimum of a 2.0 GPA with a “C” in calculus and in composition and a passing grade in chemistry

*Franks School of Education*

- Minimum of a 3.0 GPA over two full-time semesters

*All other schools:*

- Minimum of a 2.0 GPA

## Second Degree, Second Major, and Minors

### Second Degree

Dual or second degree students are awarded two separate diplomas. To earn a second baccalaureate degree, students must complete all the requirements for both degree programs along with a minimum of 30 credit hours in residence above the degree with the lower minimum hour requirement. Two associate degrees may be received at the same time provided all requirements for both degrees have been met, and the student has earned a minimum of 16 credit hours more than the degree with the lower minimum hour requirement.

A candidate for a Trine University baccalaureate degree who has already earned an associate degree from Trine University must complete a minimum of 46 Trine University credit hours.

### Second Major

Students who complete a double or second major are awarded one diploma. The two majors will be indicated on the student’s transcript. Students must complete all the requirements for both majors. Most double majors (e.g., criminal justice and psychology) can be completed without additional credit hours. Students should check with their academic department for additional information.

Ketner School of Business students may receive double majors. To receive a double major (e.g., management and finance), a student must meet all requirements in both majors and have a minimum of 135 semester hours of credit. Business electives may count in only one major; a single business elective cannot meet the elective requirements for two business majors. However, a required course in one major can count as an elective in another major.

### Academic Minors (Main Campus)

Minors must be declared and are possible with certain degree programs. Students should check with their academic department, if interested. Students are subject to the program requirements in effect at the time the minor is declared.

## Graduation Information

Undergraduate

Graduate

### Undergraduate

1. Specific degree requirements: Students must complete the degree requirements specific to their programs. Once in a program, if the requirements change, students have the option of graduating under the new requirements. Students who re-enter the University after an absence of more than one academic year are subject to the degree requirements in effect at the time of re-entry.
2. General Education Requirements: All Trine University students receiving a baccalaureate or associate degree must meet the General Education requirements. Details regarding the General Education philosophy and requirements are presented immediately before this section in the catalog.
3. A Trine University cumulative grade point average of not less than 2.0 must be achieved.
4. All required courses or approved substitutions must be completed as described in the respective degree programs. If an “I” or “IP” grade is not removed until after the start of the next semester, the graduation date will reflect the new semester.
5. Candidates for graduation must file with the Registrar, intent to graduate no later than one semester before the final semester of attendance in which degree requirements shall be completed.
6. CHAT (Culture, Humanities, and the Arts at Trine) Main Campus graduation requirement: Students must attend eight university-approved CHAT events over the course of four years, or one per semester while enrolled, with no limitations on the number of events per semester. Transfer students are required to attend a prorated number of events, dependent upon the number of semesters they are enrolled, at one per semester.

### Commencement Participation for Undergraduate Students

All spring semester and summer semester prospective graduates are eligible to participate in the annual spring commencement ceremony. Fall semester graduates are eligible to participate in the spring commencement ceremony prior to completing their degrees only if, by the end of the spring semester, they have 18 or fewer credit hours to complete to earn their degrees. If a fall graduate has more than 18 credit hours to complete, the student is invited to attend the commencement ceremony the following spring.

### Course Substitutions

An alternate course may be substituted for one required in a student’s major if the student cannot schedule the required course without undue hardship. The substitution must be requested by the student’s Department Chair. Proper notation must be made in the student’s record and approval granted prior to the substitution. The substitution cannot be made simply on the request of the student to take a different course from the one required.

### Academic Residency Requirement

To be eligible for a baccalaureate degree, a student must earn a minimum of 30 credits at Trine University. To be eligible for an associate degree, a student must earn a minimum of 16 credits at Trine University. For a baccalaureate degree 30 of the last 60 credits must be earned through Trine University or 16 credits of the last 30 for a two-year degree program. A student must be enrolled in at least one Trine class the last semester prior to graduation.

## Undergraduate Graduation Scholastic Awards

**Undergraduate Graduation Scholastic Awards****Graduation with Honors**

The grids below details the levels of academic honors listed on the student's diploma and transcript.

**Bachelor Degree**

<b>LATIN HONORS</b> <i>Minimum 40 undergraduate credit hours earned at Trine toward a Bachelor degree</i>	<b>GPA</b>	<b>ACADEMIC HONORS</b> <i>Minimum 30-39 undergraduate credit hours earned at Trine toward a Bachelor degree</i>	<b>GPA</b>
Cum Laude	3.500-3.749	Academic Honors	3.500-3.749
Magna Cum Laude	3.750-3.949	High Academic Honors	3.750-3.949
Summa Cum Laude	3.95-4.00	Highest Academic Honors	3.95-4.00

**Associate Degree**

<b>LATIN HONORS</b> <i>Minimum 20 undergraduate credit hours earned at Trine toward an Associate degree</i>	<b>GPA</b>	<b>ACADEMIC HONORS</b> <i>Minimum 16-19 undergraduate credit hours earned at Trine toward an Associate degree</i>	<b>GPA</b>
Cum Laude	3.500-3.749	Academic Honors	3.500-3.749
Magna Cum Laude	3.750-3.949	High Academic Honors	3.750-3.949
Summa Cum Laude	3.95-4.00	Highest Academic Honors	3.95-4.00

**Honors Day**

For the purpose of recognition at Honors Day, the grade point average requirement will be based upon the student's cumulative GPA before spring grades are posted. Honors will be listed on the diploma and transcript based upon the student's cumulative GPA after the final term's grades are posted and the student has met all degree requirements.

**Graduate****Graduation Requirements**

Students must have a 3.0 cumulative GPA, complete all necessary program requirements, and carry a grade of C or better in all courses to qualify for graduation.

**Graduate Student Commencement Participation**

Graduate students are eligible to attend the spring commencement ceremony following their degree completion. No graduation honors or honor cords are used for graduate degrees.

**Degrees**

An “Intent to Graduate” form should be filed at the beginning of the master’s program. This form will include an expected graduation date and other information pertinent to graduation. All degree requirements must be completed within five years.

## Academic Misconduct

Undergraduate

Graduate

### Undergraduate

The University prohibits all forms of academic misconduct. Academic misconduct refers to, but is not limited to, the following activities:

- Copying another person’s work and claiming it as your own, or submitting the same paper in two different courses without knowledge and consent of the instructor (plagiarism);
- Using the work of a group of students when the assignment requires individual work;
- Looking at or attempting to look at an examination before it is administered;
- Using materials during an examination that are not permitted;
- Allowing another student to take your examination for you;
- Intentionally impeding the academic work of others;
- Using any electronic device to transmit portions of questions or answers on an examination to other students;
- Using any electronic device to improperly store information for an exam;
- Knowingly furnishing false information to the University;
- Assisting other students in any of the acts listed above.

Moreover, a student is expected to submit his/her own work and to identify any portion of work that has been borrowed from others in any form. Failure to adhere to the policy above is considered academic misconduct.

An ignorant act of plagiarism on final versions and minor projects, such as attributing or citing inadequately, will be considered a failure to master an essential course skill and is considered Academic Misconduct. A deliberate act of plagiarism, such as having someone else do your work or submitting someone else’s work as your own (e.g., from the Internet, fraternity file, etc., including homework and in-class exercises), is also Academic Misconduct and will result in more serious penalties.

**In situations of Academic Misconduct, instructors have the authority to award a failing grade on the assignment in question or a failing grade for the course. Upon approval by the appropriate Dean, Academic Misconduct may also result in expulsion from the University.**

### Graduate

The University prohibits all forms of academic misconduct. Academic misconduct refers to, but is not limited to, the following activities:

- Copying another person’s work and claiming it as your own, or submitting the same paper in two different courses without knowledge and consent of the instructor (plagiarism);
- Using the work of a group of students when the assignment requires individual work;

- Requesting or purchasing materials from outside sources not consistent with the expectation of the assignment or assessment.
- Looking at or attempting to look at an examination before it is administered;
- Using materials during an examination that are not permitted;
- Allowing another student to take your examination for you;
- Intentionally impeding the academic work of others;
- Using any electronic device to transmit portions of questions or answers on an examination to other students;
- Using any electronic device to improperly store information for an exam;
- Knowingly furnishing false information to the University;
- Assisting other students in any of the acts listed above.

Moreover, a student is expected to submit his/her own work and to identify any portion of work that has been borrowed from others in any form.

An ignorant act of plagiarism on final versions and minor projects, such as attributing or citing inadequately, will be considered a failure to master an essential course skill and is considered Academic Misconduct. A deliberate act of plagiarism, such as having someone else do your work or submitting someone else's work as your own (e.g., from the Internet, fraternity file, etc., including homework and in-class exercises), is also Academic Misconduct and will result in more serious penalties.

**In situations of Academic Misconduct, instructors have the authority to award a failing grade on the assignment in question or a failing grade for the course. Upon approval by the appropriate Dean, Academic Misconduct may also result in expulsion from the University.**

#### **Level 1**

An ignorant act of plagiarism on final versions and minor projects, such as attributing or citing inadequately, will be considered a failure to master an essential course skill and is considered Academic Misconduct.

- Evidence suggests the offense may have arisen from a temporary panic or from confusion. No evidence suggests that the student or students engaged in sustained or especially serious violation of academic integrity.

#### **Intervention**

- We Care Alert Filed
- Meet with Faculty, Program Director and Advisor

#### **Level 2**

Second violation of academic integrity, when the first offense was level 1.

- Evidence suggests Student has made no attempt to improve integrity of work or students engaged in sustained or especially serious violation of academic integrity.

#### **Intervention**

- We Care Alert filed
- Failing Grade for Course
- Placed on Academic Integrity Probation

- Must Issue a Personal Improvement Plan
- Notification of Appropriate Parties of Interest
- Meet with Program Director

### **Level 3**

A deliberate act of plagiarism, such as having someone else do your work or submitting someone else's work as your own (e.g., from the Internet, fraternity file, etc., including homework and in-class exercises), is also Academic Misconduct and will result in more serious penalties.

- Evidence suggests individual engaged in sustained or an especially serious violation of academic integrity. For example, deliberate plagiarism, purchase of work or cheating on an examination may be in this category.

### **Intervention**

- We Care Alert Filed
- Failing Grade for Course
- Immediate Disciplinary Dismissal from Program and University communicated by the Dean of Graduate Studies
- Notification of Appropriate Parties of Interest

### **Dismissal Policy**

Once an investigation of factual evidence has occurred and decision to expel reached, by the Dean of Students and Vice President and Academic Affairs, interested parties will be notified of the Disciplinary Dismissal such as:

- Program Director (to facilitate contact):
  - Associated Faculty
  - Director of Campus Safety (Issuance of No Trespass Order)
  - Angola Police Department (Issuance of No Trespass Order)
  - Vice President of Academic Affairs
  - Executive Director of Office of International Studies

### **Disciplinary Dismissal**

A student may be dismissed from Trine University for disciplinary reasons. In such cases and regardless of the timing during a semester, the student is withdrawn from all classes, earns no credits for the semester, and is assigned a grade of "F" for each class. A disciplinary dismissal is final and cannot be erased by withdrawal from the university. Students wishing to return to the university must apply for readmission. Also, the judicial process is under the jurisdiction of the Dean of Students. The student forfeits all tuition and fees for the semester or term regardless of when the sanction is imposed. Financial Aid can be impacted if the student received any Title IV funding that requires enrollment for the entire semester.

## **Academic Probation**

The academic performance of every student is monitored by the Registrar and the academic departments to determine satisfactory progress. Students with GPAs below 2.0 will receive a letter warning them that they have fallen below the standard required for graduation. (See chart below for further explanation of required GPA.)

Students are placed on probation in the following situations:



- Degree seeking students who have attempted 59 or fewer semester hours at Trine University and are more than six cumulative honor points below the 2.0 graduation standard. (See chart below for further explanation of required GPA.)
- Degree seeking students who have attempted 60 or more semester hours of coursework and have a cumulative grade point average lower than 2.0. Transfer hours are added to Trine University hours attempted for purposes of determining the 60 hours attempted.

A student on academic probation will have one semester to reach minimum standards or be dismissed. Students on probation who raise their cumulative GPA to acceptable academic standards will be removed from probationary status.

Students on probation who achieve at least a 2.0 GPA in summer courses will not be dismissed.

After a period of not less than one semester (not including summer semester), a dismissed student may apply for readmission to the program from which he or she was dismissed. A dismissed student may be readmitted without a waiting period in any other degree program to which the student can gain acceptance by the readmit committee.

Financial aid is not automatically reinstated when a dismissed student is readmitted.

Students on academic probation will have the following restrictions placed on their attendance:

- You are required to register for UE 201, Success Skills and Reflection.
- You may not register for more than 15 credit hours. If you wish to take more, you must petition the Readmit/Probation Committee for permission.
- You may not participate in the “rush” system for any fraternity or sorority.
- If you are an athlete, you are NOT eligible to participate in any competition.

For information concerning eligibility for the University’s extra-curricular activities, consult the Student Handbook.

The chart lists the grade point average (GPA) required to be removed from probation.

The required GPA is based on the number of GPA hours attempted at Trine University.

GPA Hours Attempted	GPA	GPA Hours Attempted	GPA
1	0.000	31	1.806
2	0.000	32	1.813
3	0.000	33	1.818
4	0.500	34	1.824
5	0.800	35	1.829
6	1.000	36	1.833
7	1.143	37	1.838
8	1.250	38	1.842
9	1.333	39	1.846
10	1.400	40	1.850
11	1.455	41	1.854
12	1.500	42	1.857
13	1.538	43	1.860
14	1.571	44	1.864
15	1.600	45	1.867
16	1.625	46	1.870
17	1.647	47	1.872
18	1.667	48	1.875
19	1.684	49	1.878
20	1.700	50	1.880
21	1.714	51	1.882
22	1.727	52	1.885
23	1.739	53	1.887
24	1.750	54	1.889
25	1.760	55	1.891
26	1.769	56	1.893
27	1.778	57	1.895
28	1.786	58	1.897
29	1.793	59	1.898
30	1.800	60	2.000

When a student has attempted a total of 60 credit hours, INCLUDING transfer credits, a 2.0 GPA is required to be in academic good standing.

## Administrative Dismissal Policy

### *Disciplinary Dismissal*

A student may be dismissed from Trine University for disciplinary reasons. In such cases and regardless of the timing during a semester, the student is withdrawn from all classes, earns no credits for the semester, and is assigned a grade of “F” for each class. A disciplinary dismissal is final and cannot be erased by withdrawal from the university. Students wishing to return to the university must apply for readmission. Also, the judicial process is under the jurisdiction of the Dean of Students. The student forfeits all tuition and fees for the semester or term regardless of when the sanction is imposed. Financial Aid can be impacted if the student received any Title IV funding that requires enrollment for the entire semester.

### *Excessive Absence Dismissal*

A student may be dismissed from Trine University for excessive absences from all classes. In such cases, the student has until the semester’s withdrawal deadline to withdraw from all courses, which will garner a “W” on the transcript as the grade for each course. After the deadline to withdraw passes, the student will be administratively withdrawn from all courses, earn no credits for the semester, and be assigned a grade of “F” for each class. This excessive absence dismissal is final. Students

wishing to return to the university must apply for readmission. The student forfeits all tuition and fees for the semester or term regardless of when the sanction is imposed. Financial Aid can be impacted if the student received any Title IV funding that requires enrollment for the entire semester. The judicial process is under the jurisdiction of the Dean of Students.

## Planned Academic Leave

For students not on academic probation who need some time away from campus and who do not wish to have their enrollment interrupted, Trine University has a Planned Academic Leave program (PAL). This program provides the student with on-campus benefits during the period of the leave. Application materials are available in the Registrar's Office.

## Withdrawal from the University

### **Voluntary**

A student wishing to withdraw from the University during a term may obtain a withdrawal form from the Office of Student Success and Retention. A student living in a residence hall should also consult the Office of Student Services.

A student who plans to return to Trine University within one calendar year may apply for a Planned Academic Leave (PAL). Details and application forms are available in the Office of Student Success and Retention.

### **Unauthorized**

A student leaving the University during a term without officially withdrawing will receive "F" grades in all courses and will not receive refunds of any kind, including fees and deposits.

The withdrawal procedure will not take place automatically for a student who leaves campus because of illness or family emergency. If official notification of withdrawal cannot be made in person, the student should contact the Registrar in writing.

### **Disciplinary**

Students dismissed for disciplinary reasons during a term will be given "F" grades and monetary reimbursement will not be made for tuition, housing, or any other university fees.

### **Administrative Withdrawal Policy**

Trine University may administratively withdraw a student from a particular course or courses for the following reasons:

#### ***Academic Withdrawal***

The Registrar may administratively withdraw or drop a student from a course or courses for academic reasons such as the following: academic dismissal, unapproved credit overload, and not completing the necessary prerequisites for a particular course. An academic drop or withdrawal will be processed according to the established drop and withdrawal deadlines. A grade of "W" will be assigned in the case of a withdrawal. The student's GPA will not be affected.

#### ***Medical Withdrawal***

As a result of medical necessity, a student may be withdrawn from a class or classes. Such requests are made through the Dean of Students in conjunction with the coordinator for health services. Such withdrawals will only be granted based on appropriate medical documentation. Once approved by the Dean of Students, the student is withdrawn from all applicable classes and is assigned a grade of "W." The student's grade point average is not affected. Where appropriate and with an instructor's permission, a student could receive a grade of "I" (Incomplete).

## Academic Grievance Procedure

Students are encouraged to voice concerns they have and should attempt, in the first instance, to resolve a concern by using a direct and informal approach. Concerns may be addressed with the support, involvement or intervention of university faculty and / or staff members. It is advisable to voice concerns as soon as possible and to seek informal resolution, if possible.

If, however, a student feels that a complaint has not been dealt with satisfactorily he/she should use the appropriate process to have the issue addressed and are encouraged to submit a Formal Complaint Form.

**Step One:** Complete a Notice of Complaint form found on the Trine University myPortal – Student Page, under Miscellaneous Student Forms - Formal Complaint Form. The student will need to provide the date of the incident and a thorough explanation of what happened. The student complaint must be submitted within 30 business days of the incident.

**Step Two:** The vice president for academic affairs (or designee) will review the complaint and forward the complaint to the appropriate University administrator who will be responsible for meeting with the concerned student and investigating the complaint. Action must be taken within 10 business days.

**Step Three:** After completing the investigation of the incident, the University administrator will render a decision in writing to all entities involved in the grievance process within 5 business days. That decision is considered final. A summary of the findings will be submitted to the office of the VPAA for archiving purposes.

Students who are not satisfied with the results of the complaint process can contact the following entities:

Indiana Commission for Higher Education  
101 W. Ohio Street, Suite 300  
Indianapolis, IN 46204  
Phone: 888.528.4719  
Website: <https://www.in.gov/che/student-complaints/>

Higher Learning Commission  
230 South LaSalle Street, Suite 7-500  
Chicago, IL 60604  
Phone: 800.621.7440  
Website: <https://www.hlcommission.org/Student-Resources/complaints.html>

For students at the Arizona location: If the student complaint cannot be resolved after exhausting the Institution's grievance procedure, the student may file a complaint with the Arizona State Board for Private Post-Secondary Education. The student must Contact the State Board for further details.

The State Board address is:  
1740 W. Adams Street, #3008  
Phoenix, AZ 85007  
Phone: 602/542-5709  
Website: [www.azppse.gov](http://www.azppse.gov)

## Release of Student Information - FERPA

The Family Educational Rights and Privacy Act (FERPA) affords eligible students certain rights with respect to their education records. (An "eligible student" under FERPA is a student who is 18 years of age or older, or who attends a postsecondary institution at any age. At Trine, "attendance" begins on the first day of the term in which a student is enrolled.) These rights include:

1. **The right to inspect and review the student's education records within 45 days after the day the University receives a request for access.** A student should submit to the registrar, dean, head of the academic department, or other appropriate official, a written request that identifies the record(s) the student wishes to inspect. The University official will

make arrangements for access and notify the student of the time and place where the records may be inspected. If the records are not maintained by the University official to whom the request was submitted, that official shall advise the student of the correct official to whom the request should be addressed.

2. **The right to request the amendment of the student's education records that the student believes are inaccurate, misleading, or otherwise in violation of the student's privacy rights under FERPA.** A student who wishes to ask the University to amend a record should write the University official responsible for the record, clearly identify the part of the record the student wants changed, and specify why it should be changed. The University will, within a reasonable time after receiving the request, decide whether to amend the record as requested. If the University decides not to amend the record as requested, the University will notify the student in writing of the decision and the student's right to a hearing regarding the request for amendment. Additional information regarding the hearing procedures will be provided to the student when notified of the right to a hearing.
  
3. **The right to provide written consent before the University discloses personally identifiable information (PII) from the student's education records, except to the extent that FERPA authorizes disclosure without consent.** In general, the University will not disclose PII from a student's education records to any third party without written consent. However, the University may, and from time to time does, disclose education records without a student's prior written consent under several FERPA exceptions. FERPA permits the disclosure of PII from students' education records, without consent of the student, if the disclosure meets certain conditions found in section 99.31 of the FERPA regulations. Except for disclosures to University officials, disclosures related to some judicial orders or lawfully issued subpoenas, disclosures of directory information, and disclosures to the student, section 99.32 of the FERPA regulations requires the University to record the disclosure. Eligible students have a right to inspect and review the record of disclosures. The University may disclose PII from the education records without obtaining prior written consent of the student —
  - To other **University officials**, including teachers, within the University whom the University has determined to have legitimate educational interests. A University official typically includes a person employed by the University in an administrative, supervisory, academic or research, or support staff position (including law enforcement unit personnel and health staff); a person serving on the Board of Trustees; or a student serving on an official committee, such as a disciplinary or grievance committee. A University official also may include a volunteer or contractor outside the University who performs an institutional service or function for which the University would otherwise use its own employees and who is under the direct control of the University with respect to the use and maintenance of PII from education records, such as an attorney, auditor, or collection agent or a student volunteering to assist another University official in performing his or her tasks. A University official has a **legitimate educational interest** if the official needs to review an education record in order to fulfill his or her professional responsibilities for the University. (§ 99.31(a)(1))
  - To officials of another school where the student seeks or intends to enroll, or where the student is already enrolled if the disclosure is for purposes related to the student's enrollment or transfer, subject to the requirements of section 99.34. (§ 99.31(a)(2))
  - To authorized representatives of the U. S. Comptroller General, the U.S. Attorney General, the U.S. Secretary of Education, or State and local educational authorities, such as a State postsecondary authority that is responsible for supervising the university's State-supported education programs. Disclosures under this provision may be made, subject to the requirements of section 99.35, in connection with an audit or evaluation of Federal- or State-supported education programs, or for the enforcement of or compliance with Federal legal requirements that relate to those programs. These entities may make further disclosures of PII to outside entities that are designated by them as their authorized representatives to conduct any audit, evaluation, or enforcement or compliance activity on their behalf. (§§ 99.31(a)(3) and 99.35)
  - In connection with financial aid for which the student has applied or which the student has received, if the information is necessary to determine eligibility for the aid, determine the amount of the aid, determine the conditions of the aid, or enforce the terms and conditions of the aid. (§ 99.31(a)(4))
  - To organizations conducting studies for, or on behalf of, the University, in order to: (a) develop, validate, or administer predictive tests; (b) administer student aid programs; or (c) improve instruction. (§ 99.31(a)(6))

- To accrediting organizations to carry out their accrediting functions. (§ 99.31(a)(7))
- To parents of an eligible student if the student is a dependent for IRS tax purposes. (§ 99.31(a)(8))
- To comply with a judicial order or lawfully issued subpoena. (§ 99.31(a)(9))
- To appropriate officials in connection with a health or safety emergency, subject to § 99.36. (§ 99.31(a)(10))
- Information the University has designated as “directory information” under § 99.37. (§ 99.31(a)(11))
- To a victim of an alleged perpetrator of a crime of violence or a non-forcible sex offense, subject to the requirements of § 99.39. The disclosure may only include the final results of the disciplinary proceeding with respect to that alleged crime or offense, regardless of the finding. (§ 99.31(a)(13))
- To the general public, the final results of a disciplinary proceeding, subject to the requirements of § 99.39, if the University determines the student is an alleged perpetrator of a crime of violence or non-forcible sex offense and the student has committed a violation of the University’s rules or policies with respect to the allegation made against him or her. (§ 99.31(a)(14))
- To parents of a student regarding the student’s violation of any Federal, State, or local law, or of any rule or policy of the University, governing the use or possession of alcohol or a controlled substance if the University determines the student committed a disciplinary violation and the student is under the age of 21. (§99.31(a)(15))

**4. The right to file a complaint with the U.S. Department of Education concerning alleged failures by the University to comply with the requirements of FERPA.**

The name and address of the Office that administers FERPA is:

Family Policy Compliance Office  
 U.S. Department of Education  
 400 Maryland Avenue, SW  
 Washington, DC 20202

**Directory Information**

FERPA designates certain information related to a student as "**Directory Information.**" FERPA gives the University the right to disclose such information to anyone inquiring without having to ask a student for permission, unless the student specifically requests in writing that all such information not be made public without written consent. Trine University has designated the following as “Directory Information”: Name, local address and telephone number, permanent address, e-mail address, date and place of birth, photograph or likeness, college, curriculum, enrollment status (full/part-time), classification, dates of attendance at Trine University, awards and academic honors, degrees and dates awarded, most recent previous educational institution attended, participation in officially recognized activities and athletic teams, and height and weight of student athletes.

While attending Trine University, students may request to restrict the release of their Directory Information except to University officials with a legitimate educational interest, as outlined in section three above. In order to restrict all information, a signed and dated written request must be made in writing to the Office of the Registrar. Students may notify the University at any time that he or she does not want any or all of the above types of information designated as Directory Information, but the notice will not be applied retroactively by the University.

# Arts and Sciences

## Trine University's Jannen School of Arts & Sciences includes:

- DEPARTMENT OF CRIMINAL JUSTICE
  - ASSOCIATE IN CRIMINAL JUSTICE
  - ASSOCIATE IN GENERAL STUDIES
  - BACHELOR OF SCIENCE WITH MAJOR IN CRIMINAL JUSTICE
  - BACHELOR OF ARTS WITH MAJOR IN GENERAL STUDIES
    - PRE-LEGAL
    - SELF-DESIGNED
- DEPARTMENT OF HUMANITIES AND COMMUNICATION
  - ASSOCIATE IN ARTS
  - BACHELOR OF ARTS WITH MAJOR IN COMMUNICATION
  - BACHELOR OF ARTS WITH MAJOR IN ENGLISH
- DEPARTMENT OF MATHEMATICS AND PHYSICS
  - ASSOCIATE IN SCIENCE WITH AN EMPHASIS IN MATHEMATICS
  - BACHELOR OF SCIENCE WITH MAJOR IN ACTUARIAL SCIENCE
  - BACHELOR OF SCIENCE WITH MAJOR IN MATHEMATICS
- DEPARTMENT OF MUSIC
- DEPARTMENT OF PSYCHOLOGY AND SOCIAL SCIENCES
  - BACHELOR OF SCIENCE WITH MAJOR IN PSYCHOLOGY
- DEPARTMENT OF SPORT AND RECREATION
  - BACHELOR OF SCIENCE WITH MAJOR IN SPORT AND RECREATION
- MATHEMATICS HELP SESSIONS
- WRITING CENTER

## The School

The Jannen School of Arts and Sciences was named in honor of Robert L. Jannen, a 1950 chemical engineering graduate and former member of the University's Board of Trustees, and his wife Dolores. The Jannen School prepares students in communication, criminal justice, English, psychology, and mathematics for careers in their chosen fields. The professional focus of its degree programs ensures graduates are ready for the workplace; the School's commitment to a liberal arts education prepares these same graduates to succeed, lead, and serve in a rapidly changing global economy in which the ability to solve problems creatively, think critically, and communicate effectively are often more highly valued than a technical education alone. The School also serves the entire student body by teaching the majority of the general education courses required for all

programs.

## Department of Criminal Justice

### Associate in Criminal Justice (60 hrs.)

A career in criminal justice is both exciting and rewarding. The well-rounded Associate in Criminal Justice (60 Credit Hours) degree program prepares you for a career in the justice system. Graduates who earn Trine University's Associate in Criminal Justice degree receive an academic base for a career in the criminal justice field. This degree also prepares you for more advanced education opportunities such as the Bachelor of Science in Criminal Justice.

#### Mission

The Department of Criminal Justice's mission is to provide career-oriented higher education and to deliver quality teaching to students seeking to complete the Trine University General Education requirements as well as to meet the social sciences, humanistic, global and American perspectives required by the Common Ground component in General Education.

#### Degree Requirements

##### General Education Requirements - 21 hours

##### Communication – 6 hrs.

ENG 143	College Composition	3
HUM 203	Humanities Seminar	3

##### Humanities and Social Science – 6 hrs.

SOC 103	Principles of Sociology	3
	Humanities	3

##### Mathematics and Science – 6 hrs.

	Mathematics Elective (3)	3
	Science Elective (3)	3

##### Other General Education – 3 hrs.

POLS 113	Introduction to Government	3
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##### Additional Requirements - 15 hours

##### Required

UE 101	University Experience	1
	Or	
UE 111	Online Learning Orientation	1
	Electives (14)	14

##### Content Requirements - 24 hours

##### Required

CRJ 103	Introduction to Criminal Justice	3
CRJ 133	Criminal Justice Report Writing	3
CRJ 153	Juvenile Justice	3
CRJ 263	Introduction to Criminal Law & Justice	3
CRJ 273	Criminal Procedure & Evidence	3
CRJ 343	Criminalistics & Crime Scene Investigations I	3



PSY 113	Principles of Psychology	3
PSY 383	Forensic Psychology	3

## Associate in General Studies (60 hrs.)

### Degree Requirements

General Education Requirements - 22 hours

Communication – 6 hrs.

ENG 143	College Composition	3
HUM 203	Humanities Seminar	3

Humanities and Social Science – 6 hrs.

Social Science Elective (3)	3
Humanities Elective (6)	6

Mathematics and Science – 6 hrs.

Mathematics Elective (3)	3
Science Elective (3)	3

Other – 4 hrs.

General Education Electives (4)	4
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Additional Requirements - 1 hour

Required

UE 101	University Experience	1
	Or	
UE 111	Online Learning Orientation	1

Content Requirements - 37 hours

37 credit hours, to include at least 9 hours earned from two different academic departments

## Bachelor of Science – Criminal Justice Major (120 hrs.)

The Department of Criminal Justice provides an educational environment in which students receive individual attention as well as excellence in teaching. The Department offers programs leading to careers in criminal justice, mental health, and social sciences education, as well as a preparation for further professional training in law, public administration, psychology, history, and social service. The Department aims to prepare graduates to be productive early in their professional careers and to assume leadership roles in the public and private sector, while providing service to society.

### Mission

The Department of Criminal Justice's mission is to provide career-oriented higher education and to deliver quality teaching to students seeking to complete the Trine University General Education requirements as well as to meet the social sciences, humanistic, global and American perspectives required by the Common Ground component in General Education.

### Degree Requirements

General Education Requirements - 36 hours

Communication – 9 hrs.

ENG 143	College Composition	3
HUM 203	Humanities Seminar	3

SP 203	Effective Speaking	3
	Or	
COM 163	Interpersonal Communication	3
Humanities and Social Science – 9 hrs.		
HIS 103	American History I	3
HIS 113	American History II	3
	Or	
HIS 203	World Civilization I	3
HIS 213	World Civilization II	3
	Humanities Elective (3)	3
Mathematics and Science – 9 hrs.		
BIO 1003	Plants and People (no lab)	3
	Mathematics Elective (3)	3
	Math or Science Elective (3)	3
Other – 9 hrs.		
SOC 103	Principles of Sociology	3
POLS 113	Introduction to Government	3
PSY 113	Principles of Psychology	3
Content Requirements - 69 hours		
Required		
UE 101	University Experience	1
	Or	
UE 111	Online Learning Orientation	1
CRJ 103	Introduction to Criminal Justice	3
CRJ 133	Criminal Justice Report Writing	3
CRJ 153	Juvenile Justice	3
CRJ 243	Introduction to Criminology	3
CRJ 263	Introduction to Criminal Law & Justice	3
CRJ 273	Criminal Procedure & Evidence	3
CRJ 343	Criminalistics & Crime Scene Investigations I	3
POLS 333	State & Local Government	3
POLS 403	American Constitutional Development	3
PSY 323	Abnormal Psychology	3
Capstone and Internship – 6 hrs.		
CRJ 433	Criminal Justice Capstone Demonstration	3
CRJ 473	Law Enforcement Internship	3

Free Electives – 32 hrs.

Electives are determined in conjunction with an advisor and based on student career objectives.

**Concentrations - 15 hours**

Select one of the following three concentrations.

**Option A – Criminal Justice Professional – 15 hrs.**

CRJ 363	Institutional Corrections & Law	3
PSY 303	Research Methods in Psychology	3
CRJ 423	Criminal Justice Agency Administration	3
CRJ 453	Topics in Criminal Justice	3
SOC 323	The Family	3

**Option B – Psychology – 15 hrs.**

PSY 223	Life Span Developmental Psychology	3
	Or	
PSY 353	Child & Adolescent Psychology	3
PSY 303	Research Methods in Psychology	3
PSY 333	Psychology of Personality	3
PSY 343	Social Psychology	3
PSY 423	Counseling Theories & Practices	3

**Option C – Indiana Law Enforcement – 15 hrs.**

Successful completion of Indiana Law Enforcement Academy Basic Police Training Course.

CRJ 4015	Basic Police Training Course	15
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**Bachelor of Arts - General Studies Major (120 hrs.)**

The Department of Criminal Justice offers a General Studies major with a Concentration in Pre-Legal Studies which is designed to prepare students for law school and is recommended for students intending to go to law school who do not have a strong interest in another undergraduate discipline. The department stresses that pre-law students should seek frequent, regular advice from their advisors and from the pre-law advisor located in this department.

**Pre-law**

Admission to an accredited school of law normally requires a bachelor's degree. The Association of American Law Schools does not recommend a specific major, but students will be expected to have a broad academic background, a good scholastic record, and acceptable scores on the law school admission test. Usually that type of preparation is more beneficial for a prospective law student than is the specialized study of subjects closely related to law.

Any degree program that stresses the ability to communicate both verbally and in writing, encourages an understanding of human values, promotes understanding, reasoning and critical thinking, and fosters creativity is an excellent program for a student planning to pursue a law degree after graduation.

**Degree Requirements****General Education Requirements - 36 hours****Communication – 9 hrs.**

ENG 143	College Composition	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3

**Humanities and Social Science – 9 hrs.**

HIS 103	American History I	3
HIS 113	American History II	3

Humanities Elective (3)		3
Mathematics and Science – 9 hrs.		
Mathematics Elective (3)		3
Science Elective (3)		3
Math or Science Elective (3)		3
Other – 9 hrs.		
CSIT 103	Introduction to Information Systems	3
POLS 113	Introduction to Government	3
PSY 113	Principles of Psychology	3

## Content Requirements - 36 hours

## Required

UE 101	University Experience	1
	Or	
UE 111	Online Learning Orientation	1

## Free Electives – 35 hrs.

Electives are determined in conjunction with an advisor and based on student career objectives.

## Concentrations - 48 hours

Select one of the Concentration options below.

## Option A – Pre-Legal Studies Concentration – 48 hrs.

COM 213	Business Communication	3
COM 363	Rhetoric and Persuasion	3
ENG 2113	American Literature I	3
POLS 333	State & Local Government	3
POLS 403	American Constitutional Development	3
LE 153	Juvenile Justice	3
LE 263	Introduction to Criminal Law & Justice	3
	And	
LE 273	Criminal Procedure & Evidence	3
	Or	
	9 hours from BA or LAW	9
PHL 313	Ethics	3
PHL 343	Logic	3
PSY 373	Political Psychology	3
SOC 103	Principles of Sociology	3
SOC 323	The Family	3
PL 4003	Legal Capstone Experience	3
	Electives (6)	6

*Electives: 6 hours from LE, ENG, PSY, or COM*

## Option B – Self-Designed Studies Concentration – 48 hrs.

15 to 30 hours must be taken from two to three different academic departments at the 300 level or higher.

GS 4003	Senior Capstone Project	3
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## Department of Humanities and Communication

### Associate in Arts (60 hrs.)

#### Mission

The Department of Humanities and Communication promotes the intellectual and personal development of all students through a platform of humanistic experiences and application of concentrated practical communication skills while preparing majors to lead, succeed, and serve in their careers and lives.

#### Outcomes

Students will be able to:

1. *Reading*: Demonstrate skill in close, critical reading of a variety of texts and genres
2. *Writing*: Possess skill in writing a variety of texts for multiple audiences and purposes
3. *Researching*: Apply appropriate research processes, tools, and methods to demonstrate critical understanding
4. *Applying*: Apply the skills of reading, writing, and researching to multiple professional and academic contexts
5. *Engaging*: Engage with texts and experiences from multiple cultures and diverse perspectives

#### Degree Requirements

General Education Requirements - 22 hours

Communication – 6 hrs.

ENG 133	Technical Communication	3
HUM 203	Humanities Seminar	3

Humanities and Social Science – 6 hrs.

Social Science Elective (3)	3
Humanities Elective (3)	3

Mathematics and Science - 7 hrs.

Mathematics Elective (3)	3
Lab Science Elective (4)	4

Other – 3 hrs.

General Education Electives (3)	3
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Additional Requirements - 14 hours

Required

UE 101	University Experience	1
SP 203	Effective Speaking	3
	Free Electives (10)	10

## Content Requirements - 24 hours

## Required

Complete 24 hours in one of the following areas:

COM	Communication
ENG	English
HIS	History
	Humanities
MUS	Music

*Humanities: See Humanities list*

## Bachelor of Arts—Communication Major (120 hrs.)

**Mission**

The Department of Humanities and Communication promotes the intellectual and personal development of all students through a platform of humanistic experiences and application of concentrated practical communication skills while preparing majors to lead, succeed, and serve in their careers and lives.

**Outcomes**

Students will be able to:

1. *Reading*: Demonstrate skill in close, critical reading of a variety of texts and genres
2. *Writing*: Possess skill in writing a variety of texts for multiple audiences and purposes
3. *Researching*: Apply appropriate research processes, tools, and methods to demonstrate critical understanding
4. *Applying*: Apply the skills of reading, writing, and researching to multiple professional and academic contexts
5. *Engaging*: Engage with texts and experiences from multiple cultures and diverse perspectives

**Degree Requirements**

General Education Requirements - 42 hours

Communication – 9 hrs.

ENG 143	College Composition	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3

Humanities and Social Science – 12 hrs.

FLM 203	Film Appreciation	3
PSY 113	Principles of Psychology	3
	Literature Course	3
	Social Science Elective (3)	3

Mathematics and Science – 9 hrs.

	Mathematics Elective (3)	3
	Science Elective (3)	3
	Math or Science Elective (3)	3

Other – 12 hrs.

COM 123	History of the Media	3
COM 163	Interpersonal Communication	3

COM 203	Media & Society	3
	General Education Electives (3)	3

## Content Requirements - 63 hours

## Required

UE 101	University Experience	1
	Or	
UE 111	Online Learning Orientation	1
COM 111	Practices & Professions	1
COM 153	Principles of Public Relations	3
COM 183	Writing For The Media	3
COM 213	Business Communication	3
COM 233	Intercultural Communication	3
COM 243	Digital Media Creation	3
COM 253	Event Planning & Promotion	3
COM 263	Communication Research	3
COM 293	Argumentation & Debate	3
COM 301	Media Practicum	1
COM 343	Web Content Management	3
COM 353	Public Relations Writing & Production	3
COM 363	Rhetoric and Persuasion	3
COM 383	Advanced Writing for the Media	3
COM 433	Media Law & Ethics	3
COM 453	Public Relations Planning & Campaigns	3

*COM 301: taken twice*

## Capstone and Internship – 3 hrs.

COM 4013	Senior Capstone Internship in Communication	3
	Or	
COM 4281	Senior Communication Project Proposal	1
	And	
COM 4292	Senior Communication Project	2

## Free Electives – 14 hrs.

Electives are determined in conjunction with an advisor and based

## COM+ Concentrations - 15 hours

Students choose one of the following professional preparation tracks.

## COM+ Criminal Justice – 15 hrs.

CRJ 103	Introduction to Criminal Justice	3
CRJ 133	Criminal Justice Report Writing	3
CRJ 153	Juvenile Justice	3
CRJ 263	Introduction to Criminal Law & Justice	3
CRJ 273	Criminal Procedure & Evidence	3

## COM+ Environment – 15 hrs.

Choose 15 hours from the list below. *Angola campus only*

BIO 124	Principles of Biology II	4
BIO 214	Conservation	4

BIO 334	Environmental Biology	4
EAS 213/GEO 213	Physical Geography	3
CE 3101	Environmental Engineering Lab	1
CE 3103	Environmental Engineering	3
CE 4113	Environmental Remediation	3

*NOTE: COM+ Environment may require pre-requisites. CE 3103 pre-requisite of CH 114 is waived for COM+ Environment students. Students should consult with their advisor.*

COM+ Graphic Design – 15 hrs.

COM 303	Digital Photography	3
COM 393	Design Thinking	3
COM 413	Corporate & Organizational Communication	3
MK 203	Marketing	3
MK 373	Graphic Design Fundamentals	3

COM+ Healthcare Administration – 15 hrs.

*Primarily online*

HC 213	Healthcare Market Analysis	3
HC 313	Professional Relationships	3
HC 323	Technology & Clinical Systems	3
HC 433	Applied Finance & Revenue Cycle	3
PHL 353	Ethical Issues in Medical Care	3

COM+ Information Systems – 15 hrs.

*Primarily online*

CSIT 103	Introduction to Information Systems	3
CSIT 123	Computing Infrastructure Basics	3
CSIT 223	Network Management	3
INF 263	Data Management	3
INF 343	Information Security	3

COM+ Leadership – 15 hrs.

*Primarily online*

LDR 103	Introduction to Organization Leadership	3
LDR 203	Leadership Strengths & Skills	3
LDR 303	Contemporary Leadership Theory & Practice	3
LDR 333	Organizational Leadership Development & Change	3
LDR 403	Creativity, Innovation, & Influence	3

COM+ Sports – 15 hrs.

*Angola campus only*

EXS 103	Teaching Sport Skills I	3
EXS 123	Teaching Sport Skills II	3
EXS 203	Risk and Sports	3
EXS 221	Officiating	1
EXS 483	Professional Development in Exercise Science	3

COM+ Strategic Focus – 15 hrs.

Choose at least 15 hours in consultation with your COM major advisor. These courses must be approved by the HAC



Department Chair to ensure they meet professional track requirements.

## Bachelor of Arts—English Major (120 hrs.)

### Mission

The Department of Humanities and Communication promotes the intellectual and personal development of all students through a platform of humanistic experiences and application of concentrated practical communication skills while preparing majors to lead, succeed, and serve in their careers and lives.

### Outcomes

Students will be able to:

1. *Reading*: Demonstrate skill in close, critical reading of a variety of texts and genres
2. *Writing*: Possess skill in writing a variety of texts for multiple audiences and purposes
3. *Researching*: Apply appropriate research processes, tools, and methods to demonstrate critical understanding
4. *Applying*: Apply the skills of reading, writing, and researching to multiple professional and academic contexts
5. *Engaging*: Engage with texts and experiences from multiple cultures and diverse perspectives

### Degree Requirements

General Education Requirements - 30 hours

Communication – 9 hrs.

ENG 143	College Composition	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3

Humanities and Social Science – 9 hrs.

COM 233	Intercultural Communication	3
PSY 113	Principles of Psychology	3
HIS	Elective	3

Mathematics and Science – 9 hrs.

Mathematics Elective (3)	3
Science Elective (3)	3
Math or Science Elective (3)	3

Other – 3 hrs.

Social Science Elective (3)	3
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Content Requirements - 90 hours

Required

UE 101	University Experience	1
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Free Electives – 29 hrs.

Electives are determined in conjunction with an advisor and based on student career objectives.

Composition Core – 15 hrs.

COM 183	Writing For The Media	3
COM 383	Advanced Writing for the Media	3

ENG 133	Technical Communication	3
ENG 273	Creative Writing	3
ENG 453	Advanced Composition	3
Literature Core – 24 hrs.		
ENG 153	Introduction to Literature	3
ENG 433	Shakespeare & His Times	3
	Literature Electives	12
Complete 2 Survey Courses – 6 hrs.		
ENG 2013	British Literature I	3
ENG 2023	British Literature II	3
ENG 2113	American Literature I	3
ENG 2123	American Literature II	3
ENG 253	World Literature	3
Professional Practice Core – 21 hrs.		
COM 111	Practices & Professions	1
COM 301	Media Practicum	1
COM 243	Digital Media Creation	3
COM 343	Web Content Management	3
ENG 363	The English Language	3
ENG 411	Writing Center Consulting Laboratory	1
ENG 412	Writing Center Consulting	2
ENG XX3	Literature through the Professional Lens	3
ENG 4023	Senior Capstone Internship	3

*COM 301: taken twice*

*ENG XX3: PENDING*

## Department of Mathematics and Physics

### Associate in Science with an Emphasis in Mathematics (60 hrs.)

#### Degree Requirements

General Education Requirements - 22 hours

Communication – 6 hrs.

ENG 133	Technical Communication	3
	Or	
ENG 143	College Composition	3
HUM 203	Humanities Seminar	3

Humanities and Social Science – 6 hrs.

Social Science Elective (3)	3
Humanities Elective (6)	6

Mathematics and Science – 7 hrs.

Mathematics Elective (3)	3
Lab Science Elective (4)	4

Other – 3 hrs.

General Education Electives (3)	3
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Additional Requirements - 18 hours

Required

UE 101	University Experience	1
	Electives (17)	17

Content Requirements - 20 hours

Mathematics courses

*Student must complete 20 total hours in mathematics***Bachelor of Science – Actuarial Science Major (120 hrs.)**

The Bachelor of Science with a major in Actuarial Science program at Trine University prepares students for a career as an actuary. Graduates will have the knowledge and skills to pass the preliminary exams P (Probability) and FM (Financial Mathematics) as given by the Society of Actuaries, as well as the foundation needed to prepare to pass the remaining exams offered by the society. Courses in the Bachelor of Science with a major in Actuarial Science program include the broad range of mathematics, probability and finance needed for success in the actuarial profession. Students will learn to solve problems in a non-deterministic setting using appropriate statistical and probabilistic methods, and to solve problems in a deterministic setting in finance and investments. They also will apply probabilistic and statistical tools and methods to areas such as finance, investments, insurance and risk analysis. Graduates who eventually pass actuarial exams can be employed by the government or by any business that needs to manage financial risk, including insurance companies, consulting firms, large corporations, hospitals, banks and investment firms.

**Degree Requirements**

General Education Requirements - 42 hours

Communication – 9 hrs.

ENG 133	Technical Communication	3
	Or	
ENG 143	College Composition	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3
	Or	
COM 163	Interpersonal Communication	3

Humanities and Social Science – 12 hrs.

ECO 213	Microeconomics	3
ECO 223	Macroeconomics	3
PHL 343	Logic	3
	Humanities Elective (6)	6

Mathematics and Science – 10 hrs.

MA 312	Historical Aspects of Mathematics	2
PH 224	University Physics I	4
PH 234	University Physics II	4

Or

CH 104	General Chemistry I	4
CH 114	General Chemistry II	4
	Or	
BIO 114	Principles of Biology I	4
BIO 124	Principles of Biology II	4
Other – 11 hrs.		
BA 213	Business Spreadsheets	3
EXS 102	Lifetime Wellness	2
CSIT 163	Using Programming to Solve Problems	3
	Or	
CS 1113	Introduction to Object-Oriented Program	3
	General Education Electives (3)	3

## Content Requirements - 78 hours

## Required

UE 101	University Experience	1
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## Content – 44 hrs.

*A grade of “C” or higher is required for each content course in the major.*

FIN 303	Managerial Finance	3
FIN 403	Investments	3
MA 134	Calculus I	4
MA 164	Calculus II	4
MA 213	Calculus III	3
MA 233	Differential Equations	3
MA 313	Introduction to Linear Algebra	3
MA 343	Introduction to Proofs	3
MA 3093	Probability	3
MA 393	Probability & Statistics	3
MA 3193	Financial Mathematics	3
MA 3293	Advanced Probability & Statistics	3
MA 403	Real Analysis	3
MA 4093	Actuarial Modeling	3

*MA 4093: Capstone*

## Free Electives – 33 hrs.

Electives are determined in conjunction with an advisor and based on student career objectives.

Electives (33)	33
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## Bachelor of Science – Mathematics Major (120 hrs.)

The mathematics curriculum is a broad-based program with special emphasis on developing critical reasoning skills and fostering competence in mathematical analysis, application, and expression. A BS degree in mathematics can lead to some of the most rewarding and satisfying careers, such as operations research analysts, mathematicians, statisticians, actuaries, data scientists, financial analysts, postsecondary teachers, cryptographers, and risk analyst, just to name a few. Moreover, several government agencies including NSA, NASA, FBI, CIA, private banks, insurance agencies, software developers, and other

STEM research organizations offer attractive career paths to math majors. Students in our program can further strengthen their academic and professional portfolio by choosing an appropriate academic minor, and/or a dual degree/major program. Being an institutional member of the Mathematical Association of America (MAA), we are able to offer complimentary MAA membership to our students, so that they can enjoy being in the largest national network of mathematicians. We sponsor our students to attend, and present at regional math meetings, and also offer independent study, and undergraduate research experience on as needed basis. Our academic and career advisors gladly help our students in setting and earning their goals, and our faculty takes great pride in preparing our students to succeed, lead, and serve.

### **Mission**

To develop students' capability to ask and answer well posed questions in myriad disciplines using tools from across the mathematical spectrum in order to prepare students for success in those disciplines.

### **Outcomes**

To apply mathematical skills to course-specific settings and problems requiring knowledge from multiple fields of mathematics.

To write proofs of mathematical statements with full rigor and to learn to find counterexamples to false statements.

To correctly and succinctly interpret mathematical objects and notions along with their underlying intuitive meanings.

To properly construct and format written mathematics for the purposes of giving talks and seminars.

To prepare for post-graduation success by securing a position in the work-force or building a strong application portfolio for admission to graduate school.

### **Degree Requirements**

General Education Requirements 33 hours

Communication – 9 hrs.

ENG 133	Technical Communication	3
	Or	
ENG 143	College Composition	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3
	Or	
COM 163	Interpersonal Communication	3

Humanities and Social Science – 9 hrs.

PHL 343	Logic	3
	Social Science Elective (3)	3
	Humanities or Social Science Elective	3

Mathematics and Science – 12 hrs.

MA 134	Calculus I	4
PH 224	University Physics I	4
PH 234	University Physics II	4
	Or	
CH 104	General Chemistry I	4
CH 114	General Chemistry II	4
	Or	
BIO 114	Principles of Biology I	4
BIO 124	Principles of Biology II	4

Other – 3 hrs.		
CS 1113	Introduction to Object-Oriented Program	3
	Or	
CSIT 163	Using Programming to Solve Problems	3

#### Content Requirements 87 hours

Required - 1 hr.		
UE 101	University Experience	1

#### Content – 40 hrs.

*A grade of “C” or higher is required for each mathematics course in the major.*

MA 143	Discrete Mathematics	3
MA 164	Calculus II	4
MA 213	Calculus III	3
MA 233	Differential Equations	3
MA 313	Introduction to Linear Algebra	3
MA 343	Introduction to Proofs	3
MA 373	Abstract Algebra	3
MA 453	Point-Set Topology	3
MA 403	Real Analysis	3
MA 423	Complex Variables	3
MA 473	Graph Theory & Combinatorics	3
MA 483	Mathematics Capstone I	3
MA 493	Mathematics Capstone II	3

#### Choose 9 credits from

MA 333	Number Theory	3
MA 353	Vector Analysis	3
MA 363	Advanced Differential Equations	3
MA 3093	Probability	3
MA 393	Probability & Statistics	3
MA 413	Advanced Linear Algebra	3

Electives – 37 hrs.		
	General Electives (37)	37

## Department of Psychology and Social Sciences

### Bachelor of Science – Psychology Major (120 hrs.)

#### **Mission**

The Department of Psychology will provide students with competency in psychology, including requisite skills in analyzing human behavior, a broad range of research and skills relating to psychology, an understanding and be able to apply psychological concepts and principles, knowledge of the ethical questions and issues in psychology, and a broad understanding of all major areas of psychology. The Department offers programs leading to careers in mental health and social sciences education, as well as a preparation for further professional training in law, public administration, psychology, history, and social service.

**Degree Requirements**

## General Education Requirements - 36 hours

## Communication – 9 hrs.

ENG 143	College Composition	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3
	Or	
COM 163	Interpersonal Communication	3

## Humanities and Social Science – 12 hrs.

PSY 113	Principles of Psychology	3
POLS 113	Introduction to Government	3
SOC 103	Principles of Sociology	3
	Humanities Elective (3)	3

## Mathematics and Science – 9 hrs.

	Mathematics Elective (3)	3
	Biology Elective (3)	3
	Math or Science Elective (3)	3

## Other – 6 hrs.

HIS 103	American History I	3
	And	
HIS 113	American History II	3
	Or	
HIS 203	World Civilization I	3
	And	
HIS 213	World Civilization II	3

## Content Requirements - 84 hours

## Required

UE 101	University Experience	1
	Or	
UE 111	Online Learning Orientation	1

## Electives – 35 hrs.

Students wishing to pursue graduate training in psychology should also take MA 113 College Algebra and MA 253 Statistics.

	Electives (35)	35
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## Required Core – 6 hrs.

PSY 303	Research Methods in Psychology	3
PSY 453	Clinical Internship I	3
	Or	
PSY 473	Psychology Capstone Demonstration	3

## Subject Area Concentrations - 24 hrs.

Choose four of the following clinical core courses – 12 hrs.

PSY 323	Abnormal Psychology	3
PSY 363	Human Behavior & Counseling	3
PSY 403	Human Sexuality	3
PSY 413	The Psychology of Addiction	3
PSY 423	Counseling Theories & Practices	3

Choose two of the following social/cognitive core courses – 6 hrs.

PSY 333	Psychology of Personality	3
PSY 343	Social Psychology	3
PSY 373	Political Psychology	3

Choose two of the following developmental core courses – 6 hrs.

PSY 223	Life Span Developmental Psychology	3
PSY 353	Child & Adolescent Psychology	3
SOC 323	The Family	3

## Additional Psychology Core Electives - 18 hrs.

Choose 18 hours from any above subject area courses not used or from the list below.

PSY 313	Topics in Psychology	3
PSY 383	Forensic Psychology	3
PSY 433	Issues of Substance Abuse in Family Systems	3
PSY 443	Advanced Forensic Psychology	3
PSY 483	Counseling Issues in Substance Abuse	3
PSY 493	Issues & Ethics in Psychology & Counseling	3
SOC 313	Topics in Sociology	3
SOC 343	Social Psychology	3
SM 393	Sport Psychology	3

## Department of Sport and Recreation

### Bachelor of Science — Sport and Recreation Major (120 hrs.)

The Bachelor of Science in Sport and Recreation degree at Trine University serves the growing number of students interested in a rewarding career in recreation. It is designed to provide a broad general education in physical activity, sports and sports-related fields.

Graduates of the Bachelor of Science in Sport and Recreation program will be prepared to create and administer recreational programs and to succeed in leadership roles in coaching, recreational programming or sports administration. They also will know the requirements to maintain a healthy lifestyle in order to maximize athletic performance.

#### Degree Requirements

General Education Requirements - 41 hours

Communication – 9 hrs.

ENG 133	Technical Communication	3
	Or	
ENG 143	College Composition	3



HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3

## Humanities and Social Science – 12 hrs.

Social Science Elective (6)	6
Humanities Elective (6)	6

## Mathematics and Science – 9 hrs.

Mathematics Elective (3)	3
Science Elective (3)	3
Math or Science Elective (3)	3

## Other – 11 hrs.

EXS 102	Lifetime Wellness	2
POLS 113	Introduction to Government	3
PSY 113	Principles of Psychology	3
	General Education Electives (3)	3

## Content Requirements - 79 hours

## Required

UE 101	University Experience	1
BA 123	Business Concepts	3

## Free Electives – 30 hrs.

Electives are determined in conjunction with an advisor and based on student career objectives.

Free Electives (30)	30
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## Concentrations – 45 hrs.

Select 30 credit hours from either Group A or Group B and 15 credit hours from the other column for a total of 45 credit hours.

## Group A

SM 133	Contemporary Issues in Sport	3
SM 223	History of Physical Education & Sport	3
MGT 303	Risk Management	3
SM 313	Principles of Sport & Recreation Management	3
SM 393	Sport Psychology	3
MGT 323	Leadership	3
MGT 363	Organizational Behavior	3
MGT 373	Facility Management	3
MK 203	Marketing	3
MGT 383	Principles of Project Management	3
MGT 403	Principles of Hospitality Management	3
SM 413	Organization & Administration of Physical Education & Athletics	3
SR 343	Internship in Sport & Recreation I	3

## Group B

EXS 103	Teaching Sport Skills I	3
EXS 221	Officiating	1
EXS 233	Drug Education	3
EXS 243	Athletic Training	3

EXS 263	Motor Learning	3
EXS 273	Nutrition	3
EXS 283	Fitness Evaluation Assessment	3
EXS 293	Biomechanics	3
EXS 333	Kinesiology	3
EXS 343	Principles of Human Performance	3
EXS 353	Exercise Physiology	3
EXS 363	Capstone Experience in Exercise Science I	3
EXS 373	Health Promotion & Problems	3
EXS 383	Nutrition Counseling	3
EXS 413	Corrective Exercise	3
EXS 423	Evaluation of Athletic Injuries	3
EXS 453	Capstone Experience in Exercise Science II	3
EXS 483	Professional Development in Exercise Science	3
EXS 493	Strength and Conditioning Preparation	3

# Business

## ASSOCIATE DEGREES:

- ACCOUNTING
- ACCOUNTING (ONLINE)
- BUSINESS ADMINISTRATION
- BUSINESS ADMINISTRATION (ONLINE)

## BACHELOR OF SCIENCE IN:

- ORGANIZATIONAL LEADERSHIP (ONLINE)

## BACHELOR OF SCIENCE IN BUSINESS ADMINISTRATION MAJORS (BSBA):

- ACCOUNTING
- ACCOUNTING (ONLINE)
- APPLIED MANAGEMENT
- APPLIED MANAGEMENT (ONLINE)
- BUSINESS ADMINISTRATION
- FINANCE
- GOLF MANAGEMENT
- HUMAN RESOURCE MANAGEMENT (ONLINE)
- INTERNATIONAL BUSINESS (GLOBAL PARTNERSHIP ONLY)
- MANAGEMENT
- MANAGEMENT (ONLINE)
- MARKETING
- SPORT MANAGEMENT

## The School

Trine University's Ketner School of Business (KSB) was named in honor of Dr. Ralph W. Ketner, a distinguished alumnus and friend of the University. Dr. Ketner is a co-founder of Food Lion, one of the U.S.'s largest supermarket chains.

Courses in accounting and business law date from when the school first opened its doors on June 17, 1884, making the business program the University's oldest continuous course of study.

All undergraduate majors offered in the Ketner School of Business at Trine University are accredited by the Accreditation Council for Business Schools and Programs (ACBSP), [www.acbsp.org](http://www.acbsp.org).

## Mission

Building tomorrow's business leaders one experience at a time, founded on critical thinking, integrity, passion, personal growth

and experiential learning. It's a Trine thing.

### **Program Objectives (for all KSB majors)**

1. Demonstrate critical thinking and problem solving abilities in an organization context.
2. Demonstrate effective oral and written communication skills.
3. Demonstrate responsible, appropriate, and effective use of information and communication technology (ICT) tools to access, manage, integrate, analyze, evaluate, create and communicate information.
4. Demonstrate computer skills.
5. Be prepared to seek and grow in a professional career path.
6. Demonstrate ethical acumen both personally and professionally.

### **Courses of Study**

The Ketner School of Business offers the programs of study listed at the beginning of this section. In addition, students may earn KSB minors as shown in the programs of study list. A 2.0 cumulative grade point average for all courses in the minor program is required for a minor to be awarded. For transfer students, at least 15 hours of the courses toward a minor must be taken at Trine University. Internship credit of up to six hours can be applied toward a minor, but the internship cannot be double counted (i.e. the hours can be applied to either a major or a minor, but not both).

### **Degree Requirements**

Each of the bachelor degrees in the Ketner School of Business requires 120 semester hours unless otherwise specified. Associate degrees in the School of Business require 60 semester hours.

The requirements for both the bachelor degrees and associate degrees involve the following:

1. A liberal arts and sciences curriculum which serves to enrich the academic program so that it constitutes a basic cultural education. Courses in written and oral communication, humanities, social sciences, natural sciences, and mathematics provide basic tools needed for applying knowledge in business administration toward worthwhile goals. The foundation of this curriculum is the general education requirements.
2. A business curriculum that provides the fundamentals through which the entire business enterprise operates.
3. A business specialty curriculum that supplements the business curriculum and allows students to develop a deeper understanding in a specialized area.
4. Business electives that provide for program flexibility and allow students to complement the required credits.

In developing an academic program, each student will have the assistance of a faculty advisor. The student, however, has the ultimate responsibility for meeting specific degree requirements. Prerequisites for individual courses must be carefully observed.

### **Double Majors**

Ketner School of Business students may receive double majors. To receive a double major (e.g., management and finance), a student must meet all requirements in both majors and have a minimum of 135 semester hours of credit. Business electives may count in only one major; a single business elective cannot meet the elective requirements for two business majors.

However, a required course in one major can count as an elective in another major.

### **Internships**

The Ketner School of Business requires every business student to enter into an internship during his/her course of study at Trine University. Internships are quickly becoming a requirement before a student can be considered for a permanent position by many companies.

The value of an internship to the student, to the sponsoring entity, and to the University/School of Business is considerable.

- The intern gains by actual work experience in a real-world capacity, thus clearly establishing true expectations of the job and profession;
- The company gains by being exposed early to potential employees and by having a chance to evaluate them; and
- The University gains by brokering potential employees and employers and assisting the community.

A maximum of six semester credit hours can be earned toward degree requirements with a maximum of three hours in any one work session. (Golf Management internships are taken for three semester hours.) Internships can take place during any semester but are especially encouraged during the summer. Advisor approval is required.

### **Master of Business Administration (MBA) Preparation for Non-Business Majors**

Students who would like to enter an MBA program after graduation should consider taking the following course. Prerequisites as shown in the Course description section of this catalog must be carefully observed.

#### **Course Requirements**

AC 203	Accounting I	3
AC 213	Accounting II	3
BA 343	International Business	3
ECO 213	Microeconomics	3
ECO 223	Macroeconomics	3
FIN 303	Managerial Finance	3
LAW 203	Business Law I	3
MA 253	Statistics	3
MGT 353	Designing Operations	3
MGT 363	Organizational Behavior	3
MK 203	Marketing	3

## **Associate Degrees**

### **Associate in Accounting (60 hrs.)**

The associate in accounting program is designed to prepare students for immediate entry into the accounting field. It combines a concentration in accounting and computer science with business, economics and general education subjects. This program is especially appropriate for positions in businesses that require a small but knowledgeable accounting staff. As all of the credits are fully transferable to the four-year accounting major at Trine University, it serves as an excellent program for students who subsequently plan to seek a Bachelor of Science degree with an accounting major. A specified number of credit hours must be taken in each section described below. Prerequisites as shown in the Course Descriptions section of this catalog must be carefully observed. Excess credit hours in a section may not ordinarily be counted toward requirements in another section.

#### **Degree Requirements**

General Education Requirements - 22 hours

Communication – 6 hrs.

ENG 133	Technical Communication	3
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	Or		
ENG 143	College Composition		3
HUM 203	Humanities Seminar		3
Humanities and Social Science – 6 hrs.			
ECO 213	Microeconomics		3
	Or		
ECO 223	Macroeconomics		3
	Humanities Elective (6)		6
Mathematics and Science – 7 hrs.			
MA 113	College Algebra		3
	Science Elective (3)		3
	Math or Science Elective (1)		1
Other – 3 hrs.			
SP 203	Effective Speaking		3
Additional Requirements - 8 hours			
Required			
BA 201	Profession Development & Strategies		1
Take one of the below:			
BA 101	University Experience for Ketner School of Business		1
BA 102	University Experience-Business Students		2
UE 101	University Experience		1
UE 111	Online Learning Orientation		1
Select two of the following courses - 6 hrs.			
BA 113	Business Computer Applications		3
COM 213	Business Communication		3
PSY 113	Principles of Psychology		3
Content Requirements - 30 hours			
Associate Business Core - 15 hrs.			
AC 203	Accounting I		3
AC 213	Accounting II		3
BA 123	Business Concepts		3
LAW 203	Business Law & Ethics		3
MK 203	Marketing		3
Concentration Requirements - 15 hrs.			
AC 303	Cost Accounting		3
AC 323	Intermediate Accounting I		3
AC 333	Intermediate Accounting II		3
AC 373	Accounting Information Systems		3
AC 423	Personal Income Tax		3
	Or		

AC 463	Auditing	3
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## Associate in Business Administration (60 hrs.)

The associate in business administration degree program is designed to prepare a person for entry into business with a broad understanding of various business activities and their interrelationships. It combines coursework in accounting, finance, marketing, business law, and management. Courses in economics, psychology, mathematics, computer science and communication are all part of this curriculum. Both traditional and non-traditional students will find this program of interest. All credits are transferable to a Trine University four-year business administration degree for those who choose to continue their education. A specified number of credit hours must be taken in each of the following sections. Prerequisites as shown in the Course Descriptions section of this catalog must be carefully observed. Excess credit hours in a section may not ordinarily be counted toward requirements in another section.

### Degree Requirements

#### General Education Requirements - 22 hours

##### Communication – 6 hrs.

ENG 133	Technical Communication	3
	Or	
ENG 143	College Composition	3
HUM 203	Humanities Seminar	3

##### Humanities and Social Science – 6 hrs.

ECO 213	Microeconomics	3
	Or	
ECO 223	Macroeconomics	3
	Humanities Elective (6)	6

##### Mathematics and Science – 7 hrs.

MA 113	College Algebra	3
	Science Elective (3)	3
	Math or Science Elective (1)	1

##### Other – 3 hrs.

SP 203	Effective Speaking	3
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#### Additional Requirements - 8 hours

##### Required

BA 201	Profession Development & Strategies	1
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##### Take one of the below:

BA 101	University Experience for Ketner School of Business	1
BA 102	University Experience-Business Students	2
UE 101	University Experience	1
UE 111	Online Learning Orientation	1

##### Select two of the following courses - 6 hrs.

BA 113	Business Computer Applications	3
COM 213	Business Communication	3

PSY 113	Principles of Psychology	3
Content Requirements - 30 hours		
Associate Business Core - 15 hrs.		
AC 203	Accounting I	3
AC 213	Accounting II	3
BA 123	Business Concepts	3
LAW 203	Business Law & Ethics	3
MK 203	Marketing	3
Concentration Requirements - 15 hrs.		
MGT 363	Organizational Behavior	3
	Electives (12)	12

*Electives: AC, BA, ECO, ENT, FIN, LAW, LDR, MGT, MK*

## Bachelor of Science in Business Administration Degrees

### Bachelor of Science in Business Administration – Accounting Major (120 hrs.)

In the dynamic and increasingly complex business world, students need to acquire a broad education in addition to specialized skills and knowledge of the profession. Accounting education provides the technical skills necessary to function in today's business environment and provides an understanding of all aspects of business.

#### UNIFORM CERTIFIED PUBLIC ACCOUNTING EXAMINATION CANDIDATES

The state of Indiana and many other states require that a first-time Uniform Certified Public Accounting (CPA) Examination candidate must have at least 150 semester hours of college credit, including a baccalaureate or higher degree, with an accounting concentration or its equivalent. An accounting major wishing to meet this requirement should plan an individualized program with his or her advisor.

#### Degree Requirements

##### General Education Requirements - 39 hours

##### Communication – 12 hrs.

ENG 133	Technical Communication	3
	Or	
ENG 143	College Composition	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3
COM 213	Business Communication	3

##### Humanities and Social Science – 9 hrs.

ECO 213	Microeconomics	3
ECO 223	Macroeconomics	3
	Or	
ECO 203	Survey of Economics	3
	Social Science Elective (3)	3
	Humanities Elective (3)	3



**Mathematics and Science – 12 hrs.**

MA 113	College Algebra	3
MA 173	Essential Calculus	3
	Or	
MA 163	Applied Math w/Business Concepts	3
MA 253	Statistics	3
	Science Elective (3)	3

**Other – 6 hrs.**

BA 213	Business Spreadsheets	3
PSY 113	Principles of Psychology	3

**Additional Requirements - 81 hours****Take one of the below:**

BA 101	University Experience for Ketner School of Business	1
BA 102	University Experience-Business Students	2
UE 101	University Experience	1

\*UE 111 Online Learning Orientation for students in the online program

**Business Core – 37-39hrs.**

AC 203	Accounting I	3
AC 213	Accounting II	3
BA 123	Business Concepts	3
BA 201	Profession Development & Strategies	1
BA 3113	Business Internship	3
BA 453	Global Strategic Management	3
FIN 303	Managerial Finance	3
FIN 353	Personal Finance	3
LAW 203	Business Law & Ethics	3
MGT 353	Designing Operations	3
MGT 363	Organizational Behavior	3
MGT 483	Capstone	3
MK 203	Marketing	3

BA 3113: Advisor will determine the appropriate class anywhere between BA 3111 and BA 3113 (1 - 3 credits worth of internship work)

**Concentration Requirements - 30 hrs.**

AC 303	Cost Accounting	3
AC 323	Intermediate Accounting I	3
AC 333	Intermediate Accounting II	3
AC 373	Accounting Information Systems	3
AC 403	Advanced Accounting	3
AC 423	Personal Income Tax	3
AC 463	Auditing	3
FIN 413	Advanced Managerial Finance	3
	Business Electives (6)	6

Business Electives: 300-400 level from AC or FIN

Electives – 12-14 hrs.

Free Electives (12-14)

12-14

## Bachelor of Science in Business Administration - Applied Management (120 hrs.)

The BSBA with a major in Applied Management degree is designed to prepare an individual with an interest in management in a field where technical competence, has at a minimum, been partially acquired. This program is available to individuals who have already completed some equivalent training in a business, health, technical field, or other specialty area not offered at Trine University. The degree is designed specifically for individuals who acquired training at community colleges, technical institutes, military service schools, industry related schools, etc., and who want to continue their education in the area of management. The program's goal is to equip students with the quality educational tools needed for a career in management.

### TECHNICAL SPECIALTY

Students completing the Bachelor of Applied Management degree program must complete a minimum of 27 semester hours in a business or technical field acquired through occupational, technical training or classroom instruction. As many as 3 additional semester hours in a technical specialty may count as electives.

### Degree Requirements

General Education Requirements - 39 hours

Communication – 12 hrs.

ENG 133	Technical Communication	3
	Or	
ENG 143	College Composition	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3
COM 213	Business Communication	3

Humanities and Social Science – 9 hrs.

ECO 213	Microeconomics	3
ECO 223	Macroeconomics	3
	Or	
ECO 203	Survey of Economics	3
	Social Science Elective (3)	3
	Humanities Elective (3)	3

Mathematics and Science – 12 hrs.

MA 113	College Algebra	3
MA 173	Essential Calculus	3
	Or	
MA 163	Applied Math w/Business Concepts	3
MA 253	Statistics	3
	Science Elective (3)	3

Other – 6 hrs.

BA 213	Business Spreadsheets	3
PSY 113	Principles of Psychology	3

**Additional Requirements - 81 hours**

Take one of the below:

BA 101	University Experience for Ketner School of Business	1
BA 102	University Experience-Business Students	2
UE 101	University Experience	1

\*UE 111 Online Learning Orientation for students in the online program

**Business Core – 37 - 39 hrs.**

AC 203	Accounting I	3
AC 213	Accounting II	3
BA 123	Business Concepts	3
BA 201	Profession Development & Strategies	1
BA 3113	Business Internship	3
BA 453	Global Strategic Management	3
FIN 303	Managerial Finance	3
FIN 353	Personal Finance	3
LAW 203	Business Law & Ethics	3
MGT 353	Designing Operations	3
MGT 363	Organizational Behavior	3
MGT 483	Capstone	3
MK 203	Marketing	3

BA 3111 - BA 3113: Advisor will determine the appropriate class anywhere between BA 3111 and BA 3113 (1 -3 credits worth of internship work)

**Concentration Requirements - 30 hrs.**

Business courses with approval of Advisor or Chair – Student must be transferring in all 27 hours of a technical field/concentration. If a student can't transfer in all 27 hours, it must be a field that can be completed at Trine such as Criminal Justice. If the student does not have 27 hours and it can't be completed at Trine, the transfer credits can't be accepted as an applied management concentration. They should be considered as a normal transfer evaluation.

Technical Field/Concentration Courses	27
Business Elective/Technical Specialty (3)	3

Business Elective/Technical Specialty: AC, ENT, FIN, HR, LAW, LDR, MGT, MK

**Electives – 12-14 hrs.**

Free Electives (12-14)	12-14
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**Bachelor of Science in Business Administration - Business Administration (120 hrs.)**

**Degree Requirements**

**General Education Requirements - 39 hours**

**Communication – 12 hrs.**

ENG 133	Technical Communication	3
	Or	
ENG 143	College Composition	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3
COM 213	Business Communication	3

## Humanities and Social Science – 9 hrs.

ECO 213	Microeconomics	3
ECO 223	Macroeconomics	3

Or

ECO 203	Survey of Economics	3
	Social Science Elective (3)	3

	Humanities Elective (3)	3
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## Mathematics and Science – 12 hrs.

MA 113	College Algebra	3
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MA 173	Essential Calculus	3
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Or

MA 163	Applied Math w/Business Concepts	3
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MA 253	Statistics	3
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	Science Elective (3)	3
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## Other – 6 hrs.

BA 213	Business Spreadsheets	3
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PSY 113	Principles of Psychology	3
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## Additional Requirements - 81 hours

## Take one of the below:

BA 101	University Experience for Ketner School of Business	1
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BA 102	University Experience-Business Students	2
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UE 101	University Experience	1
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\*UE 111 Online Learning Orientation for students in the online program

## Business Core – 37 - 39 hrs.

AC 203	Accounting I	3
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AC 213	Accounting II	3
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BA 123	Business Concepts	3
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BA 201	Profession Development & Strategies	1
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BA 3113	Business Internship	3
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BA 453	Global Strategic Management	3
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FIN 303	Managerial Finance	3
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FIN 353	Personal Finance	3
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LAW 203	Business Law & Ethics	3
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MGT 353	Designing Operations	3
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MGT 363	Organizational Behavior	3
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MGT 483	Capstone	3
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MK 203	Marketing	3
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BA 3111 - BA 3113: Advisor will determine the appropriate class anywhere between BA 3111 and BA 3113 (1 - 3 credits worth of internship work)

## Concentration Requirements - 30 hrs.

AC 303	Cost Accounting	3
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AC 373	Accounting Information Systems	3
BA 433	Business Analytics	3
FIN 413	Advanced Managerial Finance	3
MGT 303	Risk Management	3
MGT 313	Human Resource Management	3
MGT 323	Leadership	3
MK 323	Integrated Marketing Communication	3
MK 473	Digital Advertising (SEM/SEO)	3
	Business Elective (3)	3

Business elective: 300 - 400 level from AC, BA, ECO, ENT, FIN, HR, LAW, LDR, MGT, MK

Electives – 12-14 hrs.

Free Electives (12-14) 12-14

## Bachelor of Science in Business Administration - Finance Major (120 hrs.)

### Degree Requirements

General Education Requirements - 39 hours

Communication – 12 hrs.

ENG 133	Technical Communication	3
	Or	
ENG 143	College Composition	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3
COM 213	Business Communication	3

Humanities and Social Science – 9 hrs.

ECO 213	Microeconomics	3
ECO 223	Macroeconomics	3
	Or	
ECO 203	Survey of Economics	3
	Social Science Elective (3)	3
	Humanities	3

Mathematics and Science – 12 hrs.

MA 113	College Algebra	3
MA 173	Essential Calculus	3
	Or	
MA 163	Applied Math w/Business Concepts	3
MA 253	Statistics	3
	Science Elective (3)	3

Other – 6 hrs.

BA 213	Business Spreadsheets	3
PSY 113	Principles of Psychology	3

## Additional Requirements - 81 hours

Take one of the below:

BA 101	University Experience for Ketner School of Business	1
BA 102	University Experience-Business Students	2
UE 101	University Experience	1

\*UE 111 Online Learning Orientation for students in the online program

## Business Core – 37-39 hrs.

AC 203	Accounting I	3
AC 213	Accounting II	3
BA 123	Business Concepts	3
BA 201	Profession Development & Strategies	1
BA 3113	Business Internship	3
BA 453	Global Strategic Management	3
FIN 303	Managerial Finance	3
FIN 353	Personal Finance	3
LAW 203	Business Law & Ethics	3
MGT 353	Designing Operations	3
MGT 363	Organizational Behavior	3
MGT 483	Capstone	3
MK 203	Marketing	3

BA 3113: Advisor will determine the appropriate class anywhere between BA 3111 and BA 3113 (1 - 3 credits worth of internship work)

## Concentration Requirements - 30 hrs.

AC 423	Personal Income Tax	3
FIN 323	Money & Banking	3
FIN 403	Investments	3
FIN 413	Advanced Managerial Finance	3
FIN 473	Finance Modeling	3

## Corporate Track:

AC 303	Cost Accounting	3
FIN 343	International Finance	3
	Accounting or Finance Electives (9)	9

Accounting or Finance Electives: 300 level or above, including Graduate courses

## Wealth Management Track:

FIN 383	Risk & Insurance	3
FIN 423	Portfolio & Wealth Planning	3
MK 423	Professional Selling	3
	Accounting or Finance Elective (6)	6

Accounting or Finance Elective: 300 level or above, including Graduate courses

## Electives – 12-14 hrs.

Free Electives (12-14)	12-14
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**Bachelor of Science in Business Administration - Golf Management Major (120 hrs.)**

The Bachelor of Science in Business Administration Golf Management major prepares students to become trained professionals

ready for immediate employment in the golfing industry. The program incorporates a business administration core with a concentration in golf management coursework, including golf course promotion, turf management, and marketing strategies.

### Degree Requirements

#### General Education Requirements - 39 hours

##### Communication – 12 hrs.

ENG 133	Technical Communication	3
	Or	
ENG 143	College Composition	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3
COM 213	Business Communication	3

##### Humanities and Social Science – 9 hrs.

ECO 213	Microeconomics	3
ECO 223	Macroeconomics	3
	Or	
ECO 203	Survey of Economics	3
	Social Science Elective (3)	3
	Humanities Elective (3)	3

##### Mathematics and Science – 12 hrs.

MA 113	College Algebra	3
MA 173	Essential Calculus	3
	Or	
MA 163	Applied Math w/Business Concepts	3
MA 253	Statistics	3
	Science Elective (3)	3

##### Other – 6 hrs.

BA 213	Business Spreadsheets	3
PSY 113	Principles of Psychology	3

#### Additional Requirements - 81 hours

##### Take one of the below:

BA 101	University Experience for Ketner School of Business	1
BA 102	University Experience-Business Students	2
UE 101	University Experience	1

\*UE 111 Online Learning Orientation for students in the online program

##### Business Core – 37 - 39 hrs.

AC 203	Accounting I	3
AC 213	Accounting II	3
BA 123	Business Concepts	3

BA 201	Profession Development & Strategies	1
BA 3113	Business Internship	3
BA 453	Global Strategic Management	3
FIN 303	Managerial Finance	3
FIN 353	Personal Finance	3
LAW 203	Business Law & Ethics	3
MGT 353	Designing Operations	3
MGT 363	Organizational Behavior	3
MGT 483	Capstone	3
MK 203	Marketing	3

BA 3113: Advisor will determine the appropriate class anywhere between BA 3111 and BA 3113 (1 - 3 credits worth of internship work).

#### Concentration Requirements - 30 hrs.

GM 131	Player Development I	1
GM 203	Golf Shop Management	3
GM 213	Club Design, Repair & Fitting	3
GM 323	Teaching the Golf Swing	3
GM 462	Senior Seminar in Golf Management	2
MGT 403	Principles of Hospitality Management	3

#### Marketing Elective: 300-400 Level MK

#### Management Core

MGT 303	Risk Management	3
MGT 313	Human Resource Management	3
MGT 323	Leadership	3
MGT 383	Principles of Project Management	3
	Marketing Elective	3

#### MK Elective 300 - 400 level (3 hrs.)

#### Electives – 12-14 hrs.

Free Electives (12-14)	12-14
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## Bachelor of Science in Business Administration - Management Major (120 hrs.)

Management pervades all facets of a business organization. Operations management studies the manufacturing and service processes where many new quantitative techniques are applied. Human resources involves the study of the human factor in business organizations. Students who select this major are preparing themselves for positions in firms regardless of size or organizational structure.

### Degree Requirements

#### General Education Requirements - 39 hours

#### Communication – 12 hrs.

ENG 133	Technical Communication	3
	Or	
ENG 143	College Composition	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3
COM 213	Business Communication	3



## Humanities and Social Science – 9 hrs.

ECO 213	Microeconomics	3
ECO 223	Macroeconomics	3

Or

ECO 203	Survey of Economics	3
	Social Science Elective (3)	3

	Humanities	3
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## Mathematics and Science – 12 hrs.

MA 113	College Algebra	3
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MA 173	Essential Calculus	3
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Or

MA 163	Applied Math w/Business Concepts	3
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MA 253	Statistics	3
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	Science Elective (3)	3
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## Other – 6 hrs.

BA 213	Business Spreadsheets	3
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PSY 113	Principles of Psychology	3
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## Additional Requirements - 81 hours

## Take one of the below:

BA 101	University Experience for Ketner School of Business	1
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BA 102	University Experience-Business Students	2
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UE 101	University Experience	1
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\*UE 111 Online Learning Orientation for students in the online program

## Business Core – 35-37 hrs.

AC 203	Accounting I	3
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AC 213	Accounting II	3
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BA 123	Business Concepts	3
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BA 201	Profession Development & Strategies	1
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BA 3113	Business Internship	3
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BA 453	Global Strategic Management	3
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FIN 303	Managerial Finance	3
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FIN 353	Personal Finance	3
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LAW 203	Business Law & Ethics	3
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MGT 353	Designing Operations	3
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MGT 363	Organizational Behavior	3
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MGT 483	Capstone	3
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MK 203	Marketing	3
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BA 3111 - BA 3113: Advisor will determine the appropriate class anywhere between BA 3111 and BA 3113 (1 - 3 credits worth of internship work).

## Concentration Requirements - 30 hrs.

MGT 303	Risk Management	3
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MGT 313	Human Resource Management	3
MGT 323	Leadership	3
MGT 383	Principles of Project Management	3
BA 433	Business Analytics	3
	Electives (9)	9

Business Electives - Complete 15 hours of applicable courses with the following prefixes that align with student career goals and based upon advisor recommendation and approval (AC, BA, COM, ECO, ENT, FIN, GM, HC, HR, INF, LAW, LDR, MGT, MK, SM), including but not limited to the below optional tracks.

**Human Resource Track:**

LAW 403 Employment Law or HR 303 Compensation & Benefits  
 HR 323 Safety & Health Management  
 MGT 343 Human Resource Development

**Information Systems Track:**

CSIT 103 Introduction to Information Systems  
 CSIT 153 Introduction to Operating Systems  
 CSIT 223 Network Management

**Leadership Track:**

LDR 403 Creativity, Innovation, and Influence  
 LDR 433 Leadership Practicum  
 MGT 333 Supervision

**Operations/Supply Chain Management Track:**

MGT 373 Facility Management  
 MGT 413 Management of Quality  
 MGT 423 Supply Chain Management

**General Management Track:**

MGT Electives - Choose any MGT 300/400 Level courses for a total of 9 hrs.

Electives – 12-14 hrs.

Free Electives (12-14)

12-14

## Bachelor of Science in Business Administration - Marketing Major (120 hrs.)

Marketing involves creating and satisfying the demands of consumers. It is the study of the organizations and systems involved in the rendering of personal services to the consumer and the physical distribution of goods from the producer to the consumer. The marketing major will discover career opportunities in the fields of sales management, advertising, market research, retailing, brand/product management, merchandising, and marketing management.

### Degree Requirements

General Education Requirements - 39 hours

Communication – 12 hrs.

ENG 133	Technical Communication	3
	Or	
ENG 143	College Composition	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3
COM 213	Business Communication	3

## Humanities and Social Science – 9 hrs.

ECO 213	Microeconomics	3
ECO 223	Macroeconomics	3

Or

ECO 203	Survey of Economics	3
	Social Science Elective (3)	3

	Humanities	3
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## Mathematics and Science – 12 hrs.

MA 113	College Algebra	3
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MA 173	Essential Calculus	3
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Or

MA 163	Applied Math w/Business Concepts	3
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MA 253	Statistics	3
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	Science Elective (3)	3
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## Other – 6 hrs.

BA 213	Business Spreadsheets	3
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PSY 113	Principles of Psychology	3
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## Additional Requirements - 81 hours

## Take one of the below:

BA 101	University Experience for Ketner School of Business	1
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BA 102	University Experience-Business Students	2
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UE 101	University Experience	1
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\*UE 111 Online Learning Orientation for students in the online program

## Business Core – 37 - 39 hrs.

AC 203	Accounting I	3
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AC 213	Accounting II	3
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BA 123	Business Concepts	3
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BA 201	Profession Development & Strategies	1
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BA 3113	Business Internship	3
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FIN 303	Managerial Finance	3
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FIN 353	Personal Finance	3
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LAW 203	Business Law & Ethics	3
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MGT 353	Designing Operations	3
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MGT 363	Organizational Behavior	3
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MK 203	Marketing	3
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BA 453	Global Strategic Management	3
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MGT 483	Capstone	3
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BA 3111 - BA 3113: Advisor will determine the appropriate class (anywhere between 1 and 3 credits per internship)

## Concentration Requirements - 30 hrs.

MK 323	Integrated Marketing Communication	3
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MK 363/PSY 3063	Commerce and Consumer Behavior	3
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MK 423	Professional Selling	3
MK 433	Marketing Strategy	3
MK 463	Marketing Research	3
	Business Electives (15)	15

Business Electives - Complete 15 hours of applicable courses with the following prefixes that align with student career goals and based upon advisor recommendation and approval (AC, BA, COM, ECO, ENT, FIN, GM, HC, HR, INF, LAW, LDR, MGT, MK, SM), including but not limited to the below optional tracks.

**Marketing Analytics Track:**

BA 433 Business Analytics  
INF 263 Data Management  
INF 393 Data Visualization

**Marketing Management Track:**

MGT 323 Leadership  
BA 433 Business Analytics  
MGT 383 Principles of Project Management

**Media Creation/Creativity Track:**

MK 373 Graphic Design Fundamentals  
COM 243 Digital Media Creation  
COM 343 Web Content Management

**Sales Track:**

MK 423 Professional Selling  
BA 433 Business Analytics  
COM 233 Intercultural Communication

**General Marketing Track:**

MK Electives - Choose any MGT 300/400 Level courses for a total of 9 hrs.

Electives – 12-14 hrs.

Free Electives (12-14)

12-14

## Bachelor of Science in Business Administration - Sport Management Major (120 hrs.)

The Bachelor of Science in Business Administration Sport Management degree program was developed to meet the demand in collegiate and professional sports for business professionals who possess an extensive knowledge of sport and an understanding of the concerns and needs of athletes. Graduates of this program will work with personnel and marketing professionals to promote, regulate, and administer collegiate and professional sport programs.

### Degree Requirements

General Education Requirements - 39 hours

Communication – 12 hrs.

ENG 133	Technical Communication	3
	Or	
ENG 143	College Composition	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3
COM 213	Business Communication	3

## Humanities and Social Science – 9 hrs.

ECO 213	Microeconomics	3
ECO 223	Macroeconomics	3

Or

ECO 203	Survey of Economics	3
	Social Science Elective (3)	3
	Humanities Elective (3)	3

## Mathematics and Science – 12 hrs.

MA 113	College Algebra	3
MA 173	Essential Calculus	3
	Or	
MA 163	Applied Math w/Business Concepts	3
MA 253	Statistics	3
	Science Elective (3)	3

## Other – 6 hrs.

BA 213	Business Spreadsheets	3
PSY 113	Principles of Psychology	3

## Additional Requirements - 81 hours

## Take one of the below:

BA 101	University Experience for Ketner School of Business	1
BA 102	University Experience-Business Students	2
UE 101	University Experience	1

\*UE 111 Online Learning Orientation for students in the online program

## Business Core – 37 - 39 hrs.

AC 203	Accounting I	3
AC 213	Accounting II	3
BA 123	Business Concepts	3
BA 201	Profession Development & Strategies	1
BA 3113	Business Internship	3
BA 453	Global Strategic Management	3
FIN 303	Managerial Finance	3
FIN 353	Personal Finance	3
LAW 203	Business Law & Ethics	3
MGT 353	Designing Operations	3
MGT 363	Organizational Behavior	3
MGT 483	Capstone	3
MK 203	Marketing	3

BA 3111 - BA 3113: Advisor will determine the appropriate class anywhere between BA 3111 and BA 3113 (1 - 3 credits worth of internship work)

## Concentration Requirements - 30 hrs.

MGT 403	Principles of Hospitality Management	3
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SM 133	Contemporary Issues in Sport	3
SM 313	Principles of Sport & Recreation Management	3
SM 333	Sports Law and Ethics	3
SM 423	Capstone Experience in Sport Management	3
	Business Elective (3)	3

Business Elective - AC, BA, ECO, ENT, FIN, HR, LAW, LDR, MGT, MK 300-400 Level (3 hrs.)

Management Core

MGT 303	Risk Management	3
MGT 323	Leadership	3
MGT 383	Principles of Project Management	3
	Marketing Elective	3

MK Elective 300-400 Level (3 hrs.)

Electives – 12-14 hrs.

Free Electives (12-14)	12-14
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# Education

## BACHELOR OF SCIENCE WITH MAJORS IN:

- EDUCATION STUDIES
- ELEMENTARY EDUCATION
- ELEMENTARY/SPECIAL EDUCATION MILD INTERVENTION DUAL LICENSURE
- ENGLISH/LANGUAGE ARTS EDUCATION
- ENGLISH/LANGUAGE ARTS EDUCATION/SPECIAL EDUCATION MILD INTERVENTION DUAL LICENSURE
- HEALTH/PHYSICAL EDUCATION
- HEALTH/PHYSICAL EDUCATION/SPECIAL EDUCATION MILD INTERVENTION DUAL LICENSURE
- LIFE SCIENCE (BIOLOGY) EDUCATION (5-12)
- LIFE SCIENCE (BIOLOGY) EDUCATION (5-12)/SPECIAL EDUCATION MILD INTERVENTION DUAL LICENSURE (P-12)
- MATHEMATICS EDUCATION
- MATHEMATICS EDUCATION/SPECIAL EDUCATION MILD INTERVENTION DUAL LICENSURE
- SCIENCE/CHEMISTRY EDUCATION (5-12)
- SCIENCE/CHEMISTRY (5-12)/SPECIAL EDUCATION MILD INTERVENTION DUAL LICENSURE (P-12)
- SOCIAL STUDIES EDUCATION
- SOCIAL STUDIES EDUCATION/SPECIAL EDUCATION MILD INTERVENTION DUAL LICENSURE

## Trine University's Franks School of Education includes this department:

- SHEVENAUGH DEPARTMENT OF ELEMENTARY EDUCATION

*Information presented here is subject to change at any time, depending on actions taken by the Indiana Department of Education/Office of Educator Effectiveness and Licensing. Students are responsible for meeting any requirements for licensure that are in effect at the time they seek to be licensed. The requirements may differ from what is presented in this document. Students should remain alert to changes in requirements. Updated information is available from the Franks School of Education.*

## The School

The Franks School of Education was named in honor of Lawrence A. Franks, a 1959 mechanical engineering graduate and an emeritus member of the University's Board of Trustees.

Established in 1884 by a group of Angola citizens, the University began as part of the normal school movement that spread throughout much of the United States during the last half of the nineteenth century. The initial course of study at Tri-State Normal College included teacher education and commerce. In 1921, Frances Kain Shevenaugh earned her "teaching certificate" at Tri-State by completing a twelve-week course of study. In June, 2001, the University reorganized its basic structure to make education a visible component. To renew the tradition of serving the needs of public education in the service area and beyond, the School of Education was created.

## Accreditation

The Trine University Franks School of Education is accredited by the Council for the Accreditation of Educator Preparation (CAEP) and the Indiana Department of Education/Office of Educator Effectiveness and Licensing (IDOE).

## Mission of the School

The mission of the Franks School of Education at Trine University is to provide a supportive and challenging educational environment where teacher candidates embody the professional knowledge, skills, and dispositions required to positively impact the academic and social growth of all learners.

## Professional Commitments and Dispositions

The Franks School of Education has adopted the principles developed by the Council of Chief State School Officers (CCSSO) and the Interstate Teacher Candidate Assessment and Support Consortium (InTASC) as program performance learning outcomes (PO). This set of model core teaching standards outlines what teachers should know and be able to do to ensure every P-12 student succeeds.

1. **Learner Development.** The teacher candidate understands how learners grow and develop, recognizing that patterns of learning and development vary individually within and across the cognitive, linguistic, social, emotional, and physical areas, and designs and implements developmentally appropriate and challenging learning experiences.
2. **Learning Differences.** The teacher candidate uses understanding of individual differences and diverse cultures and communities to ensure inclusive learning environments that enable each learner to meet high standards.
3. **Learning Environments.** The teacher candidate works with others to create environments that support individual and collaborative learning, and that encourage positive social interaction, active engagement in learning, and self-motivation.
4. **Content Knowledge.** The teacher candidate understands the central concepts, tools of inquiry, and structures of discipline(s) he or she teaches and creates learning experiences that make the discipline accessible and meaningful for learners to assure mastery of the content.
5. **Application of Content.** The teacher candidate understands how to connect concepts and use differing perspectives to engage learners in critical thinking, creativity, and collaborative problem solving related to authentic local and global issues.
6. **Assessment.** The teacher candidate understands and uses multiple methods of assessment to engage learners in their own growth, to monitor learner progress, and to guide the teacher's and learner's decision making.
7. **Planning for Instruction.** The teacher candidate plans instruction that supports every student in meeting rigorous learning goals by drawing upon knowledge of content areas, curriculum, cross-disciplinary skills, and pedagogy, as well as knowledge of learners and the community context.
8. **Instructional Strategies.** The teacher candidate understands and uses a variety of instructional strategies to encourage learners to develop deep understanding of content areas and their connections, and to build skill to apply knowledge in meaningful ways.
9. **Professional Learning and Ethical Practice.** The teacher candidate engages in ongoing professional learning and uses evidence to continually evaluate his/her practice, particularly the effects of his/her choices and actions on others (learners, families, other professionals, and the community), and adapts practice to meet the needs of each learner.
10. **Leadership and Collaboration.** The teacher candidate seeks appropriate leadership roles and opportunities to take responsibility for student learning and development, to collaborate with learners, families, colleagues, other school professionals, and community members to ensure learner growth, and to advance the profession.

## Admission to Professional Education Sequence



Before taking the majority of EDU courses, which begins EDU 301 and EDU 303, teacher candidates must be officially admitted to the professional education sequence. To apply for the professional education sequence, teacher candidates must demonstrate basic skills competency by earning passing scores on the reading, mathematics, and writing sections of Praxis 1 (CORE) assessment or qualifying ACT/SAT scores, earn a 3.0 accumulative Trine GPA through at least 24 credit hours, complete an application form and clean criminal background check, and submit a positive letter of recommendation from academic advisor.

Transfer students must meet similar requirements. The Franks School of Education should be contacted for further details (260.665.4121).

### **Approved Programs**

All teacher preparation programs are approved by the Indiana Department of Education/Office of Educator Effectiveness and Licensing.

#### **Approved programs include the following:**

- **Chemistry Education (5-12)**
- **Chemistry Education (5-12)/Special Education Mild Intervention Dual Licensure (P-12)**
- **Elementary Education (K-6)**
- **Elementary Education/Special Education Mild Intervention Dual Licensure (P-12)**
- **English/Language Arts Education (5-12)**
- **English/Language Arts Education (5-12)/Special Education Mild Intervention Dual Licensure (P-12)**
- **Health/Physical Education (P-12)**
- **Health/Physical Education (P-12)/Special Education Mild Intervention Dual Licensure (P-12)**
- **Life Science (Biology) Education (5-12)**
- **Life Science (Biology) Education (5-12)/Special Education Mild Intervention Dual Licensure (P-12)**
- **Mathematics Education (5 -12)**
- **Mathematics Education (5 -12)/Special Education Mild Intervention Dual Licensure (P-12)**
- **Social Studies Education (5 -12)**
- **Social Studies Education (5 -12)/Special Education Mild Intervention Dual Licensure (P-12)**

Social studies education majors must choose at least one content area from economics, government and citizenship, historical perspectives, and/or psychology.

Applicable standards for each program are InTASC general standards, IDOE/OEEL developmental standards, and IDOE/OEEL content standards.

### **Remaining in Professional Education Sequence**

Once officially admitted, retention in the professional education sequence is contingent upon good academic standing and successful passing of all Franks School of Education (FSOE) requirements. The GPA required for admission is 3.0 overall.

### **Testing Requirements**

To be eligible for admission to the professional education sequence, FSOE determined passing scores on Praxis CORE

assessment or qualifying ACT/SAT scores must be submitted. To be eligible for Indiana teaching licensure, State of Indiana passing score(s) on required content area assessment and developmental (pedagogy) area assessment must be submitted. The Franks School of Education should always be consulted before a test is taken to ensure most recent testing requirements are met.

### **Student Teaching**

Student teaching is completed in an area school, generally within 40 miles of the University, as assigned by the placement coordinator for the Franks School of Education. The traditional student teacher participates in a classroom with a cooperating teacher for 16 full weeks. To be eligible for licensure, the teacher candidate must have earned an overall GPA of 3.0 or higher, a GPA of 3.0 or higher in all areas of licensure, must have successfully completed student teaching with a GPA of 3.0 or higher, and must have met all FSOE-determined requirements at established levels.

### **Licensing Advisor**

Trine University's licensing advisor is the Dean of the Franks School of Education.

## **Bachelor of Science with a Major in Degrees**

BACHELOR OF SCIENCE WITH MAJORS IN:

- EDUCATION STUDIES
- ELEMENTARY EDUCATION
- ELEMENTARY/SPECIAL EDUCATION MILD INTERVENTION DUAL LICENSURE
- ENGLISH/LANGUAGE ARTS EDUCATION
- ENGLISH/LANGUAGE ARTS EDUCATION/SPECIAL EDUCATION MILD INTERVENTION DUAL LICENSURE
- HEALTH/PHYSICAL EDUCATION
- HEALTH/PHYSICAL EDUCATION/SPECIAL EDUCATION MILD INTERVENTION DUAL LICENSURE
- LIFE SCIENCE (BIOLOGY) EDUCATION (5-12)
- LIFE SCIENCE (BIOLOGY) EDUCATION (5-12)/SPECIAL EDUCATION MILD INTERVENTION DUAL LICENSURE (P-12)
- MATHEMATICS EDUCATION
- MATHEMATICS EDUCATION/SPECIAL EDUCATION MILD INTERVENTION DUAL LICENSURE
- SCIENCE/CHEMISTRY EDUCATION (5-12)
- SCIENCE/CHEMISTRY (5-12)/SPECIAL EDUCATION MILD INTERVENTION DUAL LICENSURE (P-12)
- SOCIAL STUDIES EDUCATION
- SOCIAL STUDIES EDUCATION/SPECIAL EDUCATION MILD INTERVENTION DUAL LICENSURE

## Bachelor of Science Education Studies (Non-Licensure) (120 hrs.)

### Degree Requirements

General Education Requirements - 42 hours

Communication – 9 hrs.

ENG 143	College Composition	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3

Humanities and Social Science – 12 hrs.

ENG 153	Introduction to Literature	3
	Humanities Elective (3)	3
	Social Science Elective (6)	6

Mathematics and Science – 9 hrs.

MA 113	College Algebra	3
	Or	
MA 133	Quantitative Reasoning	3
	Science Elective (3)	3
	Math or Science Elective (3)	3

Other – 12 hrs.

PSY 113	Principles of Psychology	3
	General Education Electives (5)	5

Additional Requirements - 78 hours

Required

UE 101	University Experience	1
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Capstone and Internship – 3 hrs.

Internship will be arranged by the FSOE and based on student career objectives

EDU 4003	Directed Studies In Education	3
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Professional Education Requirements – 20 hrs.

Must complete at least 20 credit hours from the following EDU courses:

EDU 111	Education Exploration	1
EDU 211	Education Immersion	1
EDU 212	Music for the Elementary Teacher	2
EDU 222	Educational Psychology for the Elementary Teacher	2
EDU 232	Educational Psychology for the Middle & Secondary School Teacher	2
EDU 242	Physical Education for the Elementary School Teacher	2
EDU 252	School & Community Health	2
EDU 273	Issues in American Education	3
EDU 322	Culturally Responsive Teaching	2
EDU 362	Classroom Behavior & Environment	2
EDU 462	Educational Measurement	2
EDU 463	Educational Media And Technology	3

Concentration Requirements - 30 hrs.

Must complete at least 15 credit hours listed as options from **two** of the following minors. If approved by academic advisor, student can choose an option not listed to fulfill concentration hour requirement.

Option A – Coaching Minor 18 hrs.

EXS 483	Professional Development in Exercise Science	3
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Choose 15 Credits from the following courses:

BIO 154	Human Body Systems	4
EXS 103	Teaching Sport Skills I	3

EXS 203	Risk and Sports	3
	Or	

MGT 303	Risk Management	3
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EXS 273	Nutrition	3
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EXS 343	Principles of Human Performance	3
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EXS 493	Strength and Conditioning Preparation	3
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LDR 203	Leadership Strengths & Skills	3
	Or	

MGT 323	Leadership	3
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SM 393	Sport Psychology	3
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Option B – Communication Minor 15 hrs.

COM 163	Interpersonal Communication	3
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COM		12
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*COM: prefix courses with at least six hours at the 300-level or above.*

Option C – Exercise Science Minor 15 hrs.

EXS 483	Professional Development in Exercise Science	3
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Choose 12 Credits from the following courses:

BIO 154	Human Body Systems	4
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EXS 102	Lifetime Wellness	2
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EXS 103	Teaching Sport Skills I	3
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EXS 273	Nutrition	3
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EXS 283	Fitness Evaluation Assessment	3
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EXS 333	Kinesiology	3
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EXS 353	Exercise Physiology	3
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EXS 373	Health Promotion & Problems	3
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Option D – Leadership Minor 24 hrs.

COM 163	Interpersonal Communication	3
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LDR 403	Creativity, Innovation, & Influence	3
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LDR 433	Leadership Practicum	3
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MGT 323	Leadership	3
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PHL 313	Ethics	3
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PSY 113	Principles of Psychology	3
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Choose two courses from the following:

BA 333	Social Media For Business	3
COM 213	Business Communication	3
COM 233	Intercultural Communication	3
COM 363	Rhetoric and Persuasion	3
COM 413	Corporate & Organizational Communication	3
POLS 343	American Political Thought	3
POLS 373	Political Psychology	3
MGT 313	Human Resource Management	3
MGT 333	Supervision	3
MGT 343	Human Resource Development	3
MGT 363	Organizational Behavior	3
MGT 413	Management Of Quality	3
MGT 443	Managing Operations	3
MGT 453	Strategic Management	3
PSY 343	Social Psychology	3
PSY 373	Political Psychology	3
SM 313	Principles of Sport & Recreation Management	3
SM 393	Sport Psychology	3
SM 413	Organization & Administration of Physical Education & Athletics	3

Option E – Music Minor 25 hrs.

MUS 112	Piano Lab	2
MUS 113	Music Theory I	3
MUS 123	Music History I	3
MUS 213	Music Theory II	3
MUS 223	Music History II	3
MUS 253	Techniques of Conducting	3

Select Applied Studies (4 hrs.)

Complete 4 hours of Applied Studies in either Woodwind, Brass, Percussion, String or Voice.

MUS 1011	Applied Studies	1
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Select Ensemble Studies (4 hrs.)

MUS 1141	Chamber Orchestra	1
MUS 1151	Marching Band	1
MUS 1161	Wind Ensemble/Pep Band	1
MUS 1171	University Choir	1
MUS 1181	Jazz Band	1
MUS 1191	Jazz/Show Choir	1

Option F – Psychology 15 hrs.

PSY 113	Principles of Psychology	3
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Choose 1 from Clinical Core Courses (3 hrs.)

PSY 323	Abnormal Psychology	3
PSY 363	Human Behavior & Counseling	3
PSY 413	The Psychology of Addiction	3
PSY 423	Counseling Theories & Practices	3

Choose 1 from Social Core Courses (3 hrs.)

PSY 333	Psychology of Personality	3
PSY 343	Social Psychology	3

PSY 373	Political Psychology	3
Choose 1 from Developmental Core Courses (3 hrs.)		
PSY 223	Life Span Developmental Psychology	3
SOC 323	The Family	3
PSY 353	Child & Adolescent Psychology	3
Electives (3 hrs.)		
PSY prefix course 200 level or above		
Electives – 30 hrs.		
Elective hours determined in conjunction with advisor and based on student career objectives		
	Free Electives (30)	30

## Bachelor of Science Elementary Education (K–6) (120 hrs.)

To be eligible for licensure as an elementary teacher in grades K–6, the following program of study must be completed.

### Degree Requirements

#### General Education Requirements - 33 hours

##### Communication – 9 hrs.

ENG 143	College Composition	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3
	Or	
COM 163	Interpersonal Communication	3

##### Humanities and Social Science – 9 hrs.

ENG 153	Introduction to Literature	3
PSY 113	Principles of Psychology	3
HIS 103	American History I	3

##### Mathematics and Science – 11 hrs.

MA 184	Mathematics for Elementary Teachers I	4
MA 194	Mathematics for Elementary Teachers II	4
BIO 1003	Plants and People (no lab)	3

##### Other – 4 hrs.

PH 104	Physical Science	4
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#### Additional Requirements - 87 hours

##### Required

UE 101	University Experience	1
SOC 323	The Family	3
GEO 303	Human Geography	3
GEO 323	World Geography	3
POLS 113	Introduction to Government	3
HIS 113	American History II	3

##### Professional Education Requirements – 61 hrs.

EDU 111	Education Exploration	1
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EDU 211	Education Immersion	1
EDU 212	Music for the Elementary Teacher	2
EDU 222	Educational Psychology for the Elementary Teacher	2
EDU 242	Physical Education for the Elementary School Teacher	2
EDU 252	School & Community Health	2
EDU 273	Issues in American Education	3
EDU 301	Instructional Design Practicum	1
EDU 303	Instructional Design	3
EDU 312	Exceptional Learners	2
EDU 322	Culturally Responsive Teaching	2
EDU 353	Children's Literature	3
EDU 362	Classroom Behavior & Environment	2
EDU 372	Teaching of Literacy (3-6)	2
EDU 441	Teaching of Literacy Practicum	1
EDU 445	Teaching of Literacy (K-2)	5
EDU 452	Art for the Elementary Teacher	2
EDU 454	Methods of Teaching Mathematics & Science	4
EDU 462	Educational Measurement	2
EDU 463	Educational Media And Technology	3
EDU 464	Methods of Teaching Language Arts & Social Studies	4
EDU 470	Supervised Student Teaching	10
EDU 482	Student Teaching Seminar	2

Electives – 10 hrs.

Elective hours determined in conjunction with advisor and based on student career objectives

Free Electives (10)	10
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## Bachelor of Science Dual Licensure Elementary Education (K–6)/Special Education Mild Intervention (P-12) (120 hrs.)

To be eligible for dual licensure as an elementary teacher/special education teacher in grades K–6, the following program of study must be completed.

### Degree Requirements

General Education Requirements - 33 hours

Communication – 9 hrs.

ENG 143	College Composition	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3
	Or	
COM 163	Interpersonal Communication	3

Humanities and Social Science – 9 hrs.

ENG 153	Introduction to Literature	3
PSY 113	Principles of Psychology	3
HIS 103	American History I	3

## Mathematics and Science – 11 hrs.

MA 184	Mathematics for Elementary Teachers I	4
MA 194	Mathematics for Elementary Teachers II	4
BIO 1003	Plants and People (no lab)	3

## Other – 4 hrs.

PH 104	Physical Science	4
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## Additional Requirements - 87 hours

## Required

UE 101	University Experience	1
SOC 323	The Family	3
GEO 303	Human Geography	3
GEO 323	World Geography	3
POLS 113	Introduction to Government	3
HIS 113	American History II	3

## Professional Education Requirements – 59 hrs.

EDU 111	Education Exploration	1
EDU 211	Education Immersion	1
EDU 212	Music for the Elementary Teacher	2
EDU 222	Educational Psychology for the Elementary Teacher	2
EDU 242	Physical Education for the Elementary School Teacher	2
EDU 252	School & Community Health	2
EDU 273	Issues in American Education	3
EDU 301	Instructional Design Practicum	1
EDU 303	Instructional Design	3
EDU 322	Culturally Responsive Teaching	2
EDU 353	Children's Literature	3
EDU 362	Classroom Behavior & Environment	2
EDU 372	Teaching of Literacy (3-6)	2
EDU 441	Teaching of Literacy Practicum	1
EDU 445	Teaching of Literacy (K-2)	5
EDU 452	Art for the Elementary Teacher	2
EDU 454	Methods of Teaching Mathematics & Science	4
EDU 462	Educational Measurement	2
EDU 463	Educational Media And Technology	3
EDU 464	Methods of Teaching Language Arts & Social Studies	4
EDU 470	Supervised Student Teaching	10
EDU 482	Student Teaching Seminar	2

## Special Education Mild Intervention (P-12) – 12 hrs.

EDU 181	Introduction to Teaching Students with Mild Exceptional Needs	1
EDU 282	The Development of Students with Mild Except Needs	2
EDU 382	Behavioral Analysis of Students with Mild Exceptional Needs	2
EDU 483	Individualized Planning & Assessment of Students with Mild Exceptional Needs	3



EDU 484	Methods of Teaching Students with Mild Exceptional Needs	4
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## Bachelor of Science - English/Language Arts Education (5–12) (120 hrs.)

To be eligible for licensure as an English/Language Arts teacher in grades 5-12, the following program of study must be completed.

### Degree Requirements

General Education Requirements - 30 hours

Communication – 12 hrs.

ENG 143	College Composition	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3
COM 163	Interpersonal Communication	3

Humanities and Social Science – 9 hrs.

ENG 153	Introduction to Literature	3
PSY 113	Principles of Psychology	3
FLM 203	Film Appreciation	3

Mathematics and Science – 9 hrs.

MA 113	College Algebra	3
	Or	
	Higher Math	
	Science Elective (3)	3
	Math or Science Elective (3)	3

Additional Requirements - 90 hours

Required

UE 101	University Experience	1
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English/Language Arts Content Area – 43 hrs.

Content Requirements – 9 hours

ENG 233	Mythology	3
ENG 273	Creative Writing	3
ENG 433	Shakespeare & His Times	3

English Language – 3 hours

ENG 363	The English Language	3
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Writing and Composition – 13 hours

ENG 133	Technical Communication	3
ENG 303	Advanced Technical Communication	3
	Or	
ENG 453	Advanced Composition	3
ENG 412	Writing Center Consulting	2
ENG 411	Writing Center Consulting Laboratory	1
COM 183	Writing For The Media	3

*ENG 411: taken twice*

## Literature Surveys – 9 hours (take 3)

ENG 2013	British Literature I	3
ENG 2023	British Literature II	3
ENG 2113	American Literature I	3
ENG 2123	American Literature II	3
ENG 253	World Literature	3

## Literature Electives – 9 hours (take 3)\*

ENG 263	Contemporary Themes in Literatures	3
ENG 3303	The Bible as Literature	3
ENG 423	Drama	3
ENG 443	Poetry	3

*\*Or upper division literature course as approved by advisor*

## Professional Education Requirements – 45 hrs.

EDU 111	Education Exploration	1
EDU 211	Education Immersion	1
EDU 232	Educational Psychology for the Middle & Secondary School Teacher	2
EDU 273	Issues in American Education	3
EDU 301	Instructional Design Practicum	1
EDU 303	Instructional Design	3
EDU 312	Exceptional Learners	2
EDU 322	Culturally Responsive Teaching	2
EDU 331	Literacy in the Content Area Practicum	1
EDU 332	Literacy in the Content Area	2
EDU 362	Classroom Behavior & Environment	2
EDU 411	Practicum in Teaching - Middle School	1
EDU 412	The Middle School	2
EDU 422	Middle School Methods	2
EDU 431	Secondary Methods Practicum	1
EDU 442	Secondary Methods	2
EDU 462	Educational Measurement	2
EDU 463	Educational Media And Technology	3
EDU 470	Supervised Student Teaching	10
EDU 482	Student Teaching Seminar	2

## Electives – 1 hrs.

Elective hours determined in conjunction with advisor and based on student career objectives

Free Electives (1)	1
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## Bachelor of Science English/Language Arts Education (5-12) and Special Education Mild Intervention (P–12) (127 hrs.)

To be eligible for licensure as an English/Language Arts teacher in grades 5-12 and Special Education for Mild Interventions in grades P-12, the following program of study must be completed.

**Degree Requirements**

## General Education Requirements - 30 hours

## Communication – 12 hrs.

ENG 143	College Composition	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3
COM 163	Interpersonal Communication	3

## Humanities and Social Science – 9 hrs.

ENG 153	Introduction to Literature	3
PSY 113	Principles of Psychology	3
FLM 203	Film Appreciation	3

## Mathematics and Science – 9 hrs.

MA 113	College Algebra	3
	Or	
	Higher Math	
	Science Elective (3)	3
	Math or Science Elective (3)	3

## Additional Requirements - 97 hours

## Required

UE 101	University Experience	1
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## English/Language Arts Content Area – 43 hrs.

## Content Requirements – 9 hours

ENG 233	Mythology	3
ENG 273	Creative Writing	3
ENG 433	Shakespeare & His Times	3

## English Language – 3 hours

ENG 363	The English Language	3
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## Writing and Composition – 13 hours

ENG 133	Technical Communication	3
ENG 303	Advanced Technical Communication	3
	Or	
ENG 453	Advanced Composition	3
ENG 412	Writing Center Consulting	2
ENG 411	Writing Center Consulting Laboratory	1
COM 183	Writing For The Media	3

*ENG 411: taken twice*

## Literature Surveys – 9 hours (take 3)

ENG 2013	British Literature I	3
ENG 2023	British Literature II	3
ENG 2113	American Literature I	3
ENG 2123	American Literature II	3

ENG 253	World Literature	3
Literature Electives – 9 hours (take 3)*		
ENG 263	Contemporary Themes in Literatures	3
ENG 3303	The Bible as Literature	3
ENG 423	Drama	3
ENG 443	Poetry	3
<i>*Or upper division literature course as approved by advisor</i>		
Professional Education Requirements – 44 hrs.		
EDU 111	Education Exploration	1
EDU 211	Education Immersion	1
EDU 232	Educational Psychology for the Middle & Secondary School Teacher	2
EDU 273	Issues in American Education	3
EDU 301	Instructional Design Practicum	1
EDU 303	Instructional Design	3
EDU 322	Culturally Responsive Teaching	2
EDU 331	Literacy in the Content Area Practicum	1
EDU 332	Literacy in the Content Area	2
EDU 362	Classroom Behavior & Environment	2
EDU 411	Practicum in Teaching - Middle School	1
EDU 412	The Middle School	2
EDU 422	Middle School Methods	2
EDU 431	Secondary Methods Practicum	1
EDU 442	Secondary Methods	2
EDU 462	Educational Measurement	2
EDU 463	Educational Media And Technology	3
EDU 470	Supervised Student Teaching	10
EDU 482	Student Teaching Seminar	2
Special Education Mild Intervention (P-12) – 12 hrs.		
EDU 181	Introduction to Teaching Students with Mild Exceptional Needs	1
EDU 282	The Development of Students with Mild Except Needs	2
EDU 382	Behavioral Analysis of Students with Mild Exceptional Needs	2
EDU 483	Individualized Planning & Assessment of Students with Mild Exceptional Needs	3
EDU 484	Methods of Teaching Students with Mild Exceptional Needs	4

## Bachelor of Science Health/Physical Education (P–12) (120 hrs.)

To be eligible for licensure as a health and/or physical education teacher in grades P-12, the following program of study must be completed.

### Degree Requirements

General Education Requirements - 30 hours

Communication – 9 hrs.

ENG 143	College Composition	3
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HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3
	Or	
COM 163	Interpersonal Communication	3
Humanities and Social Science – 9 hrs.		
ENG 153	Introduction to Literature	3
PSY 113	Principles of Psychology	3
EDU 273	Issues in American Education	3
Mathematics and Science – 10 hrs.		
MA 113	College Algebra	3
	Or	
	Higher Math	
BIO 1003	Plants and People (no lab)	3
BIO 154	Human Body Systems	4
Other – 2 hrs.		
EXS 102	Lifetime Wellness	2
Additional Requirements - 90 hours		
Required		
UE 101	University Experience	1
Health and Physical Education Content Area – 39 hrs.		
BIO 163	Medical Terminology	3
EXS 103	Teaching Sport Skills I	3
EXS 243	Athletic Training	3
EXS 263	Motor Learning	3
EXS 273	Nutrition	3
EXS 293	Biomechanics	3
EXS 333	Kinesiology	3
EXS 373	Health Promotion & Problems	3
EXS 383	Nutrition Counseling	3
EXS 483	Professional Development in Exercise Science	3
EXS 493	Strength and Conditioning Preparation	3
SM 223	History of Physical Education & Sport	3
MGT 303	Risk Management	3
	Or	
EXS 203	Risk and Sports	3
Professional Education Requirements – 48 hrs.		
EDU 111	Education Exploration	1
EDU 211	Education Immersion	1
EDU 222	Educational Psychology for the Elementary Teacher	2
EDU 232	Educational Psychology for the Middle & Secondary School Teacher	2
EDU 242	Physical Education for the Elementary School Teacher	2
EDU 252	School & Community Health	2

EDU 301	Instructional Design Practicum	1
EDU 303	Instructional Design	3
EDU 312	Exceptional Learners	2
EDU 322	Culturally Responsive Teaching	2
EDU 331	Literacy in the Content Area Practicum	1
EDU 332	Literacy in the Content Area	2
EDU 362	Classroom Behavior & Environment	2
EDU 411	Practicum in Teaching - Middle School	1
EDU 412	The Middle School	2
EDU 422	Middle School Methods	2
EDU 431	Secondary Methods Practicum	1
EDU 442	Secondary Methods	2
EDU 462	Educational Measurement	2
EDU 463	Educational Media And Technology	3
EDU 470	Supervised Student Teaching	10
EDU 482	Student Teaching Seminar	2

Electives – 2 hrs.

Elective hours determined in conjunction with advisor and based on student career objectives

Free Electives (2)	2
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## Bachelor of Science Health/Physical Education (P–12) and Special Education Mild Interventions (P-12) (126 hrs.)

To be eligible for licensure as a health and/or physical education teacher in grades P-12, and Special Education for Mild Intervention in grades P-12, the following program of study must be completed.

### Degree Requirements

General Education Requirements - 30 hours

Communication – 9 hrs.

ENG 143	College Composition	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3
	Or	
COM 163	Interpersonal Communication	3

Humanities and Social Science – 9 hrs.

ENG 153	Introduction to Literature	3
PSY 113	Principles of Psychology	3
EDU 273	Issues in American Education	3

Mathematics and Science – 10 hrs.

MA 113	College Algebra	3
	Or	
	Higher Math	
BIO 1003	Plants and People (no lab)	3
BIO 154	Human Body Systems	4

Other – 2 hrs.

EXS 102	Lifetime Wellness	2
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## Additional Requirements - 96 hours

Required		
UE 101	University Experience	1
Health and Physical Education Content Area – 39 hrs.		
BIO 163	Medical Terminology	3
EXS 103	Teaching Sport Skills I	3
EXS 243	Athletic Training	3
EXS 263	Motor Learning	3
EXS 273	Nutrition	3
EXS 293	Biomechanics	3
EXS 333	Kinesiology	3
EXS 373	Health Promotion & Problems	3
EXS 383	Nutrition Counseling	3
EXS 483	Professional Development in Exercise Science	3
EXS 493	Strength and Conditioning Preparation	3
SM 223	History of Physical Education & Sport	3
MGT 303	Risk Management	3
	Or	
EXS 203	Risk and Sports	3
Professional Education Requirements – 46 hrs.		
EDU 111	Education Exploration	1
EDU 211	Education Immersion	1
EDU 222	Educational Psychology for the Elementary Teacher	2
EDU 232	Educational Psychology for the Middle & Secondary School Teacher	2
EDU 242	Physical Education for the Elementary School Teacher	2
EDU 252	School & Community Health	2
EDU 301	Instructional Design Practicum	1
EDU 303	Instructional Design	3
EDU 322	Culturally Responsive Teaching	2
EDU 331	Literacy in the Content Area Practicum	1
EDU 332	Literacy in the Content Area	2
EDU 362	Classroom Behavior & Environment	2
EDU 411	Practicum in Teaching - Middle School	1
EDU 412	The Middle School	2
EDU 422	Middle School Methods	2
EDU 431	Secondary Methods Practicum	1
EDU 442	Secondary Methods	2
EDU 462	Educational Measurement	2
EDU 470	Supervised Student Teaching	10
EDU 482	Student Teaching Seminar	2
Special Education Mild Intervention (P-12) – 12 hrs.		
EDU 181	Introduction to Teaching Students with Mild Exceptional Needs	1
EDU 282	The Development of Students with Mild Except Needs	2
EDU 382	Behavioral Analysis of Students with Mild	2

EDU 483	Exceptional Needs Individualized Planning & Assessment of Students with Mild Exceptional Needs	3
EDU 484	Methods of Teaching Students with Mild Exceptional Needs	4

## Bachelor of Science - Mathematics Education (5-12) (120 hrs.)

To be eligible for licensure as a mathematics teacher in grades 5-12, the following program of study must be completed.

### Degree Requirements

#### General Education Requirements - 30 hours

##### Communication – 9 hrs.

ENG 143	College Composition	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3
	Or	
COM 163	Interpersonal Communication	3

##### Humanities and Social Science – 9 hrs.

ENG 153	Introduction to Literature	3
PSY 113	Principles of Psychology	3
EDU 273	Issues in American Education	3

##### Mathematics and Science – 9 hrs.

MA 134	Calculus I	4
	Science Elective (3)	3
	Math or Science Elective (2)	2

##### Other – 3 hrs.

EDU 463	Educational Media And Technology	3
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#### Additional Requirements - 90 hours

##### Required

UE 101	University Experience	1
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##### Mathematics Content Area – 28 hrs.

MA 164	Calculus II	4
MA 213	Calculus III	3
MA 233	Differential Equations	3
MA 303	College Geometry	3
MA 313	Introduction to Linear Algebra	3
MA 343	Introduction to Proofs	3
MA 373	Abstract Algebra	3
MA 393	Probability & Statistics	3
MA 473	Graph Theory & Combinatorics	3

##### Professional Education Requirements – 39 hrs.

EDU 111	Education Exploration	1
EDU 211	Education Immersion	1
EDU 232	Educational Psychology for the Middle & Secondary School Teacher	2



EDU 301	Instructional Design Practicum	1
EDU 303	Instructional Design	3
EDU 312	Exceptional Learners	2
EDU 322	Culturally Responsive Teaching	2
EDU 331	Literacy in the Content Area Practicum	1
EDU 332	Literacy in the Content Area	2
EDU 362	Classroom Behavior & Environment	2
EDU 431	Secondary Methods Practicum	1
EDU 442	Secondary Methods	2
EDU 462	Educational Measurement	2
EDU 411	Practicum in Teaching - Middle School	1
EDU 412	The Middle School	2
EDU 422	Middle School Methods	2
EDU 470	Supervised Student Teaching	10
EDU 482	Student Teaching Seminar	2

Electives – 22 hrs.

Elective hours determined in conjunction with advisor and based on student career objectives

Free Electives (22)	22
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## Bachelor of Science - Mathematics Education (5-12) and Special Education Mild Interventions (P-12) (120 hrs.)

To be eligible for licensure as a mathematics teacher in grades 5-12 and Special Education for Mild Interventions in grades P-12, the following program of study must be completed.

### Degree Requirements

General Education Requirements - 30 hours

Communication – 9 hrs.

ENG 143	College Composition	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3
	Or	
COM 163	Interpersonal Communication	3

Humanities and Social Science – 9 hrs.

ENG 153	Introduction to Literature	3
PSY 113	Principles of Psychology	3
EDU 273	Issues in American Education	3

Mathematics and Science – 9 hrs.

MA 134	Calculus I	4
	Science Elective (3)	3
	Math or Science Elective (2)	2

Other – 3 hrs.

EDU 463	Educational Media And Technology	3
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## Additional Requirements - 90 hours

## Required

UE 101	University Experience	1
Mathematics Content Area – 28 hrs.		
MA 164	Calculus II	4
MA 213	Calculus III	3
MA 233	Differential Equations	3
MA 303	College Geometry	3
MA 313	Introduction to Linear Algebra	3
MA 343	Introduction to Proofs	3
MA 373	Abstract Algebra	3
MA 393	Probability & Statistics	3
MA 473	Graph Theory & Combinatorics	3
Professional Education Requirements – 37 hrs.		
EDU 111	Education Exploration	1
EDU 211	Education Immersion	1
EDU 232	Educational Psychology for the Middle & Secondary School Teacher	2
EDU 301	Instructional Design Practicum	1
EDU 303	Instructional Design	3
EDU 322	Culturally Responsive Teaching	2
EDU 331	Literacy in the Content Area Practicum	1
EDU 332	Literacy in the Content Area	2
EDU 362	Classroom Behavior & Environment	2
EDU 431	Secondary Methods Practicum	1
EDU 442	Secondary Methods	2
EDU 462	Educational Measurement	2
EDU 411	Practicum in Teaching - Middle School	1
EDU 412	The Middle School	2
EDU 422	Middle School Methods	2
EDU 470	Supervised Student Teaching	10
EDU 482	Student Teaching Seminar	2
Electives – 12 hrs.		
Elective hours determined in conjunction with advisor and based on student career objectives		
	Free Electives (12)	12
Special Education Mild Intervention (P-12) – 12 hrs.		
EDU 181	Introduction to Teaching Students with Mild Exceptional Needs	1
EDU 282	The Development of Students with Mild Except Needs	2
EDU 382	Behavioral Analysis of Students with Mild Exceptional Needs	2
EDU 483	Individualized Planning & Assessment of Students with Mild Exceptional Needs	3
EDU 484	Methods of Teaching Students with Mild Exceptional Needs	4

## Bachelor of Science - Life Sciences (Biology) Education (5-12) (120 hrs.)

To be eligible for licensure as a life sciences (biology) teacher in grades 5-12, the following program of study must be completed.

### Degree Requirements

#### General Education Requirements - 32-33 hours

##### Communication – 9 hrs.

ENG 143	College Composition	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3
	Or	
COM 163	Interpersonal Communication	3

##### Humanities and Social Science – 9 hrs.

ENG 153	Introduction to Literature	3
PSY 113	Principles of Psychology	3
EDU 273	Issues in American Education	3

##### Mathematics and Science – 14 hrs.

MA 113	College Algebra	3
MA 123	Trigonometry	3
	Or	
MA 134	Calculus I	4
CH 104	General Chemistry I	4
CH 114	General Chemistry II	4

#### Additional Requirements - 87-88 hours

##### Required

UE 101	University Experience	1
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##### Biology Content Area – 35 hrs.

BIO 114	Principles of Biology I	4
BIO 124	Principles of Biology II	4
BIO 154	Human Body Systems	4
BIO 304	Plant Biology	4
BIO 314	Animal Biology	4
BIO 324	Microbiology	4
BIO 334	Environmental Biology	4
BIO 233	Cell Biology	3
BIO 414	Genetics	4

##### Professional Education Requirements – 42 hrs.

EDU 111	Education Exploration	1
EDU 211	Education Immersion	1
EDU 232	Educational Psychology for the Middle & Secondary School Teacher	2
EDU 301	Instructional Design Practicum	1
EDU 303	Instructional Design	3

EDU 312	Exceptional Learners	2
EDU 322	Culturally Responsive Teaching	2
EDU 331	Literacy in the Content Area Practicum	1
EDU 332	Literacy in the Content Area	2
EDU 362	Classroom Behavior & Environment	2
EDU 431	Secondary Methods Practicum	1
EDU 442	Secondary Methods	2
EDU 462	Educational Measurement	2
EDU 411	Practicum in Teaching - Middle School	1
EDU 412	The Middle School	2
EDU 422	Middle School Methods	2
EDU 463	Educational Media And Technology	3
EDU 470	Supervised Student Teaching	10
EDU 482	Student Teaching Seminar	2

Electives – 9-10 hrs.

Elective hours determined in conjunction with advisor and based on student career objectives

Free Electives (9-10)	9-10
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## Bachelor of Science - Life Sciences (Biology) Education (5-12) and Special Education Mild Interventions (P-12) (120 hrs.)

To be eligible for licensure as a life sciences (biology) teacher in grades 5-12 and Special Education for Mild Interventions in grades P-12, the following program of study must be completed.

### Degree Requirements

General Education Requirements - 32-33 hours

Communication – 9 hrs.

ENG 143	College Composition	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3
	Or	
COM 163	Interpersonal Communication	3

Humanities and Social Science – 9 hrs.

ENG 153	Introduction to Literature	3
PSY 113	Principles of Psychology	3
EDU 273	Issues in American Education	3

Mathematics and Science – 14 hrs.

MA 113	College Algebra	3
MA 123	Trigonometry	3
	Or	
MA 134	Calculus I	4
CH 104	General Chemistry I	4
CH 114	General Chemistry II	4

## Additional Requirements - 88 hours

## Required

UE 101	University Experience	1
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## Biology Content Area – 35 hrs.

BIO 114	Principles of Biology I	4
BIO 124	Principles of Biology II	4
BIO 154	Human Body Systems	4
BIO 304	Plant Biology	4
BIO 314	Animal Biology	4
BIO 324	Microbiology	4
BIO 334	Environmental Biology	4
BIO 233	Cell Biology	3
BIO 414	Genetics	4

## Professional Education Requirements – 40 hrs.

EDU 111	Education Exploration	1
EDU 211	Education Immersion	1
EDU 232	Educational Psychology for the Middle & Secondary School Teacher	2
EDU 301	Instructional Design Practicum	1
EDU 303	Instructional Design	3
EDU 322	Culturally Responsive Teaching	2
EDU 331	Literacy in the Content Area Practicum	1
EDU 332	Literacy in the Content Area	2
EDU 362	Classroom Behavior & Environment	2
EDU 431	Secondary Methods Practicum	1
EDU 442	Secondary Methods	2
EDU 462	Educational Measurement	2
EDU 411	Practicum in Teaching - Middle School	1
EDU 412	The Middle School	2
EDU 422	Middle School Methods	2
EDU 463	Educational Media And Technology	3
EDU 470	Supervised Student Teaching	10
EDU 482	Student Teaching Seminar	2

## Special Education Mild Intervention (P-12) – 12 hrs.

EDU 181	Introduction to Teaching Students with Mild Exceptional Needs	1
EDU 282	The Development of Students with Mild Except Needs	2
EDU 382	Behavioral Analysis of Students with Mild Exceptional Needs	2
EDU 483	Individualized Planning & Assessment of Students with Mild Exceptional Needs	3
EDU 484	Methods of Teaching Students with Mild Exceptional Needs	4

## Bachelor of Science - Science Education/Chemistry (5-12) (120 hrs.)

To be eligible for licensure as a chemistry teacher in grades 5–12, the following program of study must be completed.

**Degree Requirements**

## General Education Requirements - 30 hours

## Communication – 9 hrs.

ENG 143	College Composition	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3
	Or	
COM 163	Interpersonal Communication	3

## Humanities and Social Science – 9 hrs.

ENG 153	Introduction to Literature	3
PSY 113	Principles of Psychology	3
EDU 273	Issues in American Education	3

## Mathematics and Science – 12 hrs.

MA 134	Calculus I	4
MA 164	Calculus II	4
PH 224	University Physics I	4

## Additional Requirements - 90 hours

## Required

UE 101	University Experience	1
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## Chemistry Content Area – 39 hrs.

CH 104	General Chemistry I	4
CH 114	General Chemistry II	4
CH 204	Organic Chemistry I	4
CH 214	Organic Chemistry II	4
CH 234	Quantitative Chemical Analysis	4
CH 344	Inorganic Chemistry	4
CH 324	Chemical Instrumental Analysis	4
CH 354	Physical Chemistry I	4
CH 434	Biochemistry I	4
MA 213	Calculus III	3

## Professional Education Requirements – 42 hrs.

EDU 111	Education Exploration	1
EDU 211	Education Immersion	1
EDU 232	Educational Psychology for the Middle & Secondary School Teacher	2
EDU 301	Instructional Design Practicum	1
EDU 303	Instructional Design	3
EDU 312	Exceptional Learners	2
EDU 322	Culturally Responsive Teaching	2
EDU 331	Literacy in the Content Area Practicum	1
EDU 332	Literacy in the Content Area	2
EDU 362	Classroom Behavior & Environment	2
EDU 431	Secondary Methods Practicum	1
EDU 442	Secondary Methods	2
EDU 462	Educational Measurement	2
EDU 411	Practicum in Teaching - Middle School	1

EDU 412	The Middle School	2
EDU 422	Middle School Methods	2
EDU 463	Educational Media And Technology	3
EDU 470	Supervised Student Teaching	10
EDU 482	Student Teaching Seminar	2

Electives – 8 hrs.

Elective hours determined in conjunction with advisor and based on student career objectives

Free Electives (8)	8
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## Bachelor of Science - Science Education/Chemistry (5-12) and Special Education Mild Interventions (P-12) (122 hrs.)

To be eligible for licensure as a chemistry teacher in grades 5–12 and Special Education for Mild Interventions in grades (P-12), the following program of study must be completed.

### Degree Requirements

General Education Requirements - 30 hours

Communication – 9 hrs.

ENG 143	College Composition	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3
	Or	
COM 163	Interpersonal Communication	3

Humanities and Social Science – 9 hrs.

ENG 153	Introduction to Literature	3
PSY 113	Principles of Psychology	3
EDU 273	Issues in American Education	3

Mathematics and Science – 12 hrs.

MA 134	Calculus I	4
MA 164	Calculus II	4
PH 224	University Physics I	4

Additional Requirements - 92 hours

Required

UE 101	University Experience	1
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Chemistry Content Area – 39 hrs.

CH 104	General Chemistry I	4
CH 114	General Chemistry II	4
CH 204	Organic Chemistry I	4
CH 214	Organic Chemistry II	4
CH 234	Quantitative Chemical Analysis	4
CH 344	Inorganic Chemistry	4
CH 324	Chemical Instrumental Analysis	4
CH 354	Physical Chemistry I	4
CH 434	Biochemistry I	4
MA 213	Calculus III	3

Professional Education Requirements – 40 hrs.		
EDU 111	Education Exploration	1
EDU 211	Education Immersion	1
EDU 232	Educational Psychology for the Middle & Secondary School Teacher	2
EDU 301	Instructional Design Practicum	1
EDU 303	Instructional Design	3
EDU 322	Culturally Responsive Teaching	2
EDU 331	Literacy in the Content Area Practicum	1
EDU 332	Literacy in the Content Area	2
EDU 362	Classroom Behavior & Environment	2
EDU 431	Secondary Methods Practicum	1
EDU 442	Secondary Methods	2
EDU 462	Educational Measurement	2
EDU 411	Practicum in Teaching - Middle School	1
EDU 412	The Middle School	2
EDU 422	Middle School Methods	2
EDU 463	Educational Media And Technology	3
EDU 470	Supervised Student Teaching	10
EDU 482	Student Teaching Seminar	2
Special Education Mild Intervention (P-12) – 12 hrs.		
EDU 181	Introduction to Teaching Students with Mild Exceptional Needs	1
EDU 282	The Development of Students with Mild Except Needs	2
EDU 382	Behavioral Analysis of Students with Mild Exceptional Needs	2
EDU 483	Individualized Planning & Assessment of Students with Mild Exceptional Needs	3
EDU 484	Methods of Teaching Students with Mild Exceptional Needs	4

## Bachelor of Science - Social Studies Education (5-12) (120 hrs.)

To be eligible for licensure as a social studies teacher in grades 5-12, the following program of study must be completed.

### Degree Requirements

#### General Education Requirements - 30 hours

#### Communication – 9 hrs.

ENG 143	College Composition	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3
	Or	
COM 163	Interpersonal Communication	3

#### Humanities and Social Science – 9 hrs.

ENG 153	Introduction to Literature	3
PSY 113	Principles of Psychology	3
HIS 103	American History I	3



## Mathematics and Science – 9 hrs.

MA 113	College Algebra	3
	Or	
	Higher Math	
	Science Elective (3)	3
	Math or Science Elective (3)	3

## Other – 3 hrs.

HIS 113	American History II	3
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## Additional Requirements - 90 hours

## Required

UE 101	University Experience	1
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## Social Studies Content Area – 36 hrs.

ECO 223	Macroeconomics	3
GEO 213	Physical Geography	3
HIS 203	World Civilization I	3
HIS 213	World Civilization II	3
POLS 113	Introduction to Government	3
SOC 103	Principles of Sociology	3

## At least Two of the following concentrations:

## Economics

ECO 213	Microeconomics	3
FIN 343	International Finance	3
FIN 353	Personal Finance	3

## Government and Citizenship

POLS 313	Comparative Governments	3
POLS 333	State & Local Government	3
POLS 403	American Constitutional Development	3

## Historical Perspectives

HIS 323	The Contemporary World	3
HIS 343	American Political Thought	3
HIS 263	Indiana History	3

## Psychology

PSY 323	Abnormal Psychology	3
PSY 343	Social Psychology	3
PSY 353	Child & Adolescent Psychology	3

## Professional Education Requirements – 45 hrs.

EDU 111	Education Exploration	1
EDU 211	Education Immersion	1
EDU 232	Educational Psychology for the Middle & Secondary School Teacher	2
EDU 273	Issues in American Education	3
EDU 301	Instructional Design Practicum	1
EDU 303	Instructional Design	3
EDU 312	Exceptional Learners	2

EDU 322	Culturally Responsive Teaching	2
EDU 331	Literacy in the Content Area Practicum	1
EDU 332	Literacy in the Content Area	2
EDU 362	Classroom Behavior & Environment	2
EDU 431	Secondary Methods Practicum	1
EDU 442	Secondary Methods	2
EDU 462	Educational Measurement	2
EDU 463	Educational Media And Technology	3
EDU 411	Practicum in Teaching - Middle School	1
EDU 412	The Middle School	2
EDU 422	Middle School Methods	2
EDU 470	Supervised Student Teaching	10
EDU 482	Student Teaching Seminar	2

Electives – 8 hrs.

Elective hours determined in conjunction with advisor and based on student career objectives

Free Electives (8)	8
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## Bachelor of Science - Social Studies Education (5-12) and Special Education Mild Interventions (P-12) (122 hrs.)

To be eligible for licensure as a social studies teacher in grades 5-12 and Special Education for Mild Intervention in grades P-12, the following program of study must be completed.

### Degree Requirements

General Education Requirements - 30 hours

Communication – 9 hrs.

ENG 143	College Composition	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3
	Or	
COM 163	Interpersonal Communication	3

Humanities and Social Science – 9 hrs.

ENG 153	Introduction to Literature	3
PSY 113	Principles of Psychology	3
HIS 103	American History I	3

Mathematics and Science – 9 hrs.

MA 113	College Algebra	3
	Or	
	Higher Math	
	Science Elective (3)	3
	Math or Science Elective (3)	3

Other – 3 hrs.

HIS 113	American History II	3
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## Additional Requirements - 92 hours

## Required

UE 101	University Experience	1
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## Social Studies Content Area – 36 hrs.

ECO 223	Macroeconomics	3
GEO 213	Physical Geography	3
HIS 203	World Civilization I	3
HIS 213	World Civilization II	3
POLS 113	Introduction to Government	3
SOC 103	Principles of Sociology	3

At least two of the following concentrations:

## Economics

ECO 213	Microeconomics	3
FIN 343	International Finance	3
FIN 353	Personal Finance	3

## Government and Citizenship

POLS 313	Comparative Governments	3
POLS 333	State & Local Government	3
POLS 403	American Constitutional Development	3

## Historical Perspectives

HIS 323	The Contemporary World	3
HIS 343	American Political Thought	3
HIS 263	Indiana History	3

## Psychology

PSY 323	Abnormal Psychology	3
PSY 343	Social Psychology	3
PSY 353	Child & Adolescent Psychology	3

## Professional Education Requirements – 43 hrs.

EDU 111	Education Exploration	1
EDU 211	Education Immersion	1
EDU 232	Educational Psychology for the Middle & Secondary School Teacher	2
EDU 273	Issues in American Education	3
EDU 301	Instructional Design Practicum	1
EDU 303	Instructional Design	3
EDU 322	Culturally Responsive Teaching	2
EDU 331	Literacy in the Content Area Practicum	1
EDU 332	Literacy in the Content Area	2
EDU 362	Classroom Behavior & Environment	2
EDU 431	Secondary Methods Practicum	1
EDU 442	Secondary Methods	2
EDU 462	Educational Measurement	2
EDU 463	Educational Media And Technology	3
EDU 411	Practicum in Teaching - Middle School	1
EDU 412	The Middle School	2
EDU 422	Middle School Methods	2
EDU 470	Supervised Student Teaching	10

EDU 482	Student Teaching Seminar	2
Special Education Mild Intervention (P-12) – 12 hrs.		
EDU 181	Introduction to Teaching Students with Mild Exceptional Needs	1
EDU 282	The Development of Students with Mild Except Needs	2
EDU 382	Behavioral Analysis of Students with Mild Exceptional Needs	2
EDU 483	Individualized Planning & Assessment of Students with Mild Exceptional Needs	3
EDU 484	Methods of Teaching Students with Mild Exceptional Needs	4

# Engineering and Computing

**Trine University's Allen School of Engineering and Computing includes these Departments:**

- DEPARTMENT OF BIOMEDICAL ENGINEERING
  - BACHELOR OF SCIENCE IN BIOMEDICAL ENGINEERING
- MCKETTA DEPARTMENT OF CHEMICAL & BIOPROCESS ENGINEERING
  - BACHELOR OF SCIENCE IN CHEMICAL ENGINEERING
- REINERS DEPARTMENT OF CIVIL & ENVIRONMENTAL ENGINEERING
  - BACHELOR OF SCIENCE IN CIVIL ENGINEERING
- DEPARTMENT OF ELECTRICAL & COMPUTER ENGINEERING
  - BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING
  - BACHELOR OF SCIENCE IN COMPUTER ENGINEERING
  - BACHELOR OF SCIENCE IN SOFTWARE ENGINEERING
- WADE DEPARTMENT OF MECHANICAL & AEROSPACE ENGINEERING
  - BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING
  - BACHELOR OF SCIENCE IN MECHATRONICS AND ROBOTICS ENGINEERING
- DEPARTMENT OF ENGINEERING TECHNOLOGY
  - BACHELOR OF SCIENCE IN DESIGN ENGINEERING TECHNOLOGY
- DEPARTMENT OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY
  - BACHELOR OF SCIENCE WITH A MAJOR IN COMPUTER SCIENCE & INFORMATION TECHNOLOGY

## **The School**

The Drs. Jerry and Jorja Allen School of Engineering and Computing was named in honor of Jerry Allen, a 1978 mechanical engineering graduate and member of the University's Board of Trustees, and Jorja Allen, a 1978 business administration graduate and member of the Alumni Board of Governors.

## **Mission**

The Allen School of Engineering and Computing promotes the application of science and technology by preparing graduates for the practice of engineering and engineering technology at the professional level.

## **Vision**

The Allen School of Engineering and Computing will be nationally recognized for the quality of its graduates.

## **Values**

To attain its mission and vision, the Allen School accepts that the School must educate engineers and technologists:

- who have a broad education;

- who see themselves as global citizens;
- who have the potential for leadership in business and public service; and
- who have a strong ethical foundation.

### Goals

The Allen School of Engineering and Computing will:

- provide quality preparation for the practice of engineering and engineering technology at the professional level;
- provide graduates with the opportunities to pursue graduate studies, lifelong learning, and to offer service to their profession; and
- provide technical and educational services to the community.

### Programmatic Accreditation

Trine University's programs in chemical engineering, civil engineering, computer engineering, electrical engineering and mechanical engineering are accredited by the Engineering Accreditation Commission of ABET, <http://www.abet.org>.

### Programs and Degree Requirements

The degree programs are listed and then described in the catalog section for each academic department. All undergraduate degrees require students to fulfill General Education requirements (discussed in detail under "General Education Requirements"), as well as specific program requirements.

### Allen School of Engineering and Computing Requirement

#### General Engineering

Engineering students who are undecided about their major are classified as "general engineers." Since most courses in the first year are common to all engineering disciplines, a general engineering student will still be able to make progress toward an engineering degree, even though a major has not been selected. During this year, the student should be actively investigating the options available in engineering by talking to faculty members and practicing engineers, attending meetings of the student chapters of professional societies, and doing library research. All general engineering students are expected to transfer into one of the engineering majors by the beginning of their second year. While classified as a general engineer, a student would normally take the following courses. The student's instructor in GE 101 Introduction to Engineering can provide additional guidance.

First Semester - 15 hrs.

CH 104	General Chemistry I	4
ENG 133	Technical Communication	3
GE 101	Introduction to Engineering	1
MA 134	Calculus I	4
	Social Science or Humanities Elective	3

Second Semester - 15-18 hrs.

HUM 203	Humanities Seminar	3
MA 164	Calculus II	4
PH 224	University Physics I	4
	Social Science or Humanities Elective	3
	Engineering or Science Courses	1-4

## Bock Biomedical Engineering Department

### Bachelor of Science in Biomedical Engineering (129 hrs.)

The Bock Department of Biomedical Engineering offers the following degree:

- **Bachelor of Science in Biomedical Engineering**

The biomedical engineering program is accredited by the Engineering Accreditation Commission of ABET, [www.abet.org](http://www.abet.org).

The field of biomedical engineering combines knowledge from all of the basic science disciplines: mathematics, chemistry, physics, and biology, as well as the engineering sciences. Due to this inter-disciplinary nature and rapidly advancing knowledge in the field of medicine, the curriculum for a biomedical engineer must also be adaptive and keep up with current advancements. To incorporate these aspects into a biomedical program, the coursework must be grounded in the traditional sciences but also be flexible enough to consider both individual student interests and special topics knowledge of faculty. The biomedical major integrates well with the mission of the University as well as the vision of the Allen School of Engineering.

#### **Mission**

The mission of the biomedical engineering program at Trine University is to enable and equip students to become productive biomedical engineers, to advance to leadership roles in the profession, and to provide service to society.

#### **Objectives**

Our graduates will be able to apply their acquired knowledge of biological, medical, and engineering disciplines. In addition, they will exhibit technical competency, effective communication skills, and be a valued team member.

Within a few years after graduation,

1. Graduates will successfully advance in their field and continue to grow professionally and personally.
2. Graduates will contribute to their field through innovation and technology development by solving open-ended problems.
3. Graduates will provide leadership and service to society while maintaining ethical principles and social responsibilities.

#### **Outcomes**

As specified for accreditation, the biomedical engineering program assures the students will be able to:

1. Identify, formulate, and solve complex engineering problems by applying principles of engineering, science and mathematics
2. Apply engineering design to produce solutions that meet specified needs with considerations of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. Communicate effectively with a range of audiences
4. Ability to recognize ethical and professional responsibilities in engineering situations and make informal judgements, which must consider the impact of engineering solutions in global, economic, environmental and societal contexts

5. Ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. Ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgement to draw conclusions
7. Ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

### Purposes

The mission of the Trine University biomedical engineering program is fulfilled through a learning environment featuring the following components:

- curriculum: rigorous, but carefully shaped to provide a path to success;
- faculty: committed to an excellent undergraduate learning experience;
- classrooms: sized and equipped to promote personal attention;
- laboratories: equipped to provide an excellent laboratory experience through many hands-on experiments with direct guidance from full-time faculty;
- mentoring: promoted at all levels – faculty to student and upperclassman to underclassman;
- peer interaction: encouraged and enhanced by team interaction in classwork and laboratories, and membership in student organizations.

### Degree Requirements

General Education Requirements - 39 hours

Communication – 9 hrs.

ENG 133	Technical Communication	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3

Humanities and Social Science – 9 hrs.

PHL 313	Ethics	3
	Social Science Elective	3
	Humanities or Social Science Elective	3

Mathematics and Science – 21-24 hrs.

MA 134	Calculus I	4
MA 164	Calculus II	4
CH 104	General Chemistry I And	4
CH 114	General Chemistry II Or	4
CH 155H	Advanced Honors General Chemistry	5
PH 224	University Physics I	4
PH 234	University Physics II	4



## Additional Requirements - 17 hours

## Required

BIO 384	Human Anatomy & Physiology I	4
BIO 394	Human Anatomy & Physiology II	4
MA 213	Calculus III	3
MA 233	Differential Equations	3
MA 393	Probability & Statistics	3

## Core Requirements - 73 hours

## General Engineering – 2 hrs.

GE 101	Introduction To Engineering	1
GE 401	Professional Practice	1

## Electives – 3 hrs.

Elective hours determined in conjunction with advisor and based on student career objectives

Free Electives	3
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## Engineering Science – 15 hrs.

ES 141	Biology for Engineers	1
	Or	
BIO 114	Principles Of Biology I	4
ES 213	Statics	3
ES 223	Dynamics	3
ES 233	Engineering Materials	3
ES 382	Engineering Economics	2
ES 313	Thermodynamics	3

## Electrical/Computing Engineering – 4 hrs.

ECE 213	Circuit Analysis	3
ECE 211	Circuits Laboratory	1

## BME Core – 34 hrs.

BME 2011	Intro to BME Programming MATLAB	1
BME 2012	Intro to Biomedical Engineering	2
BME 3003	Musculoskeletal Biomechanics	3
BME 3103	Introduction to Biomaterials	3
BME 3202	Biomedical Engineering Laboratory Techniques	2
BME 3212	Biomedical Engineering Research Techniques	2
BME 4403	Biomedical Engineering Measurements & Instrumentation I	3
BME 4413	Biomedical Engineering Measurements & Instrumentation II	3
BME 4503	Tissue Engineering	3
BME 4603	Bio fluid Mechanics	3
BME 4613	Biological Mass & Energy Transport	3
BME 4853	Biomedical Engineering Design I	3
BME 4863	Biomedical Engineering Design II	3

## BME Concentration Requirements

Choose one (1) of the following three concentration areas

### Research Engineering (Health Sciences) Concentration – 15 hrs.

CH 204	Organic Chemistry I	4
BIO 324	Microbiology	4
	Or	
CH 214	Organic Chemistry II	4
BIO 434	Biochemistry I	4

### Complete one (1) BME XXX3 Elective:

BME 4003	Advanced Topics in Biomechanics	3
BME 4213	Introduction to BioMEMS	3
BME 4303	Biochemical Engineering	3
BME 490X	Special Topics in Biomedical Engineering	3

### Electrical Engineering Concentration – 15 hrs.

CS 1113	Introduction to Object-Oriented Program	3
ECE 263	Digital Systems	3
ECE 261	Digital Systems Laboratory	1
ECE 273	Microcontrollers	3
ECE 271	Microcontrollers Laboratory	1
ECE 323	Dynamic Electromagnetic Fields	3
ECE XXX1	Elective	1
	Or	
BME XXX1	Elective	1

### Mechanical Engineering Concentration – 15 hrs.

EGR 143	Engineering Graphics	3
ES 243	Solid Mechanics	3
MAE 242	Manufacturing Processes & Equipment	2
MAE 241	Manufacturing Processes & Equipment Laboratory	1
MAE 353	Machine Component Design	3

### Complete one (1) BME XXX3 Elective:

BME 4003	Advanced Topics in Biomechanics	3
BME 4213	Introduction to BioMEMS	3
BME 4303	Biochemical Engineering	3
BME 490X	Special Topics in Biomedical Engineering	3

## McKetta Department of Chemical and Bioprocess Engineering

### Bachelor of Science in Chemical Engineering (128 hrs.)

The Dr. John J. McKetta Department of Chemical & Bioprocess Engineering was named in honor of Dr. John J. McKetta, a 1937 chemical engineering graduate and member of the University's Board of Trustees. The McKetta Department of Chemical & Bioprocess Engineering offers the following degree:

- **Bachelor of Science in Chemical Engineering**

Trine University's chemical engineering program is accredited by the Engineering Accreditation Commission of ABET, [www.abet.org](http://www.abet.org).

The core classes for chemical engineering are focused on the chemical sciences. The chemical sciences affect virtually every aspect of life: the food we eat, the clothes we wear, the materials for our homes and cars, our medicines and health care products, and the protection of the environment. Chemical engineers are found in every industry.

Chemical engineering is distinctive in its emphasis on chemistry. The chemistry studied by the chemical engineer may include quantitative analysis, organic chemistry, physical or biochemistry and instrumental analysis. These are the same courses that a chemist would be required to take. The chemical engineer takes these chemical principles and applies them to industrial processes.

Chemical engineering has many common elements with the other engineering disciplines. It is based upon the fundamentals of physics and mathematics. It shares the core engineering sciences of mechanics, fluid flow, heat transfer, thermodynamics, and economics. Oral and written communication skills and interpersonal skills are required for success.

Engineering design is an integral component in chemical engineering coursework. Solution of open-ended problems and the design process are introduced in the department's freshman engineering course. Design of experiments is covered in the Unit Operations laboratories, and equipment and process design concepts are taught through the Unit Operations and Chemical Engineering Kinetics courses. This work culminates in the capstone courses Chemical Process Design I and Chemical Process Design II.

Chemical engineering differs from the other engineering disciplines in three main ways. First, chemical engineers work with not only pure or single component materials, but with complex mixtures or multi-component materials. A chemical engineer must characterize and predict the behavior of these complex mixtures. Second, chemical engineers are the purification and separation specialists. The processes for removing impurities or extracting a valuable product are the domain of the chemical engineer. Third, by using chemical or biochemical processes, chemical engineers create materials that did not previously exist. These new and useful components or materials improve the way we live.

Chemical engineers find themselves employed in positions of research and development, process engineering and operations, engineering design and construction, technical sales and service, and plant and corporate management. Typical industries employing chemical engineers include bulk and specialty chemical, petroleum and natural gas, consumer products, pharmaceuticals and biomedical, steel production, plastics and polymers, semiconductor and electronic materials, environmental and consulting. Chemical engineering is also an excellent preparation for those desiring to undertake graduate studies in engineering and other fields such as medicine, law, or business.

### **Mission**

To offer higher education in chemical and bioprocess engineering by providing a personalized learning environment in which students receive mentoring, small classes, and excellent teaching combined with opportunities for research, industry, and extracurricular experience. The program prepares graduates to succeed, lead and serve to their employers, profession and society.

### **Objectives**

To meet this mission, a graduate from the McKetta Department of Chemical & Bioprocess Engineering must be:

1. A Technically Competent Problem Solver – Alumni will be technically competent, with the ability to implement creative problem solving toward their professions as well as non-work related endeavors to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
2. An Effective Communicator with Collaborative Experience and Leadership Ability - Graduates will provide valuable service and leadership to their community, professional organizations and Trine University through their strong

communication and productive teamwork skills.

3. Professionally Obligated - Alumni will demonstrate ethical and professional responsibility and the ability to acquire and apply new knowledge as evidence by advanced elective projects, advanced degrees, professional registration, certificates and other personal and professional development activities.

### Outcomes

As specified by the accrediting body, engineering programs assure that their students will be able to:

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
3. An ability to communicate effectively with a wide range of audiences.
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgements, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgement to draw conclusions.
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.
8. An ability to recognize hazards associated with chemical, biological, and physical processes and be able to evaluate, minimize, and control these hazards.

### Degree Requirements

The curriculum requires the completion of 128 hours of coursework. The average course load is 16-17 hours per semester based on eight semesters. The core requirements may be fulfilled with the Trine courses listed below or others at the department's discretion. Individuals seeking a Bachelor of Science in Chemical Engineering are required to register for the National Council of Examiners for Engineering & Surveying (NCEES) Fundamentals of Engineering (FE) examination prior to graduation.

General Education Requirements - 40 hours

Communication – 9 hrs.

ENG 133	Technical Communication	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3

Humanities and Social Science – 9 hrs.

ECO 203	Survey of Economics	3
	Or	
ECO 213	Microeconomics	3
	Or	
ECO 223	Macroeconomics	3
	Humanities Elective (3)	3
	Humanities or Social Science Elective	3

## Mathematics and Science – 22 hrs.

MA 134	Calculus I	4
MA 164	Calculus II	4
MA 213	Calculus III	3
MA 233	Differential Equations	3
PH 224	University Physics I	4
PH 234	University Physics II	4

## Additional Requirements - 28 hours

## Required

CH 104	General Chemistry I And	4
CH 114	General Chemistry II Or	4
CH 155H	Advanced Honors General Chemistry	5
CH 204	Organic Chemistry I	4
CH 234	Quantitative Chemical Analysis	4
CH	CH Elective (8)	8

## Electives – 4-7 hrs.

Elective hours determined in conjunction with advisor and based on student career objectives

## Core Requirements - 60 hours

## General Engineering – 2 hrs.

GE 101	Introduction To Engineering	1
GE 401	Professional Practice	1

## Engineering Science – 6 hrs.

ES 141	Biology for Engineers	1
ES 233	Engineering Materials	3
ES 382	Engineering Economics	2

## Chemical Engineering Concentration Requirements – 52 hrs.

CHE 203	Material Balances	3
CHE 212	Energy Balances	2
CHE 222	Sustainability & Process Measurement Laboratory	2
CHE 252	Introduction to Statistical & Computational Methods in Chemical Engineering	2
CHE 303	Chemical Engineering Fluid Dynamics	3
CHE 313	Chemical Engineering Thermodynamics I	3
CHE 333	Unit Operations Laboratory	3
CHE 372	Chemical Engineering Thermodynamics II	2
CHE 373	Chemical Engineering Heat Transfer	3
CHE 383	Mass Transfer	3
CHE 393	Stagewise Separations	3
CHE 412	Applied Numerical Methods	2
CHE 433	Unit Operations Laboratory II	3
CHE 453	Chemical Engineering Kinetics	3
CHE 463	Chemical Process Dynamics & Control	3
CHE 473	Chemical Process Design I	3

CHE 483	Chemical Process Design II	3
	Chemical Engineering Electives	6

## Reiners Department of Civil and Environmental Engineering

### Bachelor of Science in Civil Engineering (129 hrs.)

The Reiners Department of Civil and Environmental Engineering offers the following undergraduate degree:

- **Bachelor of Science in Civil Engineering**

The civil engineering program is accredited by the Engineering Accreditation Commission of ABET, [www.abet.org](http://www.abet.org).

The civil engineering profession provides for our basic needs: housing, cities, commerce, transportation, education, recreation, clean air, water, environmental projects, and energy production. Civil engineers plan, design, construct and maintain safe and purposeful civic facilities that add to the quality of life.

Today, civil engineers explore the frontiers of high technology for solutions to global needs. They deal with the techniques of modern computer-integrated design, as well as perform research for new methods and materials of construction. They design and conduct experiments to study the wind effects on tall buildings and the hydrodynamic effects on offshore structures. They use computer simulations to predict hydrologic events, assess flood damage, and manage transportation systems. They employ computers to monitor treatment facilities, lasers for precision surveying, and remote sensing technologies for geodetic surveying.

Based on this vision of the future, the Reiners Department of Civil & Environmental Engineering, with the support of the Allen School of Engineering and Computing and Trine University, will excel in the education of individuals uniquely prepared for the practice of civil engineering at the professional level.

Civil engineering is comprised of many important engineering disciplines including structural engineering, water resources engineering, geotechnical engineering, environmental engineering, highway and transportation engineering, materials science, urban planning, and construction engineering. Civil engineering projects require a combined knowledge of many of these areas, as well as managerial skills, which include the ability to make decisions that are based not only on sound engineering principles, but also on an understanding of the social, ethical, and economic makeup of society. Therefore, it is essential that students receive a broad foundation in the areas of mathematics, physical and engineering sciences, analytical and design methods, communication skills, the social sciences and humanities, and several, if not all, of the civil engineering disciplines mentioned above.

Civil engineers find career opportunities with architectural and engineering firms, construction corporations, material manufacturers, material testing services, utility corporations, and the petroleum and aircraft industries. As many civil engineering projects involve public infrastructure such as highways, bridges, dams, land reclamation and water distribution systems, belong to the public sector, a significant proportion of civil engineers work for local, state and federal governments, as well as the Army Corps of Engineers, the Air Force and the Navy. Those who pursue advanced degrees often enter teaching and research careers in universities.

#### **Mission**

The mission of the Reiners Department of Civil and Environmental Engineering is to develop work-ready engineers through active learning opportunities, hands-on laboratories and projects, and real-world experiences in a nurturing educational community.

#### **Objectives**

The following educational objectives have been developed for the civil engineering program at Trine University.

1. Graduates will effectively prepare and present written and verbal proposals, design reports, drawings and other technical information to a diverse audience.
2. Graduates demonstrate the importance of teamwork and leadership in executing projects, including their role within the team and their impact on the scope, budget, and schedule of the project.
3. Graduates can effectively use state of the practice engineering tools.
4. Graduates can analyze and design a structure, system or process, taking into consideration the legal, ethical and other societal impacts of the design.
5. Graduates take an active role in professional development and community outreach, including achieving professional licensure, active participation in professional societies and service to their community.
6. Graduates are engaged in business aspects of the profession, including marketing, budgeting, client and public interaction, and contracting.

### **Outcomes**

As specified by the accrediting body, engineering programs assure that their students will be able to:

1. identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics;
2. apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors;
3. communicate effectively with a range of audiences;
4. recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts;
5. function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives;
6. develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions;
7. acquire and apply new knowledge as needed, using appropriate learning strategies.

### **Purposes**

The Reiners Department of Civil and Environmental Engineering at Trine University fulfills its mission by providing a dedicated and enhanced learning environment featuring the following components:

- curriculum: rigorous, but carefully shaped to provide a path to success;
- faculty: committed to an excellent undergraduate learning experience;
- classrooms: sized and equipped to promote personal attention;
- laboratories: equipped to provide an engaging and educational laboratory experience through numerous hands-on experiments with direct guidance from full-time faculty;
- mentoring: promoted at all levels – faculty to student, upperclassman to underclassman, and through the services of the Trine Learning Center;
- peer interaction: fostered by team assignments in classes and active membership in student organizations.

## Degree Requirements

To prepare the student for a professional career in civil engineering, the curriculum listed below is specified. Its flexibility allows considerable freedom to choose courses that best fit a student's interests or objectives. Additional substitutions may be allowed when warranted.

The program design experience begins with the freshman engineering program. Introduction to the design process, ethics, professionalism, economics, and communication skills are presented and explored through individual and team assignments. As the analytical problem-solving capabilities of the students develop in their sophomore and junior years, design projects become more complex and involve engineering specifications, analysis, testing, safety, and societal constraints. Finally, the program design experience is completed with a senior design project. A multi-faceted civil engineering need is identified, and a problem statement is formulated. Alternative solutions are explored, and a detailed design is developed, documented and presented.

To ensure a breadth of knowledge across the civil engineering disciplines, the completion of Civil Engineering In-Depth Electives in three of the following four disciplines of civil engineering is required: environmental engineering, geotechnical engineering, water resources engineering, or transportation engineering. All students must complete Structural Design I and Structural Design Laboratory. The Civil Engineering In-Depth Electives are listed as follows.

### General Education Requirements - 41 hours

#### Communication – 9 hrs.

ENG 133	Technical Communication	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3

#### Humanities and Social Science – 9 hrs.

Social Science Elective (3)	3
Humanities Elective (3)	3
Humanities or Social Science Elective	3

#### Mathematics and Science – 23 hrs.

MA 134	Calculus I	4
MA 164	Calculus II	4
MA 213	Calculus III	3
CH 104	General Chemistry I	4
CH 114	General Chemistry II	4
PH 224	University Physics I	4

### Additional Requirements - 6 hours

#### Required

MA 233	Differential Equations	3
MA 393	Probability & Statistics	3

### Core Requirements - 82 hours

#### General Engineering – 4 hrs.

GE 101	Introduction To Engineering	1
GE 401	Professional Practice	1
EGR 152	Engineering Graphics for Civil Engineering	2

#### Engineering Science – 14 hrs.

ES 213	Statics	3
ES 243	Solid Mechanics	3
ES 323	Fluid Mechanics	3
ES 382	Engineering Economics	2



ES 223	Dynamics	3
Civil Engineering Concentration Requirements – 43 hrs.		
CE 1023	Engineering Math	3
CE 2001	Basic Surveying Laboratory	1
CE 2003	Basic Surveying	3
CE 3101	Environmental Engineering Lab	1
CE 3103	Environmental Engineering	3
CE 3201	Civil Engineering Materials Laboratory	1
CE 3203	Civil Engineering Materials	3
CE 3301	Hydraulic Engineering Lab	1
CE 3303	Hydraulic Engineering	3
CE 3501	Structural Analysis Laboratory	1
CE 3503	Structural Analysis I	3
CE 3521	Structural Design Laboratory	1
CE 3523	Structural Design I	3
CE 3603	Transportation Engineering	3
CE 3701	Soil Mechanics Laboratory	1
CE 3703	Soil Mechanics	3
CE 3903	Introduction to Site Development	3
CE 4911	Civil & Environmental Engineering Design Workshop	1
CE 4912	Civil & Environmental Engineering Design Seminar	2
CE 4913	Civil & Environmental Engineering Design	3
Civil Engineering In-Depth Electives – 9 hrs.		
Select 3 courses for a total of 9 credits		
CE 4103	Pollution Control Technologies	3
CE 4113	Environmental Remediation	3
CE 4123	Water & Wastewater Treatment	3
CE 4303	Open Channel Hydraulics	3
CE 4323	Engineering Hydrology	3
CE 4333	Design of Water Distribution Systems & Sewers	3
CE 4603	Highway Geometric Design	3
CE 4713	Foundation Engineering	3
CE 4723	Pavement Design	3
Additional Electives – 12 hrs.		
	Business Elective (3)	3
	Science Elective (3)	3
	Professional Developmental Elective	3
	Professional Developmental Elective	3

## Department of Electrical and Computer Engineering

### Bachelor of Science in Electrical Engineering (129 Hours)

The Department of Electrical and Computer Engineering offers the following degrees:

- **Bachelor of Science in Computer Engineering**

- **Bachelor of Science in Electrical Engineering**
- **Bachelor of Science in Software Engineering**

Both the electrical engineering program and the computer engineering program are accredited by the Engineering Accreditation Commission of ABET, [www.abet.org](http://www.abet.org).

To prepare students for the innovative work required in these areas, students are provided an undergraduate preparation with a foundation in mathematics and science, proper development in communication skills, an understanding of the relevance and impact of engineering and technology on society, and a combination of classroom study and “hands on” laboratory experience.

In addition to academic activities, engineering experience has become a major factor in acquiring a desired position upon graduation. A Cooperative Educational Program (Co-op) is available to enhance the educational experience and provide necessary industrial experience; students are encouraged to participate in this optional program, and the department and Career Services offer help to any student seeking Co-op or summer employment in the majors.

### **Mission**

The Mission in the Department of Electrical and Computer Engineering is to provide students with the nurturing environment of a small school accompanied by academically rigorous programs that prepare graduates for either immediate employment or entry to graduate school.

### **Objectives**

The computer, electrical and software engineering programs meet the needs of students, alumni, employers and the faculty by assuring that a few years after graduation:

1. Graduates embrace problem solving and learning as a natural aspect of their work.
2. Graduates value and are valued by their professional teammates.
3. Graduate have broad and deep knowledge of the technical issues that they face.

### **Outcomes**

As specified by the accrediting body, our engineering programs assure that graduates will be able to:

1. Identify, formulate and solve complex engineering problems by applying principles of engineering, science and math
2. Apply engineering design to produce solutions that meet specified needs with consideration of public health, safety and welfare as well as global, cultural, social, environmental and economic factors.
3. Communicate effectively with a range of audiences.
4. Recognize ethical and professional responsibilities in engineering situations and make informed judgements which must consider the impact of engineering solutions in global, economic, environmental and societal contexts.
5. Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks and meet objectives.
6. Develop and conduct appropriate experimentation, analyze and interpret data and use engineering judgement to draw conclusions.
7. Acquire and apply new knowledge as needed, using appropriate learning strategies.

### **Purposes**

The Trine University Electrical and Computer Engineering Departments fulfills its Mission by providing a dedicated and

enhanced learning environment featuring the following components:

- curriculum: rigorous, but carefully shaped to provide a path to success;
- faculty: committed to an excellent undergraduate learning experience;
- classrooms: sized and equipped to promote personal attention;
- laboratories: equipped to provide an excellent laboratory experience through many hands-on experiments with direct guidance from full-time faculty;
- mentoring: promoted at all levels – faculty to student and upperclassman to underclassman;
- peer interaction: fostered by team assignments in classes and membership in student organization.

### **Degree Requirements**

The electrical engineering degree program requires 129 semester hours of study comprising 41 hours of University general education, 9 additional hours of mathematics beyond the general education requirement and 79 hours of program-specific requirements. The program-specific requirements include 2 hours of general engineering courses, 32 hours of required electrical and computer engineering core courses, 10 hours of electrical engineering concentration required courses, 15 hours of ECE-, CS-, or CO-prefixed elective courses, 6 hours of completely free electives at the college level, 5 hours of engineering science elective courses, and 9 hours of restricted electives chosen for depth or breadth; courses can be approved by the department, but some courses are pre-approved: technical drawing EGR 143, any courses based directly or indirectly on calculus, and all 300, 400, and 500 level courses.

This division of courses is planned to assure that electrical students complete lecture and laboratory courses in: circuits, analog electronics, digital electronics, signals, integrated systems, an advanced electrical engineering elective area, and a capstone design project. The format of laboratories and design projects is such that students will experience working as an individual, working with a same-discipline partner or small team, and finally working as part of a multi-disciplinary team.

The degree requirements may be fulfilled with the Trine courses listed below or others at the department's discretion. For curriculum-related details, see the Department Chair.

### **International Transfer Credit:**

The electrical engineering program will not accept international transfer credit toward required courses unless the institution granting the credit is either accredited by an agency recognized by the U.S. Department of Education (e.g. Higher Learning Commission) or from a program that is ABET accredited. In all cases, the transcripts must be translated into English to the satisfaction of both the Director of Transfer Pathways and Evaluations and the electrical engineering Program Chair. In addition, the transcript must be accompanied by supporting documentation in English that clearly indicates course content and prerequisites. Transfer credit evaluation will then be made based on the policy in the Trine University course catalog.

A student may appeal the denial of transfer credit by contacting the electrical engineering Program Chair. The Program Chair will then direct the student to the Registrar's office, so that the student may arrange to demonstrate course knowledge using the 'University Credit by Exam' as spelled out in the University catalog.

### **General Education Requirements - 41 hours**

#### **Communication – 9 hrs.**

ENG 133	Technical Communication	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3

#### **Humanities and Social Science – 9 hrs.**

Social Science Elective (3)	3
Humanities Elective (3)	3

	Humanities or Social Science Elective	3
Mathematics and Science – 23 hrs.		
MA 134	Calculus I	4
MA 164	Calculus II	4
MA 213	Calculus III	3
CH 104	General Chemistry I	4
PH 224	University Physics I	4
PH 234	University Physics II	4
Additional Requirements - 9 hours		
Required		
MA 233	Differential Equations	3
MA 393	Probability & Statistics	3
MA	300-400 Level Elective	3
Core Requirements - 79 hours		
Electrical and Computer Engineering Concentration Requirements – 32 hrs.		
CS 1113	Introduction to Object-Oriented Program	3
ECE 211	Circuits Laboratory	1
ECE 213	Circuit Analysis	3
ECE 231	Discrete Electronics Laboratory	1
ECE 233	Discrete Electronics	3
ECE 243	Analog Signals	3
ECE 261	Digital Systems Laboratory	1
ECE 263	Digital Systems	3
ECE 271	Microcontrollers Laboratory	1
ECE 273	Microcontrollers	3
ECE 453	Random Processes in Electrical & Computer Engineering	3
ECE 3051	Junior-Year Laboratory	1
ECE 4001	Contemporary Issues for Engineers	1
ECE 4002	Project Management	2
ECE 4003	Design Project	3
ECE 4003: Or cross-disciplinary project with an in-major oral examination		
Electrical Engineering Concentration – 10 hrs.		
ECE 313	Electrical Power	3
ECE 323	Dynamic Electromagnetic Fields	3
ECE 481	Instrument Systems Laboratory	1
ECE 483	Instrument Systems	3
Major Electives – 15 hrs.		
ECE 112	Prototyping & Projects	2
ECE 112: required only for first-time freshmen		
Choose from - 13 hrs.		
	CO, CS, ECE, or SE prefixed courses;	
	Or	
MAE 4023	System Dynamics & Controls	3

Engineering Science – 5 hrs.

ES	ES Elective (3)	3
ES	ES Elective (3)	3

General Engineering – 2 hrs.

GE 101	Introduction To Engineering	1
GE 401	Professional Practice	1

Restricted Electives – 9 hrs.

Choose from approved courses: EGR 143; Calculus-based; 300-level or higher

Electives – 6 hrs.

Choose from approved courses to bring the total to 129 hours

## Bachelor of Science in Computer Engineering (129 Hours)

The Department of Electrical and Computer Engineering offers the following degrees:

- **Bachelor of Science in Computer Engineering**
- **Bachelor of Science in Electrical Engineering**
- **Bachelor of Science in Software Engineering**

Both the electrical engineering program and the computer engineering program are accredited by the Engineering Accreditation Commission of ABET, [www.abet.org](http://www.abet.org).

To prepare students for the innovative work required in these areas, students are provided an undergraduate preparation with a foundation in mathematics and science, proper development in communication skills, an understanding of the relevance and impact of engineering and technology on society, and a combination of classroom study and “hands on” laboratory experience.

In addition to academic activities, engineering experience has become a major factor in acquiring a desired position upon graduation. A Cooperative Educational Program (Co-op) is available to enhance the educational experience and provide necessary industrial experience; students are encouraged to participate in this optional program, and the department and Career Services offer help to any student seeking Co-op or summer employment in the majors.

### Mission

The Mission in the Department of Electrical and Computer Engineering is to provide students with the nurturing environment of a small school accompanied by academically rigorous programs that prepare graduates for either immediate employment or entry to graduate school.

### Objectives

The computer, electrical and software engineering programs meet the needs of students, alumni, employers and the faculty by assuring that a few years after graduation:

1. Graduates embrace problem solving and learning as a natural aspect of their work.
2. Graduates value and are valued by their professional teammates.
3. Graduate have broad and deep knowledge of the technical issues that they face.

### Outcomes

As specified by the accrediting body, our engineering programs assure that graduates will be able to:

1. Identify, formulate and solve complex engineering problems by applying principles of engineering, science and math
2. Apply engineering design to produce solutions that meet specified needs with consideration of public health, safety and welfare as well as global, cultural, social, environmental and economic factors.
3. Communicate effectively with a range of audiences.
4. Recognize ethical and professional responsibilities in engineering situations and make informed judgements which must consider the impact of engineering solutions in global, economic, environmental and societal contexts.
5. Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks and meet objectives.
6. Develop and conduct appropriate experimentation, analyze and interpret data and use engineering judgement to draw conclusions.
7. Acquire and apply new knowledge as needed, using appropriate learning strategies.

### **Purposes**

The Trine University Electrical and Computer Engineering Departments fulfills its Mission by providing a dedicated and enhanced learning environment featuring the following components:

- curriculum: rigorous, but carefully shaped to provide a path to success;
- faculty: committed to an excellent undergraduate learning experience;
- classrooms: sized and equipped to promote personal attention;
- laboratories: equipped to provide an excellent laboratory experience through many hands-on experiments with direct guidance from full-time faculty;
- mentoring: promoted at all levels – faculty to student and upperclassman to underclassman;
- peer interaction: fostered by team assignments in classes and membership in student organization.

### **Degree Requirements**

The computer engineering degree program requires 129 semester hours of study comprising 41 hours of University general education, 9 additional hours of mathematics beyond the general education requirement and 79 hours of program-specific requirements. The program-specific requirements include 2 hours of general engineering courses, 32 hours of required electrical and computer engineering core courses, 11 hours of computer engineering concentration required courses, 14 hours of ECE-, CS-, or CO-prefixed elective courses, 5 hours of engineering science courses, 9 hours of restricted elective courses, and 6 hours of open electives.

This division of courses is planned to assure that computer engineering students complete lecture and laboratory courses in: circuits, analog electronics, digital electronics, embedded systems, software design or software engineering, an advanced computer engineering elective area, and a capstone design project. The format of laboratories and design projects is such that students will experience working as an individual, working with a same-discipline partner or small team, and finally working as part of a multi-disciplinary team. Degree requirements may be fulfilled with the Trine courses listed below or others at the department's discretion. For curriculum-related details, see the Department Chair.

### **International Transfer Credit:**

The computer engineering program will not accept international transfer credit toward required courses unless the institution granting the credit is either accredited by an agency recognized by the U.S. Department of Education (e.g. Higher Learning Commission) or from a program that is ABET accredited. In all cases, the transcripts must be translated into English to the satisfaction of both the Director of Transfer Pathways and Evaluations and the computer engineering Program Chair. In

addition, the transcript must be accompanied by supporting documentation in English that clearly indicates course content and prerequisites. Transfer credit evaluation will then be made based on the policy in the Trine University course catalog.

A student may appeal the denial of transfer credit by contacting the computer engineering Program Chair. The Program Chair will then direct the student to the Registrar's office, so that the student may arrange to demonstrate course knowledge using the 'University Credit by Exam' as spelled out in the University catalog.

#### General Education Requirements - 41 hours

##### Communication – 9 hrs.

ENG 133	Technical Communication	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3

##### Humanities and Social Science – 9 hrs.

Social Science Elective (3)	3
Humanities Elective (3)	3
Humanities or Social Science Elective	3

##### Mathematics and Science – 23 hrs.

MA 134	Calculus I	4
MA 164	Calculus II	4
MA 213	Calculus III	3
CH 104	General Chemistry I	4
PH 224	University Physics I	4
PH 234	University Physics II	4

#### Additional Requirements - 9 hours

##### Required

MA 233	Differential Equations	3
MA 393	Probability & Statistics	3
MA 473	Graph Theory & Combinatorics	3

#### Core Requirements - 79 hours

##### Electrical and Computer Engineering Concentration Requirements – 32 hrs.

CS 1113	Introduction to Object-Oriented Program	3
ECE 211	Circuits Laboratory	1
ECE 213	Circuit Analysis	3
ECE 231	Discrete Electronics Laboratory	1
ECE 233	Discrete Electronics	3
ECE 243	Analog Signals	3
ECE 261	Digital Systems Laboratory	1
ECE 263	Digital Systems	3
ECE 271	Microcontrollers Laboratory	1
ECE 273	Microcontrollers	3
ECE 453	Random Processes in Electrical & Computer Engineering	3
ECE 3051	Junior-Year Laboratory	1
ECE 4001	Contemporary Issues for Engineers	1
ECE 4002	Project Management	2
ECE 4003	Design Project	3

ECE 4003: Or cross-disciplinary project with an in-major oral examination

Computer Engineering Concentration – 11 hrs.		
CS 1123	C++ & Object Oriented Design	3
ECE 361	Logic & Computer Design Laboratory	1
ECE 363	Logic & Computer Design	3
ECE 371	Embedded Systems Laboratory	1
ECE 373	Embedded Systems	3

Major Electives – 14 hrs.		
ECE 112	Prototyping & Projects	2

ECE 112: required only for first-time freshmen

Choose from – 12 hrs.		
	CO, CS, ECE, or SE prefixed courses; Or	
MAE 4023	System Dynamics & Controls	3

Engineering Science – 5 hrs.		
ES	ES Elective (3)	3
ES	ES Elective (3)	3

General Engineering – 2 hrs.		
GE 101	Introduction To Engineering	1
GE 401	Professional Practice	1

Restricted Electives – 9 hrs.

Choose from approved courses: EGR 143; Calculus-based; 300-level or higher

Electives – 6 hrs.

Choose from approved courses to bring the total to 129 hours

## Bachelor of Science in Software Engineering (128 Hours)

The Department of Electrical and Computer Engineering offers the following degrees:

- **Bachelor of Science in Computer Engineering**
- **Bachelor of Science in Electrical Engineering**
- **Bachelor of Science in Software Engineering**

Both the electrical engineering program and the computer engineering program are accredited by the Engineering Accreditation Commission of ABET, [www.abet.org](http://www.abet.org).

To prepare students for the innovative work required in these areas, students are provided an undergraduate preparation with a foundation in mathematics and science, proper development in communication skills, an understanding of the relevance and impact of engineering and technology on society, and a combination of classroom study and “hands on” laboratory experience.

In addition to academic activities, engineering experience has become a major factor in acquiring a desired position upon graduation. A Cooperative Educational Program (Co-op) is available to enhance the educational experience and provide necessary industrial experience; students are encouraged to participate in this optional program, and the department and Career Services offer help to any student seeking Co-op or summer employment in the majors.



## **Mission**

The Mission in the Department of Electrical and Computer Engineering is to provide students with the nurturing environment of a small school accompanied by academically rigorous programs that prepare graduates for either immediate employment or entry to graduate school.

## **Objectives**

The computer, electrical and software engineering programs meet the needs of students, alumni, employers and the faculty by assuring that a few years after graduation:

1. Graduates embrace problem solving and learning as a natural aspect of their work.
2. Graduates value and are valued by their professional teammates.
3. Graduate have broad and deep knowledge of the technical issues that they face.

## **Outcomes**

As specified by the accrediting body, our engineering programs assure that graduates will be able to:

1. Identify, formulate and solve complex engineering problems by applying principles of engineering, science and math
2. Apply engineering design to produce solutions that meet specified needs with consideration of public health, safety and welfare as well as global, cultural, social, environmental and economic factors.
3. Communicate effectively with a range of audiences.
4. Recognize ethical and professional responsibilities in engineering situations and make informed judgements which must consider the impact of engineering solutions in global, economic, environmental and societal contexts.
5. Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks and meet objectives.
6. Develop and conduct appropriate experimentation, analyze and interpret data and use engineering judgement to draw conclusions.
7. Acquire and apply new knowledge as needed, using appropriate learning strategies.

## **Purposes**

The Trine University Electrical and Computer Engineering Departments fulfills its Mission by providing a dedicated and enhanced learning environment featuring the following components:

- curriculum: rigorous, but carefully shaped to provide a path to success;
- faculty: committed to an excellent undergraduate learning experience;
- classrooms: sized and equipped to promote personal attention;
- laboratories: equipped to provide an excellent laboratory experience through many hands-on experiments with direct guidance from full-time faculty;
- mentoring: promoted at all levels – faculty to student and upperclassman to underclassman;
- peer interaction: fostered by team assignments in classes and membership in student organization.

## Degree Requirements

The software engineering degree program requires 128 semester hours of study comprising 41 hours of University general education, 6 additional hours of mathematics and 3 additional hours of mathematics or science beyond the general education requirement and 78 hours of program-specific requirements. The program-specific requirements include 2 hours of general engineering courses, 42 hours of required computer science, electrical and software engineering core courses, 2 hours of engineering science elective courses, 12 hours of COM 343, ECE 361 & 363, CO 453, or any CS- or SE- prefixed elective courses, and 8 hours of open and 12 hours of guided electives. Students are encouraged to use the 17 elective hours to meet the requirements for a minor in an area of their interest.

This division of courses is planned to assure that software students complete lecture and laboratory courses in: circuits, analog electronics, digital electronics, signals, integrated systems, an advanced electrical engineering elective area, and a capstone design project. The format of laboratories and design projects is such that students will experience working as an individual, working with a same-discipline partner or small team, and finally working as part of a multi-disciplinary team.

The degree requirements may be fulfilled with the Trine courses listed below or others at the department's discretion. For curriculum-related details, see the Department Chair.

### International Transfer Credit:

The software engineering program will not accept international transfer credit toward required courses unless the institution granting the credit is either accredited by an agency recognized by the U.S. Department of Education (e.g. Higher Learning Commission) or from a program that is ABET accredited. In all cases, the transcripts must be translated into English to the satisfaction of both the Director of Transfer Pathways and Evaluations and the software engineering Program Chair. In addition, the transcript must be accompanied by supporting documentation in English that clearly indicates course content and prerequisites. Transfer credit evaluation will then be made based on the policy in the Trine University course catalog.

A student may appeal the denial of transfer credit by contacting the software engineering Program Chair. The Program Chair will then direct the student to the Registrar's office, so that the student may arrange to demonstrate course knowledge using the 'University Credit by Exam' as spelled out in the University catalog.

### General Education Requirements - 41 hours

#### Communication – 9 hrs.

ENG 133	Technical Communication	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3

#### Humanities and Social Science – 9 hrs.

	Social Science Elective (3)	3
	Humanities Elective (3)	3
	Humanities or Social Science Elective	3

#### Mathematics and Science – 23 hrs.

MA 134	Calculus I	4
MA 164	Calculus II	4
MA 213	Calculus III	3
CH 104	General Chemistry I	4
	Or	
BIO 114	Principles of Biology I	4
PH 224	University Physics I	4
PH 234	University Physics II	4

## Additional Requirements - 9 hours

## Required

MA 393	Probability & Statistics	3
MA 473	Graph Theory & Combinatorics	3
	Math or Science Elective (3)	3

## Core Requirements - 78 hours

## General Engineering – 2 hrs.

GE 101	Introduction To Engineering	1
GE 401	Professional Practice	1

## Electives – 8 hrs.

Any college-level courses

## Restricted Electives – 12 hrs.

## 9 Hours of Restricted Electives

Nine hours of any 300-level or higher courses in the Jannen School of Arts & Sciences or the College of Business or Engineering is pre-approved, as are courses that require calculus as a prerequisite. 100 or 200 level courses can be approved by the departmental curriculum committee.

## 3 Hours of Restricted Electives

Three hours in the Humanities or Social Sciences, beyond the General Education Requirement.

## Engineering Science – 2 hrs.

ES 382	Engineering Economics	2
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## Software Engineering Core – 42 hrs.

CS 1113	Introduction to Object-Oriented Program	3
CS 1123	C++ & Object Oriented Design	3
CS 2103	Algorithm Design & Analysis	3
ECE 261	Digital Systems Laboratory	1
ECE 263	Digital Systems	3
ECE 271	Microcontrollers Laboratory	1
ECE 273	Microcontrollers	3
ECE 371	Embedded Systems Laboratory	1
ECE 373	Embedded Systems	3
SE 4001	Contemporary Issues for Engineering	1
SE 4002	Project Management	2
SE 4003	Design Project	3
SE 153	Client-side Databases	3
SE 233	Systems Programming	3
SE 353	Software Engineering	3
SE 383	Computer Security	3
SE 393	Software Patterns & Team Development	3

## Software Engineering Concentration – 12 hrs.

Chosen from below for a total of 12 credit hours:

COM 343	Web Content Management	3
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ECE 361	Logic & Computer Design Laboratory	1
	And	
ECE 363	Logic & Computer Design	3
CO 453	Co-Op Work Experience	3
	Or	
	CS or SE prefixed courses	3

## Wade Department of Mechanical and Aerospace Engineering

### Bachelor of Science in Mechanical Engineering (129 hrs.)

The Wade Department of Mechanical and Aerospace Engineering offers the following degrees:

- **Bachelor of Science in Mechanical Engineering**
- **Bachelor of Science in Mechatronics and Robotics Engineering**

The mechanical engineering program is accredited by the Engineering Accreditation Commission of ABET, [www.abet.org](http://www.abet.org).

Mechanical engineering is, perhaps, the most diverse and general of all the engineering fields. Mechanical engineers can be found working in almost any company. Manufacturing, transportation, health care, and insurance are some of the types of firms that employ mechanical engineers. No other field of engineering provides a better professional base for interdisciplinary activities.

Mechanical engineers design tools and machines of all types, from paper clips to space shuttles. They plan, design, and direct the manufacture, distribution, and operation of these items. Mechanical engineers also design the power sources needed to operate the machines and provide for the environment in which they function. In fact, mechanical engineering involves all phases of energy production and utilization: engines, power plants, electrical generation, heating, ventilating, and air conditioning.

Those mechanical engineers who choose to specialize in the aerospace area are particularly suited for employment in vehicle design. They may be involved in the design of aircraft, spacecraft, missiles, automobiles, trucks, buses, trains, or ships. Their specialized knowledge of lightweight structures and efficient, low drag design take on added importance as fuel costs increase.

Other mechanical engineers may specialize in the area of metallurgy and focus on the relationships among the structure, properties, processing and performance of metals. These engineers will be involved in product design, process development, and equipment design in addition to material specification, failure analysis, and implementing manufacturing processes.

Due to the diverse nature of the profession, the mechanical engineering education must provide a very broad base of studies. To be successful a mechanical engineer must be able to communicate knowledge and ideas to others; thus communication skills are an important part of the engineer's preparation. Studies in the social sciences and humanities develop an understanding of the relevance and impact of engineering and technology on society. Mathematics provides the engineer with the tools needed to build on the scientific foundations of chemistry and physics. The engineering sciences, common to all engineering disciplines, provide a broad foundation for the design of both thermal and mechanical systems, which are at the core of mechanical engineering.

Engineering creativity cannot be developed by theory alone; an engineer learns by doing. Thus, the laboratory courses stress hands-on work and the project design courses involve real-world problems. Multidisciplinary teams, involving students from business, technology, and/or other engineering programs in the senior design projects prepare students for the team design approach common in industry. A cooperative education program, incorporating alternating periods of full-time work and full-time school, is available to enhance the education and provide valuable engineering experience. Students are encouraged to participate in this optional program.

## **Mission**

The mission of the mechanical engineering program at Trine University is to enable students to become productive mechanical engineers, to advance to leadership roles in the profession, and to provide service to society.

## **Program Objectives**

The mechanical engineering program meet the needs of students, alumni, employers, and the faculty by assuring that a few years after graduation:

1. Our graduates are prepared for the practice of mechanical engineering and related disciplines at the professional level; and
2. Our graduates engage in lifelong learning and serve their professions and community.

## **Outcomes**

As specified by ABET, accrediting body for engineering curricula, the mechanical engineering program assures that graduates will be able to:

1. Identify, formulate and solve complex engineering problems by applying principles of engineering, science and math.
2. Apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare as well as global, cultural, social, environmental and economic factors.
3. Communicate effectively with a range of audiences.
4. Recognize ethical and professional responsibilities in engineering situations and make informed judgements which must consider the impact of engineering solutions in global, economic, environmental and societal contexts.
5. Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6. Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgement to draw conclusions.
7. Acquire and apply new knowledge as needed, using appropriate learning strategies.

## **Purposes**

The mission of the Trine University mechanical engineering program is fulfilled through a learning environment comprising the following components:

- curriculum: broad yet appropriately in-depth; rigorous, with a mixture of theory and hands-on experiences;
- faculty: committed to an excellence in teaching;
- classrooms: small and personal;
- laboratories: equipped to provide excellent hands-on experiments with direct oversight of full-time faculty and a skilled laboratory technician;
- peer interaction: encouraged and enhanced by team interaction in classwork and laboratories and membership in student organizations.

## **Degree Requirements**

The first year of the mechanical engineering program is devoted to developing knowledge and skills in communication, mathematics, and the natural sciences. Students are introduced to the mechanical engineering profession through the courses Mechanical Engineering Analysis and Engineering Graphics. In the second year the fundamental courses in the engineering

sciences provide the foundation for engineering design. The design process is formalized in the junior year in the courses Computer-Aided Machine Design and Thermo-Fluid Component Design. The other courses in the third year emphasize engineering analysis and design in the areas of thermal and mechanical systems. The year-long senior design project integrates the previous studies into the design of a machine or system, most often resulting in fabrication and testing of a prototype. A professional atmosphere is developed through multidisciplinary teams and industry originated projects in the senior design sequence.

**International Transfer Credit:** The mechanical engineering program will not accept international transfer credit toward required courses unless the institution granting the credit is either accredited by an agency recognized by the U.S. Department of Education (e.g. Higher Learning Commission) or from a program that is ABET accredited. In all cases, the transcripts must be translated into English to the satisfaction of both the Director of Transfer Pathways and Evaluations and the mechanical engineering Program Chair. In addition, the transcript must be accompanied by supporting documentation in English that clearly indicates course content and prerequisites. Transfer credit evaluation will then be made based on the policy in the Trine University course catalog.

A student may appeal the denial of transfer credit by contacting the mechanical engineering Program Chair. The Program Chair will then direct the student to the Registrar's office, so that the student may arrange to demonstrate course knowledge using the 'University Credit by Exam' as spelled out in the University catalog.

#### General Education Requirements - 41 hours

##### Communication – 9 hrs.

ENG 133	Technical Communication	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3

##### Humanities and Social Science – 9 hrs.

ECO 203	Survey of Economics	3
	Or	
ECO 213	Microeconomics	3
	Humanities Elective	3
	Humanities or Social Science Elective	3

##### Mathematics and Science – 23 hrs.

MA 134	Calculus I	4
MA 164	Calculus II	4
MA 213	Calculus III	3
CH 103	General Chemistry I (no lab)	3
	Or	
CH 104	General Chemistry I	4
PH 224	University Physics I	4
PH 234	University Physics II	4

#### Additional Requirements - 12 hours

##### Required

MA 233	Differential Equations	3
MA 313	Introduction to Linear Algebra	3
MA 393	Probability & Statistics	3
EGR 143	Engineering Graphics	3

## Core Requirements - 76 hours

## General Engineering – 2 hrs.

GE 101	Introduction To Engineering	1
GE 401	Professional Practice	1

## Electives – 6 hrs.

Electives	6
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## Engineering Science – 23 hrs.

ES 213	Statics	3
ES 223	Dynamics	3
ES 233	Engineering Materials	3
ES 243	Solid Mechanics	3
ES 253	Electrical Science	3
ES 313	Thermodynamics	3
ES 343	Heat Transfer	3
ES 382	Engineering Economics	2

## Mechanical Engineering Concentration Requirements – 36 hrs.

MAE 202	Mechanical Engineering Analysis	2
MAE 201	Introduction to Programming in MATLAB	1
MAE 242	Manufacturing Processes & Equipment	2
MAE 241	Manufacturing Processes & Equipment Laboratory	1
MAE 303	Mechanics of Machinery	3
MAE 323	Thermodynamics II	3
MAE 3033	Fluid Dynamics for Mechanical Engineers	3
MAE 353	Machine Component Design	3
MAE 373	Computer-Aided Machine Design	3
MAE 413	Thermo-Fluid Component Design	3
MAE 453	Mechanical Vibration	3
	Or	
MAE 4023	System Dynamics & Controls	3
MAE 463	Mechanical Measure Laboratory	3
MAE 4053	Mechanical Engineering Design I	3
MAE 4063	Mechanical Engineering Design II	3

## Mechanical Electives – 9 hrs.

Electives must be MAE courses of 300-level or higher, unless completing an engineering minor.

MAE XX3	3
MAE XX3	3
MAE XX3	3

## Bachelor of Science in Mechatronics and Robotics Engineering (128 hrs.)

The Wade Department of Mechanical and Aerospace Engineering offers the following degrees:

- **Bachelor of Science in Mechanical Engineering**
- **Bachelor of Science in Mechatronics and Robotics Engineering**

Trine University's Bachelor of Science in Mechatronics and Robotics Engineering degree is built on mechanical and electrical engineering principles, with an additional mechatronics and robotics core that prepares graduates for the practice of robotics engineering at the professional level. You will graduate the program with a breadth and depth of knowledge to address technical issues.

### **Mission**

The mission of the Mechatronics and Robotics Engineering program at Trine University is to enable students to gain employment in the multidisciplinary field of mechatronics and develop automated systems and smart solutions to solve tomorrow's industry challenges.

### **Program Objectives**

The mechatronics and robotics engineering program meets the needs of students, alumni, employers, and the faculty by assuring that a few years after graduation:

1. Our graduates are prepared to apply principles of mechanical and electrical engineering to the practice of engineering at the professional level of robotics, mechatronics and related industries; and
2. Our graduates engage in lifelong learning and serve their professions and community.

### **Outcomes**

The mechatronics and robotics engineering program assures that graduates will be able to:

1. Identify, formulate, and solve complex engineering problems by applying principles of engineering, science and mathematics.
2. Apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare as well as global, cultural, social, environmental, and economics factors.
3. Communicate effectively with a range of audiences.
4. Recognize ethical and professional responsibilities in engineering situations and make informed judgements which must consider the impact of engineering solutions in global, economics, environmental and societal contexts.
5. Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6. Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgement to draw conclusions.
7. Acquire and apply new knowledge as needed, using appropriate learning strategies.

### **Degree Requirements**

General Education Requirements - 41 hours

Communication – 9 hrs.

ENG 133	Technical Communication	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3

Humanities and Social Science – 9 hrs.

Social Science Elective	3
Humanities Elective	3
Humanities or Social Science Elective	3



## Mathematics and Science – 23 hrs.

MA 134	Calculus I	4
MA 164	Calculus II	4
MA 213	Calculus III	3
CH 104	General Chemistry I	4
PH 224	University Physics I	4
PH 234	University Physics II	4

## Additional Requirements - 12 hours

## Required

MA 233	Differential Equations	3
MA 313	Introduction to Linear Algebra	3
MA 393	Probability & Statistics	3
EGR 143	Engineering Graphics	3

## Core Requirements - 75 hours

## General Engineering – 2 hrs.

GE 101	Introduction To Engineering	1
GE 401	Professional Practice	1

## Electives – 3 hrs.

Electives	3
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## Engineering Science – 17 hrs.

ES 213	Statics	3
ES 223	Dynamics	3
ES 233	Engineering Materials	3
ES 243	Solid Mechanics	3
ES 253	Electrical Science	3
ES 382	Engineering Economics	2

## Electrical/Computer Engineering Concentration Requirements – 18 hrs.

ECE 243	Analog Signals	3
ECE 261	Digital Systems Laboratory	1
ECE 263	Digital Systems	3
ECE 271	Microcontrollers Laboratory	1
ECE 273	Microcontrollers	3
ECE 301	Electrical Machines Laboratory	1
ECE 303	Electrical Machines	3
ECE 313	Electrical Power	3

## Mechanical Engineering – 12hrs.

MAE 201	Introduction to Programming in MATLAB	1
MAE 202	Mechanical Engineering Analysis	2
MAE 241	Manufacturing Processes & Equipment Laboratory	1
MAE 242	Manufacturing Processes & Equipment	2
MAE 303	Mechanics of Machinery	3
MAE 353	Machine Component Design	3

## Mechatronics/Robotics Core – 23 hrs.

MRE 262	Robotics Lab & Introduction to Programmable	2
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	Logic Controllers	
MRE 313	Fluid Power Systems & Design	3
MRE 323	Robotic Kinematics & Kinetics	3
MRE 403	Machine Communications	3
MRE 463	Advanced Mechatronics	3
MRE 4023	System Dynamics & Controls	3
MRE 4053	Mechatronics & Robotics Engineering Design I	3
MRE 4063	Mechatronics & Robotics Engineering Design II	3

## Department of Engineering Technology

### Bachelor of Science in Design Engineering Technology (122 hrs.)

The Department of Engineering Technology offers the following degrees:

- **Bachelor of Science in Design Engineering Technology**

Students are prepared for the innovative design work required in this area. The degree prepares students with a foundation in mathematics and science, and understanding of the relevance and impact of engineering and technology on society. This is achieved through a combination of classroom study and hands on laboratory experiences. Professional communication skills are also emphasized.

In addition to academic activities, field experience can be a major factor in acquiring a desired position upon graduation. Cooperative Educational Programs (Co-op) are available to enhance the educational experience and provide necessary industrial experience. Students are encouraged to participate in these optional programs, and the department and Career Services offer help to any student seeking Co-op or summer employment in their major.

#### Mission

In concert with the mission of Trine University and the Allen School of Engineering and Computing, the Department of Technology will provide an academic environment with an interactive educational climate which produces high quality graduates that are engaged, well-rounded, and technologically experienced.

#### Objectives

1. To produce graduates who are prepared for careers in the areas associated with the analysis, applied design, development, implementation, and oversight of design projects and processes.
2. Foster a desire for personal development to ensure a lifetime of professional advancement, success, and an appreciation for the ethical and social responsibilities of a design engineering technologist.
3. Equip students with sufficient general education studies, including liberal arts, to permit the graduate to communicate effectively and to function as a responsible citizen.

#### Degree Requirements

The design engineering technology curriculum emphasizes many of the underlying principles of component design and the skills required to communicate with other engineers, scientists, and production personnel. Elective course offerings within the academic programs provide the student with the opportunity to minor in areas such as plastics engineering, business, management, marketing, and leadership.

A strong emphasis is placed on the application of skills needed in the modern engineering department. The program provides

opportunities to learn the skills and knowledge needed to advance in industry into the upper levels of supervision. Knowledge of computers, management, computer FEA analysis, solid modeling and applied engineering design, and the application of engineering specifications are integrated in this program. This program is approved, strongly supported, and guided by an advisory board of engineers from various industries.

#### General Education Requirements - 39 hours

##### Communication – 9 hrs.

ENG 133	Technical Communication	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3

##### Humanities and Social Science – 9 hrs.

ECO 213	Microeconomics	3
ECO 223	Macroeconomics	3
	Humanities Elective (3)	3

##### Mathematics and Science – 21 hrs.

MA 113	College Algebra	3
MA 123	Trigonometry	3
MA 134	Calculus I	4
MA 253	Statistics	3
PH 154	College Physics I	4
PH 164	College Physics II	4

#### Additional Requirements - 4 hours

##### Required

CH 144	Chemistry - Ideas & Applications	4
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#### Core Requirements - 79 hours

##### Design Engineering Technology – 49 hrs.

ETD 101	Introduction to Engineering Technology	1
ETD 103	Basic Technical Drawing	3
ETD 113	Geometric Dimensioning & Tolerancing	3
ETD 123	Manufacturing Materials & Processes	3
ETD 163	Environmental Health & Safety	3
ETD 173	Computer Aided 3-D Modeling	3
ETD 203	Basic Mechanisms	3
ETD 233	Engineering & Manufacturing Systems	3
ETD 263	Design, Analysis & Prototyping	3
ETD 273	Electrical Fundamentals	3
ETD 313	Design for Manufacture & Assembly	3
ETD 333	Statics & Strength of Materials	3
ETD 363	Elements Of Machines	3
ETD 433	Computer Numerical Control Principles	3
ETD 463	Senior Design Project I	3
ETD 473	Senior Design Project II	3
GE 313	SPC & Lean Manufacturing	3

##### Additional Requirements – 18 hrs.

COM 213	Business Communication	3
EGR 453	Advanced Parametric Design	3
CSIT 103	Introduction to Information Systems	3

MGT 353	Designing Operations	3
MGT 363	Organizational Behavior	3
MGT 413	Management Of Quality	3
Electives – 12 hrs.		
	Department Approved Elective (3)	3
	Department Approved Elective (3)	3
	300/400 Department Approved Elective	3
	300/400 Department Approved Elective	3

## Department of Computer Science and Information Technology

### Bachelor of Science - Computer Science and Information Technology Major (120 hrs.)

The Department of Computer Science and Information Technology offers the following undergraduate degree:

- **Bachelor of Science in Computer Science & Information Technology**

The computer science and information technology program is designed to prepare students for a wide range of endeavors in the information field, including information management, information security, research and information services, and information science.

Graduates of the computer science and information technology program will be qualified for jobs in the information and technology industry and in business, public service, and other various professions. Possible job titles include security and performance analyst, information management specialist, network administrator, product developer, business analyst, usability engineer, database administrator, and many others.

The program also provides strong preparation for graduate studies. Graduates will qualify to be placed in prestigious graduate schools and pursue a variety of programs, including information security, information and management science, information science, information technology, and technical law.

The mission of this program is to provide students with a broadly based and sophisticated understanding of information and its technology, preparing them for careers in this rapidly emerging field.

#### **Mission**

##### **CSIT Department Mission Statement**

The CSIT Department exists to educate and mentor the next generation of IT and Computer Science experts while supporting and enhancing the student education experience to transform them into world technology leaders.

##### **CSIT Advisory Board Mission Statement**

The CSIT Advisory Board exists to support the CSIT Department of Trine University in their endeavors to educate and mentor the next generation of world technology leaders by guiding the curriculum development and providing expert advice, internship, and job opportunities for students.

#### **Objectives**

##### **Objectives**

The following educational objectives have been developed for the CSIT program at Trine University:

1. Graduates will effectively prepare and present written and verbal proposals, design reports, programs and other technical information to a diverse audience.
2. Graduates demonstrate the importance of teamwork and leadership in executing projects, including their role within the team and their impact on the scope, budget, and schedule of the project.
3. Graduates can effectively analyze the requirements of an IT project and execute the plan to completion for all areas of IT.
4. Graduates take an active role in professional development and community outreach, including achieving industry known certifications and service to their community.
5. Graduates are trained to understand the business requirements of projects including calculating risk and generating budgets for all resources involved.

### Outcomes

Our CSIT Program assures that students will be able to:

1. Identify, formulate, and solve complex logic problems by applying principles of computer science;
2. Communicate effectively with a range of audiences;
3. Recognize ethical and professional responsibilities in project development and make informed judgments;
4. Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives;
5. Develop and conduct appropriate project plans to analyze and interpret project data while keeping in mind the need for security and compliance;
6. Acquire and apply new knowledge as needed, using appropriate learning strategies.

### Degree Requirements

General Education Requirements - 42 hours

Communication – 9 hrs.

ENG 133	Technical Communication	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3

Humanities and Social Science – 12 hrs.

PSY 113	Principles of Psychology	3
PHL 313	Ethics	3
PHL 343	Logic	3
	Social Science Elective	3

Mathematics and Science – 12 hrs.

MA 113	College Algebra	3
MA 173	Essential Calculus	3
MA 253	Statistics	3
	Science Elective	3

Other – 9 hrs.

	General Education Electives	9
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## Core Requirements - 78 hours

## Content Requirement – 52 hrs.

BA 123	Business Concepts	3
CSIT 101	Introduction to Computer Science & Information Technology	1
CSIT 103	Introduction to Information Systems	3
CSIT 123	Computing Infrastructure Basics	3
CSIT 153	Introduction to Operating Systems	3
CSIT 163	Using Programming to Solve Problems	3
CSIT 223	Network Management	3
CSIT 253	Artificial Intelligence & Information	3
CSIT 273	Enterprise Architecture	3
INF 263	Data Management	3
INF 343	Information Security	3
INF 403	Advanced Database Management	3
MA 203	Discrete Math for Information Sciences	3
MA 323	Operations Research	3
MGT 303	Risk Management	3
MGT 383	Principles of Project Management	3
CSIT 483	Senior Capstone I	3
CSIT 493	Senior Capstone II	3

## Concentrations – 18 hrs.

Choose one of the concentrations below.

## Option A – Cybersecurity

CSIT 363	Certified Ethical Hacking I	3
CSIT 373	Certified Ethical Hacking II	3
CSIT 383	Certified Ethical Hacking III	3
CSIT 393	Certified Ethical Hacking IV	3
CSIT 403	Applications of Cybersecurity	3
CSIT 443	Advanced Cybersecurity Concepts	3

## Option B – Health Information

BIO 2X3	Introduction to Health & Disease	3
INF 383	Principles of Health Informatics	3
INF 393	Data Visualization	3
INF 433	Data Mining & Visualization	3
LDR 403	Creativity, Innovation, & Influence	3
MGT 363	Organizational Behavior	3

*BIO 2X3: PENDING*

## Option C – Web Development

COM 343	Web Content Management	3
CS 1113	Introduction to Object-Oriented Program	3
CSIT 203	Web Site Design	3
CSIT 233	Designing Data Links to Web Applications	3
CSIT 243	Mobile Application Development	3
CSIT 333	Introduction to E-Commerce Site Development	3

Electives – 8 hrs.

Any college-level courses, including CSIT 311X Internship Experience (1-3), as advised by the department

# Health Sciences

Trine University's Rinker-Ross School of Health Sciences includes these Departments:

- DEPARTMENT OF EXERCISE SCIENCE
  - BACHELOR OF SCIENCE WITH MAJOR IN APPLIED HEALTH SCIENCE
  - BACHELOR OF SCIENCE WITH MAJOR IN EXERCISE SCIENCE
- DEPARTMENT OF SCIENCE
  - ASSOCIATE IN SCIENCE WITH AN EMPHASIS IN SCIENCE
  - BACHELOR OF SCIENCE WITH MAJOR IN BIOCHEMISTRY
    - TRADITIONAL TRACK
    - PHYSICIAN ASSISTANT TRACK
    - PRE-MEDICAL TRACK
  - BACHELOR OF SCIENCE WITH MAJOR IN BIOLOGY
    - TRADITIONAL TRACK
    - PHYSICIAN ASSISTANT TRACK
    - PHYSICAL THERAPY TRACK
    - PRE-MEDICAL TRACK
  - BACHELOR OF SCIENCE WITH MAJOR IN CHEMISTRY
    - TRADITIONAL TRACK
    - PHYSICIAN ASSISTANT TRACK
    - PRE-MEDICAL TRACK
  - BACHELOR OF SCIENCE WITH MAJOR IN FORENSIC SCIENCE
    - BIOLOGY CONCENTRATION
    - CHEMISTRY CONCENTRATION
- DIRECT ADMIT PROGRAMS
  - DOCTORATE OF PHYSICAL THERAPY
    - 3+3 BACHELOR OF SCIENCE IN BIOLOGY AND A DOCTORATE OF PHYSICAL THERAPY
    - 3+3 BACHELOR OF SCIENCE IN EXERCISE SCIENCE AND A DOCTORATE OF PHYSICAL THERAPY
  - MASTER'S OF PHYSICIAN ASSISTANT STUDIES
    - 3+3 BACHELOR OF SCIENCE IN BIOCHEMISTRY AND A MASTER'S OF PHYSICIAN ASSISTANT



## STUDIES

- 3+3 BACHELOR OF SCIENCE IN BIOLOGY AND A MASTER'S OF PHYSICIAN ASSISTANT STUDIES
- PROFESSIONAL TRACKS
  - PRE-MED PROFESSIONAL TRACK
  - PRE-PHYSICAL THERAPY PROFESSIONAL TRACK

## Department of Exercise Science

### Bachelor of Science — Applied Health Science Major (120 hrs.)

The Bachelor of Science in Applied Health Science degree is designed to help prepare an individual for a career in the health sciences field. This program is available to individuals who have completed a minimum of 60 credits at the undergraduate level (30 General Education Credits and 30 Health Science Credits with at least 15 credits being at least 300 level or above) and completed their associate degree in a health care field.

#### Program Outcomes

1. Describe the components and importance of health science.
2. Apply the credentials of health careers to the desired career path in health science.
3. Assess standardized metrics in performance, health, and disease models within health science fields.
4. Analyze current research and evidence based methods and apply them to the field of health science.
5. Analyze the components of health science and how they relate to their desired career path.

#### Degree Requirements

General Education Requirements - 30 hours

Communication – 9 hrs.

ENG 133	Technical Communication	3
	Or	
ENG 143	College Composition	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3

Humanities and Social Science – 9 hrs.

PSY 113	Principles of Psychology	3
	Humanities Elective (3)	3
	Social Science Elective (3)	3

Mathematics and Science – 10 hrs.

MA 113	College Algebra	3
MA 253	Statistics	3
BIO 114	Principles of Biology I	4

Other – 2 hrs.

EXS 102	Lifetime Wellness	2
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Content Requirements - 90 hours

Concentration – 45 hrs.

Credits applied from an associate degree in a health sciences related field.

Technical Field/Concentration Courses	45
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Content – 30 hrs.

Health Science - Choose 30 credits from this section with at least 15 credits being from 300 or above level classes

UE 101	University Experience	1
EXS 203	Risk and Sports	3
EXS 233	Drug Education	3
EXS 243	Athletic Training	3
EXS 263	Motor Learning	3
EXS 273	Nutrition	3
EXS 283	Fitness Evaluation Assessment	3
EXS 293	Biomechanics	3
EXS 333	Kinesiology	3
EXS 353	Exercise Physiology	3
EXS 373	Health Promotion & Problems	3
EXS 383	Nutrition Counseling	3
EXS 483	Professional Development in Exercise Science	3
BIO 124	Principles of Biology II	4
BIO 163	Medical Terminology	3
BIO 202	Introduction to Biological Literature & Communication	2
BIO 324	Microbiology	4
BIO 233	Cell Biology	3
BIO 383	Introduction to Pharmacology	3
BIO 384	Human Anatomy & Physiology I	4
BIO 394	Human Anatomy & Physiology II	4
BIO 443	Pathology	3
CH 104	General Chemistry I	4
CH 114	General Chemistry II	4
SCI 434	Science Internship	4
PH 154	College Physics I	4
PH 164	College Physics II	4

Electives – 15 hrs.

Elective hours determined in conjunction with advisor and based on student career objectives

Electives (9)	9
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## Bachelor of Science — Exercise Science Major (120 hrs.)

The course work for the Bachelor of Science in Exercise Science is designed to give you the knowledge and experiences you need to become an effective role model and leader of a wellness lifestyle. With a strong emphasis on health related subjects, you will gain knowledge of biology, anatomy, kinesiology, exercise physiology, lifetime wellness, athletic training, nutrition, drug education, health problems and fitness assessments. Course work lays the foundation for the students capstone experience which is writing a major paper related to this field and doing an internship which gives the student valuable work experience.

**Degree Requirements**

## General Education Requirements - 30 hours

## Communication – 9 hrs.

ENG 133	Technical Communication	3
	Or	
ENG 143	College Composition	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3

## Humanities and Social Science – 9 hrs.

PSY 113	Principles of Psychology	3
SM 393	Sport Psychology	3
	Humanities Elective (3)	3

## Mathematics and Science – 10 hrs.

MA 113	College Algebra	3
BIO 154	Human Body Systems	4
BIO 163	Medical Terminology	3

## Other – 2 hrs.

EXS 102	Lifetime Wellness	2
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## Content Requirement - 55 hours

## Required Courses - 43 hours

UE 101	University Experience	1
EXS 103	Teaching Sport Skills I	3
EXS 203	Risk and Sports	3
EXS 263	Motor Learning	3
EXS 273	Nutrition	3
EXS 283	Fitness Evaluation Assessment	3
EXS 293	Biomechanics	3
EXS 323	Performance Nutrition	3
EXS 333	Kinesiology	3
EXS 343	Principles of Human Performance	3
EXS 353	Exercise Physiology	3
EXS 363	Capstone Experience in Exercise Science I	3
EXS 373	Health Promotion & Problems	3
EXS 383	Nutrition Counseling	3
EXS 483	Professional Development in Exercise Science	3

## Exercise Science Electives - 12 hours

12 Exercise Science elective credits from the following: EXS 243, EXS 413, EXS 423, EXS 453, EXS 483 in Athletic Training, EXS 483 in Coaching, EXS 493.

## Electives - 35 hrs

Elective hours determined in conjunction with advisor and based on student career objectives.

**Department of Science**

## Associate in Science with an Emphasis in Science (60 Hrs.)

The Science Department seeks to prepare students for a professional career by providing a science foundation consisting of a body of information and the ability to use this information to solve problems. Important concepts of this information include the theory and practice of modern laboratory procedures, professional ethics, safety, statistical data handling, and scientific report writing.

The Science Department also seeks to provide non-science majors with an understanding of science as it relates to modern society.

Students who transfer into the Department of Science are expected to take at least two 300- or 400-level courses in their science major.

### Degree Requirements

#### General Education Requirements - 18 hours

##### Communication – 6 hrs.

ENG 133	Technical Communication	3
	Or	
ENG 143	College Composition	3

##### And one of the following:

HUM 203	Humanities Seminar	3
COM 163	Interpersonal Communication	3
SP 203	Effective Speaking	3

##### Humanities and Social Science – 6 hrs.

	Social Science Elective (3)	3
	Humanities Elective (3)	3

##### Mathematics and Science – 6 hrs.

	Mathematics Elective (3)	3
	Science Elective (3)	3

#### Content Requirements - 42 hours

##### Required

UE 101	University Experience	1
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##### Electives – 20 hrs.

Elective hours determined in conjunction with advisor and based on student career objectives

	Free Electives (7)	7
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##### Sciences Courses – 21 hrs.

Student must complete 21 total hours in science (AST, BIO, CH, FS, GLY, or PH)

	Science Elective Courses	21
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## Bachelor of Science - Biochemistry Major (120 Hrs.)

The Science Department seeks to prepare students for a professional career by providing a science foundation consisting of a body of information and the ability to use this information to solve problems. Important concepts of this information include the theory and practice of modern laboratory procedures, professional ethics, safety, statistical data handling, and scientific report writing.

The Science Department also seeks to provide non-science majors with an understanding of science as it relates to modern society.

Students who transfer into the Department of Science are expected to take at least two 300- or 400-level courses in their science major in addition to SCI 412 Senior Research Seminar and SCI 422 Senior Research Project or SCI 434 Science Internship.

### Degree Requirements

#### General Education Requirements - 30 hour

##### Communication – 9 hrs.

ENG 133	Technical Communication	3
	Or	
ENG 143	College Composition	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3
	Or	
COM 163	Interpersonal Communication	3

##### Humanities and Social Science – 9 hrs.

ENG 153	Introduction to Literature	3
PSY 113	Principles of Psychology	3
	Humanities or Social Science Elective	3

##### Mathematics and Science – 12 hrs.

MA 134	Calculus I	4
BIO 114	Principles of Biology I	4
CH 104	General Chemistry I	4

#### Content Requirements - 90 hours

##### Biochemistry Core – 59 hrs.

UE 101	University Experience	1
BIO 324	Microbiology	4
BIO 233	Cell Biology	3
BIO 364	Toxicology	4
BIO 414	Genetics	4
BIO 454	Molecular Biology	4
CH 114	General Chemistry II	4
CH 202	Introduction to Chemical Literature and Communication	2
CH 204	Organic Chemistry I	4
CH 214	Organic Chemistry II	4
CH 234	Quantitative Chemical Analysis	4
CH 302	Professional Practice Science	2
CH 324	Chemical Instrumental Analysis	4
CH 434	Biochemistry I	4
CH 444/BIO 444	Biochemistry II	4
MA 253	Statistics	3
SCI 412	Senior Research Seminar	2
	And	
SCI 422	Science Research Project	2

SCI 434	Or Science Internship	4
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### Biochemistry Tracks – 31 hrs.

Choose one of the following 3 tracks in addition to the Biochemistry Core

#### Traditional Track

MA 164	Calculus II	4
MA 213	Calculus III	3
CH 354	Physical Chemistry I	4
PH 224	University Physics I	4
PH 234	University Physics II	4
	Science Electives (8)	8
	General Electives (2)	2

#### Physician Assistant Track

BIO 124	Principles of Biology II	4
BIO 163	Medical Terminology	3
BIO 384	Human Anatomy & Physiology I	4
BIO 394	Human Anatomy & Physiology II	4
	Science Electives (8)	8
	General Electives (2)	2

#### Pre-Medical Track

MA 164	Calculus II	4
MA 213	Calculus III	3
CH 354	Physical Chemistry I	4
PH 224	University Physics I	4
PH 234	University Physics II	4
SOC 103	Principles of Sociology	3
PHL 313	Ethics	3
	Science Electives (8)	8

## Bachelor of Science – Biology Major (120 Hrs.)

The Science Department seeks to prepare students for a professional career by providing a science foundation consisting of a body of information and the ability to use this information to solve problems. Important concepts of this information include the theory and practice of modern laboratory procedures, professional ethics, safety, statistical data handling, and scientific report writing.

The Science Department also seeks to provide non-science majors with an understanding of science as it relates to modern society.

Students who transfer into the Department of Science are expected to take at least two 300- or 400-level courses in their science major in addition to SCI 412 Senior Research Seminar and SCI 422 Senior Research Project or SCI 434 Science Internship.

### Degree Requirements

General Education Requirements - 32 hours

Communication – 9 hrs.

ENG 133	Technical Communication	3
	Or	
ENG 143	College Composition	3

HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3
	Or	
COM 163	Interpersonal Communication	3
Humanities and Social Science – 9 hrs.		
ENG 153	Introduction to Literature	3
PSY 113	Principles of Psychology	3
	Humanities or Social Science Elective	3
Mathematics and Science – 14 hrs.		
MA 113	College Algebra	3
MA 123	Trigonometry	3
CH 104	General Chemistry I	4
CH 114	General Chemistry II	4
Content Requirements - 88 hours		
Biology Core – 47 hrs.		
UE 101	University Experience	1
BIO 114	Principles of Biology I	4
BIO 124	Principles of Biology II	4
BIO 202	Introduction to Biological Literature & Communication	2
BIO 274	General Ecology	4
BIO 302	Professional Practice in Science	2
BIO 233	Cell Biology	3
BIO 414	Genetics	4
CH 204	Organic Chemistry I	4
MA 253	Statistics	3
PH 154	College Physics I	4
PH 164	College Physics II	4
SCI 412	Senior Research Seminar	2
	And	
SCI 422	Science Research Project	2
	Or	
SCI 434	Science Internship	4
Choose one of the following natural science classes		
BIO 214	Conservation	4
BIO 392	Aquatic Biology	2
BIO 334	Environmental Biology	4
Biology Tracks – 41 hrs.		
Choose one of the following 3 tracks in addition to the Biology Core		
Traditional Track		
Choose one of the following physiology classes:		
BIO 304	Plant Biology	4
BIO 384	Human Anatomy & Physiology I	4

Choose one of the following organism classes:

BIO 304	Plant Biology	4
BIO 314	Animal Biology	4
BIO 324	Microbiology	4

Electives:

Biology Electives (10)	10
Chemistry or Math Electives (4)	4
General Electives (19)	19

Physician Assistant Track

BIO 163	Medical Terminology	3
BIO 324	Microbiology	4
BIO 384	Human Anatomy & Physiology I	4
BIO 394	Human Anatomy & Physiology II	4
BIO 434	Biochemistry I	4
	General Electives (14-15)	14-15

Choose two of the following:

BIO 364	Toxicology	4
BIO 404	Embryology	4
BIO 443	Pathology	3
BIO 454	Molecular Biology	4

Physical Therapy Track

ENG 453	Advanced Composition	3
BIO 324	Microbiology	4
BIO 364	Toxicology	4
BIO 384	Human Anatomy & Physiology I	4
BIO 394	Human Anatomy & Physiology II	4
	Biology Elective (3)	3
	Chemistry or Math Electives (4)	4
	General Electives (15)	15

Pre-Medical Track

BIO 434	Biochemistry I	4
CH 214	Organic Chemistry II	4
PHL 313	Ethics	3
SOC 103	Principles of Sociology	3
	Biology Electives (4)	4
	Math or Science Elective (4)	4
	General Electives (11)	11

Choose one of the following physiology classes:

BIO 304	Plant Biology	4
BIO 384	Human Anatomy & Physiology I	4

Choose one of the following organism classes:

BIO 304	Plant Biology	4
BIO 314	Animal Biology	4
BIO 324	Microbiology	4

## Bachelor of Science - Chemistry Major (120 Hrs.)

The Science Department seeks to prepare students for a professional career by providing a science foundation consisting of a



body of information and the ability to use this information to solve problems. Important concepts of this information include the theory and practice of modern laboratory procedures, professional ethics, safety, statistical data handling, and scientific report writing.

The Science Department also seeks to provide non-science majors with an understanding of science as it relates to modern society.

Students who transfer into the Department of Science are expected to take at least two 300- or 400-level courses in their science major in addition to SCI 412 Senior Research Seminar and SCI 422 Senior Research Project or SCI 434 Science Internship.

### Degree Requirements

#### General Education Requirements - 30 hours

##### Communication – 9 hrs.

ENG 133	Technical Communication	3
	Or	
ENG 143	College Composition	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3
	Or	
COM 163	Interpersonal Communication	3

##### Humanities and Social Science – 9 hrs.

ENG 153	Introduction to Literature	3
PSY 113	Principles of Psychology	3
	Humanities or Social Science Elective	3

##### Mathematics and Science – 12 hrs.

MA 134	Calculus I	4
MA 164	Calculus II	4
BIO 114	Principles of Biology I	4

#### Content Requirements - 90 hours

##### Chemistry Core – 67 hrs.

UE 101	University Experience	1
CH 104	General Chemistry I	4
CH 114	General Chemistry II	4
CH 202	Introduction to Chemical Literature and Communication	2
CH 204	Organic Chemistry I	4
CH 214	Organic Chemistry II	4
CH 234	Quantitative Chemical Analysis	4
CH 302	Professional Practice Science	2
CH 324	Chemical Instrumental Analysis	4
CH 344	Inorganic Chemistry	4
CH 354	Physical Chemistry I	4
CH 374	Physical Chemistry II	4
CH 434	Biochemistry I	4
CH 444/BIO 444	Biochemistry II	4
MA 213	Calculus III	3
MA 253	Statistics	3

PH 224	University Physics I	4
PH 234	University Physics II	4
SCI 412	Senior Research Seminar And	2
SCI 422	Science Research Project Or	2
SCI 434	Science Internship	4

Chemistry Tracks – 23 hrs.

Choose one of the following 3 tracks in addition to the Chemistry Core

**Traditional Track**

General Electives (23) 23

**Physician Assistant Track**

BIO 124	Principles of Biology II	4
BIO 163	Medical Terminology	3
BIO 324	Microbiology	4
BIO 384	Human Anatomy & Physiology I	4
BIO 394	Human Anatomy & Physiology II	4
	General Elective (4)	4

**Pre-Medical Track**

BIO 124	Principles of Biology II	4
SOC 103	Principles of Sociology	3
PHL 313	Ethics	3
	General Electives (13)	13

## Bachelor of Science - Forensic Science Major (120 Hrs.)

The Science Department seeks to prepare students for a professional career by providing a science foundation consisting of a body of information and the ability to use this information to solve problems. Important concepts of this information include the theory and practice of modern laboratory procedures, professional ethics, safety, statistical data handling, and scientific report writing.

The Science Department also seeks to provide non-science majors with an understanding of science as it relates to modern society.

Students who transfer into the Department of Science are expected to take at least two 300- or 400-level courses in their science major in addition to SCI 412 Senior Research Seminar and SCI 422 Senior Research Project or SCI 434 Science Internship.

### Degree Requirements

General Education Requirements - 30 hours

Communication – 9 hrs.

ENG 133	Technical Communication Or	3
ENG 143	College Composition	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking Or	3

COM 163	Interpersonal Communication	3
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## Humanities and Social Science – 9 hrs.

ENG 153	Introduction to Literature	3
PSY 113	Principles of Psychology	3
	Humanities or Social Science Elective	3

## Mathematics and Science – 12 hrs.

MA 134	Calculus I	4
CH 104	General Chemistry I	4
BIO 114	Principles of Biology I	4

## Content Requirements - 90 hours

## Forensic Science Core – 50 hrs.

UE 101	University Experience	1
CH 114	General Chemistry II	4
CH 204	Organic Chemistry I	4
CH 214	Organic Chemistry II	4
CH 234	Quantitative Chemical Analysis	4
CH 324	Chemical Instrumental Analysis	4
CH 434	Biochemistry I	4
CRJ 273	Criminal Procedure & Evidence	3
FS 203	Principles of Forensic Science I	3
FS 223	Principles of Forensic Science II	3
FS 343	Criminalistics & Crime Scene Investigations	3
FS 351	Criminalistics & Crime Scene Laboratory	1
FS 373	Forensic Comparative Science	3
FS 422	Expert Testimony in Forensic Science	2
MA 253	Statistics	3
SCI 412	Senior Research Seminar	2
	And	
SCI 422	Science Research Project	2
	Or	
SCI 434	Science Internship	4

## Forensic Science Concentrations – 40 hrs.

Choose one of the following 2 concentrations in addition to the Forensic Science Core

*Students interested in the Pre-Medical track would need to take the appropriate additional coursework, which would include BIO 124 (for those students in the chemistry concentration), SOC 103 and PHL 313. This would result in earning more than the 120 hours prescribed for the forensic science degree.*

## Biology Concentration

PH 154	College Physics I	4
PH 164	College Physics II	4
BIO 154	Human Body Systems	4
BIO 202	Introduction to Biological Literature & Communication	2
BIO 302	Professional Practice in Science	2
BIO 324	Microbiology	4
BIO 233	Cell Biology	3
BIO 374	Forensic Biology	4

BIO 414	Genetics	4
BIO 443	Pathology	3
BIO 454	Molecular Biology	4
	General Electives (2)	2
<b>Chemistry Concentration</b>		
MA 164	Calculus II	4
MA 213	Calculus III	3
PH 224	University Physics I	4
PH 234	University Physics II	4
CH 202	Introduction to Chemical Literature and Communication	2
CH 302	Professional Practice Science	2
CH 344	Inorganic Chemistry	4
CH 354	Physical Chemistry I	4
CH 364/BIO 364	Toxicology	4
CH 444/BIO 444	Biochemistry II	4
CH 474	Forensic Chemistry	4
	General Electives (2)	2

## Direct Admit Programs & Professional Tracks

### Direct Admit Programs

#### DIRECT ADMIT PROGRAMS

- DOCTORATE OF PHYSICAL THERAPY
  - 3+3 BACHELOR OF SCIENCE IN BIOLOGY AND A DOCTORATE OF PHYSICAL THERAPY
  - 3+3 BACHELOR OF SCIENCE IN EXERCISE SCIENCE AND A DOCTORATE OF PHYSICAL THERAPY
- MASTER'S OF PHYSICIAN ASSISTANT STUDIES
  - 3+ 3 BACHELOR OF SCIENCE IN BIOCHEMISTRY AND MASTER'S OF PHYSICIAN ASSISTANT STUDIES
  - 3+3 BACHELOR OF SCIENCE IN BIOLOGY AND MASTER'S OF PHYSICIAN ASSISTANT STUDIES

### 3+3 Bachelor of Science in Biology and a Doctorate of Physical Therapy

#### 3+3 Degree Path for a Bachelor of Science in Biology and A Doctorate in Physical Therapy

##### Recommend Sequence of Courses

##### Freshman Fall – 17 hrs.

UE 101	University Experience	1
ENG 133	Technical Communication	3
	Or	
ENG 143	College Composition	3
BIO 114	Principles of Biology I	4
MA 113	College Algebra	3

PSY 113	Principles of Psychology	3
COM 163	Interpersonal Communication	3
	Or	
SP 203	Effective Speaking	3
Freshman Spring – 17 hrs.		
BIO 124	Principles of Biology II	4
HUM 203	Humanities Seminar	3
MA 123	Trigonometry	3
CH 104	General Chemistry I	4
MA 253	Statistics	3
Sophomore Fall – 18 hrs.		
BIO 233	Cell Biology	3
BIO 274	General Ecology	4
CH 114	General Chemistry II	4
ENG 153	Introduction to Literature	3
PH 154	College Physics I	4
Sophomore Spring – 17 hrs.		
CH 204	Organic Chemistry I	4
BIO 202	Introduction to Biological Literature & Communication	2
BIO 324	Microbiology	4
	Biology Elective (3)	3
PH 164	College Physics II	4
Junior Fall – 18 hrs.		
BIO 384	Human Anatomy & Physiology I	4
BIO 414	Genetics	4
BIO 302	Professional Practice in Science	2
	Natural Science Biology Elective	4
	Chemistry or Math Electives (4)	4
Junior Spring – 18 hrs.		
BIO 394	Human Anatomy & Physiology II	4
ENG 453	Advanced Composition	3
BIO 364	Toxicology	4
SCI 434	Science Internship	4
	Humanities or Social Science Elective	3
Not Pursuing the DPT Program – 15 hrs.		
Courses to complete for Bachelor of Science – Biology if not pursuing the DPT Program		
Senior Fall and Spring - 15 hrs.		
	Electives (9)	9
DPT Program Acceptance – 24 hrs.		
Courses to complete as part of the 1 <sup>st</sup> year DPT Program		
DPT Fall I – 12 hrs.		
DPT 5111	CARE I	1
DPT 5124	Anatomy of Movement I	4

DPT 5134	Applied Physiology I	4
DPT 5143	Clinical Practice I	3
DPT Spring I – 12 hrs.		
DPT 5224	Anatomy of Movement II	4
DPT 5234	Applied Physiology II	4
DPT 5254	Applied Neuroscience	4

### 3+3 Bachelor of Science in Exercise Science and a Doctorate of Physical Therapy

#### 3+ 3 Degree Path for a Bachelor of Science in Exercise Science and a Doctorate in Physical Therapy

##### Recommend Sequence of Courses

##### Freshman Fall – 16 hrs.

BIO 114	Principles of Biology I	4
ENG 133	Technical Communication	3
	Or	
ENG 143	College Composition	3
EXS 102	Lifetime Wellness	2
EXS 273	Nutrition	3
MA 113	College Algebra	3
UE 101	University Experience	1

##### Freshman Spring – 16 hrs.

BIO 124	Principles of Biology II	4
MA 123	Trigonometry	3
EXS 263	Motor Learning	3
HUM 203	Humanities Seminar	3
PSY 113	Principles of Psychology	3

##### Sophomore Fall – 16 hrs.

CH 104	General Chemistry I	4
SP 203	Effective Speaking	3
MA 253	Statistics	3
EXS 283	Fitness Evaluation Assessment	3
EXS 293	Biomechanics	3

##### Sophomore Spring – 16 hrs.

CH 114	General Chemistry II	4
EXS 353	Exercise Physiology	3
EXS 373	Health Promotion & Problems	3
	Humanities Elective	3
	Psychology Elective	3

##### Junior Fall – 17 hrs.

BIO 384	Human Anatomy & Physiology I	4
ENG 453	Advanced Composition	3
EXS 333	Kinesiology	3
EXS 483	Professional Development in Exercise Science	3
PH 154	College Physics I	4

## Junior Spring – 14 hrs.

BIO 394	Human Anatomy & Physiology II	4
EXS 383	Nutrition Counseling	3
EXS 423	Evaluation of Athletic Injuries	3
PH 164	College Physics II	4

## DPT Program Acceptance – 30 hrs.

Courses to complete as part of the 1<sup>st</sup> year DPT Program.

## DPT Fall I – 16 hrs.

DPT 5111	CARE I	1
DPT 5124	Anatomy of Movement I	4
DPT 5134	Applied Physiology I	4
DPT 5143	Clinical Practice I	3
DPT 5152	Health Behavior Science	2
DPT 5162	Professional Development I	2

## DPT Spring I – 14 hrs.

DPT 5211	CARE II	1
DPT 5224	Anatomy of Movement II	4
DPT 5234	Applied Physiology II	4
DPT 5243	Clinical Practice II	3
DPT 5352	Pharmacology	2

### 3+3 Bachelor of Science in Biochemistry and a Master's of Physician Assistant Studies

#### 3+3 Degree Path for a Bachelor of Science in Biochemistry and a Master of Physician Assistant Studies

##### Recommend Sequence of Courses

## Freshman Fall – 18 hrs.

UE 101	University Experience	1
MA 134	Calculus I	4
CH 104	General Chemistry I	4
ENG 133	Technical Communication	3
	Or	
ENG 143	College Composition	3
PSY 113	Principles of Psychology	3
SP 203	Effective Speaking	3
	Or	
COM 163	Interpersonal Communication	3

## Freshman Spring – 17 hrs.

BIO 163	Medical Terminology	3
CH 114	General Chemistry II	4
BIO 114	Principles of Biology I	4
ENG 153	Introduction to Literature	3
	Humanities or Social Science Elective	3

## Sophomore Fall – 18 hrs.

CH 204	Organic Chemistry I	4
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BIO 124	Principles of Biology II	4
BIO 233	Cell Biology	3
HUM 203	Humanities Seminar	3
CH 234	Quantitative Chemical Analysis	4

## Sophomore Spring – 17 hrs.

CH 214	Organic Chemistry II	4
CH 202	Introduction to Chemical Literature and Communication	2
BIO 324	Microbiology	4
MA 253	Statistics	3
CH 324	Chemical Instrumental Analysis	4

## Junior Fall – 18 hrs.

BIO 384	Human Anatomy & Physiology I	4
BIO 414	Genetics	4
CH 302	Professional Practice Science	2
CH 434	Biochemistry I	4
SCI 434	Science Internship	4

## Junior Spring – 16 hrs.

BIO 394	Human Anatomy & Physiology II	4
CH 444/BIO 444	Biochemistry II	4
BIO 364	Toxicology	4
BIO 454	Molecular Biology	4

## Not Pursuing the DPT Program – 16 hrs.

Courses to complete for Bachelor of Science – Biochemistry if not pursuing the MPAS Program

## Senior Fall and Spring - 16 hrs.

Electives (16)	16
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## MPAS Program Acceptance - 35 hrs.

Courses to complete as part of the 1<sup>st</sup> year MPAS Program

## MPAS Fall I – 17 hrs.

PAS 5001	Clinical Genetics	1
PAS 5002	Diagnostic Techniques - Laboratory Medicine	2
PAS 5003	Clinical Physiology	3
PAS 5004	Clinical Anatomy	4
PAS 5012	Clinical Skills I: Medical Documentation & Interviewing	2
PAS 5022	Physician Assistant Professional Practice	2
PAS 5052	Clinical Application & Reflection Experience I	2
PAS 5161	Clinical Pharmacology I	1

## MPAS Spring I – 18 hrs.

PAS 5110	Clinical Medicine & Therapeutics I	10
PAS 5102	Clinical Skills II: Physical Exam & Documentation	2
PAS 5112	Diagnostic Techniques - EKG	2
PAS 5152	Clinical Application & Reflection Experience II	2



PAS 5171	Evidence Based Practice I	1
PAS 5261	Clinical Pharmacology II	1

### 3+3 Bachelor of Science in Biology and a Master's Physician Assistant Studies

#### 3+3 Degree Path for a Bachelor of Science in Biology and a Master of Physician Assistant Studies

##### Recommend Sequence of Courses

##### Freshman Fall – 17 hrs.

UE 101	University Experience	1
MA 113	College Algebra	3
BIO 114	Principles of Biology I	4
ENG 133	Technical Communication	3
	Or	
ENG 143	College Composition	3
PSY 113	Principles of Psychology	3
SP 203	Effective Speaking	3
	Or	
COM 163	Interpersonal Communication	3

##### Freshman Spring – 17 hrs.

MA 123	Trigonometry	3
CH 104	General Chemistry I	4
BIO 124	Principles of Biology II	4
HUM 203	Humanities Seminar	3
BIO 163	Medical Terminology	3

##### Sophomore Fall – 18 hrs.

BIO 233	Cell Biology	3
BIO 274	General Ecology	4
CH 114	General Chemistry II	4
ENG 153	Introduction to Literature	3
PH 154	College Physics I	4

##### Sophomore Spring – 17 hrs.

CH 204	Organic Chemistry I	4
BIO 202	Introduction to Biological Literature & Communication	2
BIO 324	Microbiology	4
PH 164	College Physics II	4
	PA Specific Biology Elective (3)	3

##### Junior Fall – 18 hrs.

BIO 384	Human Anatomy & Physiology I	4
BIO 414	Genetics	4
BIO 302	Professional Practice in Science	2
BIO 434	Biochemistry I	4
	Natural Science Biology Elective	4

##### Junior Spring – 18 hrs.

BIO 394	Human Anatomy & Physiology II	4
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	Humanities & Social Science Elective	3
MA 253	Statistics	3
SCI 434	Science Internship	4
	PA Specific Biology Elective (3)	3

Not Pursuing the MPAS Program – 15 hrs.

Courses to complete for Bachelor of Science – Biology if not pursuing the MPAS Program

Senior Fall and Spring - 15 hrs.

Electives (9)	9
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MPAS Program Acceptance – 35 hrs.

Courses to complete as part of the 1<sup>st</sup> year MPAS Program

MPAS Fall I – 17 hrs.

PAS 5001	Clinical Genetics	1
PAS 5002	Diagnostic Techniques - Laboratory Medicine	2
PAS 5003	Clinical Physiology	3
PAS 5004	Clinical Anatomy	4
PAS 5012	Clinical Skills I: Medical Documentation & Interviewing	2
PAS 5022	Physician Assistant Professional Practice	2
PAS 5052	Clinical Application & Reflection Experience I	2
PAS 5161	Clinical Pharmacology I	1

MPAS Spring I – 18 hrs.

PAS 5110	Clinical Medicine & Therapeutics I	10
PAS 5102	Clinical Skills II: Physical Exam & Documentation	2
PAS 5112	Diagnostic Techniques - EKG	2
PAS 5152	Clinical Application & Reflection Experience II	2
PAS 5171	Evidence Based Practice I	1
PAS 5261	Clinical Pharmacology II	1

## Professional Tracks

The Department of Exercise Science also helps to coordinate the following program:

- PRE-MED PROFESSIONAL TRACK
- PRE-PHYSICAL THERAPY PROFESSIONAL TRACK

### Pre-Med Professional Track - 51-53 Hours

The Pre-Med Professional Track can be associated with any major offered at Trine University and is designed for students interested in preparing themselves for a career in health sciences. In conjunction with, or in addition to, the curricular requirements of the major, the Pre-Med Professional Track requires the below coursework.

To be a competitive Medical School Applicant, students in the track must achieve at least a “B+” grade in all science courses listed above. Honors courses are highly recommended. Students must maintain a GPA of 3.5 or better to remain in the pre-med track. Students meet regularly with the Pre-Health advisor to assess readiness for the medical school application process.

## Requirements – 51-53 hrs.

BIO 114	Principles of Biology I	4
BIO 124	Principles of Biology II	4
	Or	
BIO 233	Cell Biology	3
CH 104	General Chemistry I	4
	And	
CH 114	General Chemistry II	4
	Or	
CH 155H	Advanced Honors General Chemistry	5
CH 204	Organic Chemistry I	4
CH 214	Organic Chemistry II	4
CH 434	Biochemistry I	4
MA 134	Calculus I	4
MA 253	Statistics	3
PH 154	College Physics I	4
	And	
PH 164	College Physics II	4
	Or	
PH 224	University Physics I	4
	And	
PH 234	University Physics II	4
PSY 113	Principles of Psychology	3
SOC 103	Principles of Sociology	3
PHL 313	Ethics	3

**Pre-Physical Therapy Professional Track - 41 Hours**

The Pre-Physical Therapy Professional Track can be associated with any major offered at Trine University, though majors in the School of Health Sciences provide the clearest path to successful entry into a Doctor of Physical Therapy degree program. In conjunction with, or in addition to, the curricular requirements of the major, the Pre-Physical Therapy Professional Track requires the below coursework.

Students must also maintain a cumulative GPA of 3.5 or better to stay in the track. They are evaluated during their final year via benchmark interviews that address the following characteristics of a successful physical therapy program applicant: development of personal and professional qualities; physical therapy or graduate school applications; and community service, clinical observation and leadership experiences.

## Pre-Physical Therapy Professional Track Requirements – 41 hrs.

BIO 384	Human Anatomy & Physiology I	4
BIO 394	Human Anatomy & Physiology II	4
	Biological Sciences	8
CH 104	General Chemistry I	4
CH 114	General Chemistry II	4
ENG 453	Advanced Composition	3
MA 253	Statistics	3
PH 154	College Physics I	4
	And	

PH 164	College Physics II	4
	Or	
PH 224	University Physics I	4
	And	
PH 234	University Physics II	4
	Psychology Elective	3
<i>Biological Sciences: excluding botany &amp; zoology</i>		

# College of Health Professions

The College of Health Professions offers the following degrees:

ASSOCIATE DEGREES:

- ASSOCIATE OF APPLIED SCIENCE IN SURGICAL TECHNOLOGY

BACHELOR OF SCIENCE IN:

- NURSING (ONLINE)

GRADUATE PROGRAMS:

- CERTIFICATE OF NURSING EDUCATION
- CERTIFICATE OF NURSING LEADERSHIP
- MASTER OF SCIENCE IN NURSING
- MASTER OF PHYSICIAN ASSISTANT STUDIES
- MASTER OF SCIENCE IN SPEECH LANGUAGE PATHOLOGY
- DOCTORATE OF PHYSICAL THERAPY

## Mission

The College of Health Professions at Trine University, by providing high quality, professionally focused and formative undergraduate and graduate science learning opportunities, enable its students, graduates and faculty to make a positive impact on the community through service, leadership, and scholarship.

The College of Health Professions, located in the growing Trine University Fort Wayne education center on the Parkview Hospital Randalia campus in Fort Wayne, Indiana, offers degrees essential to the future of healthcare. As a student in this college, you will experience state-of-the art laboratories, top-of-the-line classroom technology and expert faculty dedicated to your success. Trine University has partnerships and clinical agreements with established health systems in northeastern Indiana including Parkview Health System and Lutheran Health Network, which allows for real-world clinical education experiences.

The diverse programs within the College of Health Professions allow students to experience collaboration with those in different medical fields. Graduate programs in the College of Health Professions offer direct entry options for students in Trine's Rinker-Ross School of Health Sciences on the Angola campus.

## Associate of Applied Science in Surgical Technology (71 Hrs.)

The program is located in the Health Sciences Education Center at the Carew Street Campus.

### Degree Requirements

Recommend Sequence of Courses for a total of 71 Hours

Fall Year 1 – 18 hrs.

ENG 133	Technical Communication	3
	Or	
ENG 143	College Composition	3
HS 104	Anatomy & Physiology I for Applied Science Majors	4

BIO 163	Medical Terminology	3
SUR 104	Introduction to Surgical Technology	4
SUR 114	Clinical Experience I	4
Spring Year 1 – 18 hrs.		
HS 114	Anatomy & Physiology II for Applied Science Majors	4
BIO 123	Microbiology for Health Sciences	3
SUR 134	Surgical Procedure I	4
SUR 124	Clinical Experience II	4
Complete one of the following:		
HUM 203	Humanities Seminar	3
COM 163	Interpersonal Communication	3
COM 213	Business Communication	3
SP 203	Effective Speaking	3
Summer Year 1 – 17 hrs.		
BIO 212	Pharmacology for Surgical Technologist	2
SUR 234	Surgical Procedures II	4
SUR 218	Clinical Experience III	Other
PSY 113	Principles of Psychology	3
Fall Year 2 – 18 hrs.		
SUR 244	Surgical Procedures III	4
SUR 228	Clinical Experience IV	8
SUR 223	Capstone for the Surgical Technologist	3
MA 113	College Algebra	3

## Bachelor of Science in Nursing (120 hrs.)

The RN-BSN Program at Trine University will provide a quality, innovative educational experience that produces professional nursing graduates capable of delivering safe, culturally and contextually relevant, evidence-based care in a variety of environments, while also preparing graduates to positively impact individuals, groups, and communities through scholarship, leadership, and service.

The RN-BSN program is designed for Associate degree registered nurses as an educational bridge that leads to a baccalaureate degree in nursing. Students enrolled in the RN-BSN program will be required to participate in two clinical education experiences in addition to online coursework within the curriculum.

### Degree Requirements

General Education Requirements - 32 hours

Communication – 9 hrs.

ENG 143	College Composition	3
HUM 203	Humanities Seminar	3
COM 163	Interpersonal Communication	3
	Or	
SP 203	Effective Speaking	3

Humanities and Social Science – 9 hrs.

	Humanities Elective	3
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	Social Science Elective (3)	3
	Social Sciences or Humanities elective	3
Mathematics and Science –11 hrs.		
	Math Elective	3
HS 104	Anatomy & Physiology I for Applied Science Majors	4
HS 114	Anatomy & Physiology II for Applied Science Majors	4
Other – 3 hrs.		
	General Education Electives	3

## Content Requirements - 35 hours

## Required

NRS 303	Professional Nursing Role	3
NRS 313	Transcultural Nursing	3
NRS 333	Nursing Ethics	3
NRS 343	Nursing Informatics	3
NRS 353	Health Promotion Over Lifespan	3
NRS 414	Community-Public Health Nursing	4
NRS 423	Biostatistics & Epidemiology	3
NRS 433	Foundations of Research	3
NRS 443	Global Health	3
NRS 453	Nursing Leadership & Management	3
NRS 484	Professional Capstone Project	4

## Additional Requirements - 53 hours

## Required

UE 111	Online Learning Orientation	1
	Electives	16
	Pre-Licensure Nursing Care	36

## Certificate in Nursing Education (12 hrs.)

The Certificate of Nursing Education is designed to provide additional professional development opportunity for registered nurses interested or engaged in nurse preceptor, clinical educator, or academic nurse educator roles. This certificate would be available to nurses that possess a minimum of a baccalaureate degree in nursing. Should the BSN nurse wish to pursue the master's degree of nursing (MSN) at Trine within three years of completion of the certificate, credit for these courses will be awarded as part of the MSN program after successful completion of NRS 5101. The Certificate of Nursing Education additional prepares graduates for the Certified Nurse Educator CNE® exam, which is administered through the National League for Nursing.

**Note:** Pending accreditation approval of the Master of Science in Nursing

## Certificate of Nursing Education (12 hrs.)

## Program Requirements

NRS 6213	Curriculum Design in Nursing	3
NRS 6223	Nursing Course Development	3
NRS 6233	Teaching Strategies in Nursing	3
NRS 6243	Assessment & Evaluation	3

## Certificate of Nursing Leadership (12 hrs.)

The Certificate of Nursing Leadership is designed to provide professional leadership development opportunities for registered nurses. This is important across an academic nursing career in order to reflect changes in healthcare, in addition to strengthened competencies in organizational and systems thinking, quality improvement and safety, care coordination, inter-professional communication, and team-based care and leadership.

This certificate would be available to nurses that possess a minimum of a baccalaureate degree in nursing. Should the BSN nurse wish to pursue the master's degree of nursing (MSN) at Trine within three years of completion of the certificate, credit for these courses will be awarded as part of the MSN program after successful completion of NRS 5101. Additionally, the Certificate of Nursing Leadership prepares graduates for the Certified in Executive Nursing Practice CENP® exam, which is administered through the American Organization of Nursing Leadership (AONL).

**Note:** Pending accreditation approval of the Master of Science in Nursing

### Certificate of Nursing Leadership (12 hrs.)

#### Program Requirements

NRS 6403	Organizational Leadership in NRS	3
NRS 6413	Healthcare Finance	3
NRS 6423	Healthcare Quality Improvement	3
NRS 6433	Human Resources for Healthcare	3

## Master of Science in Nursing (35 hrs.)

### Program Mission

The Master of Science in Nursing (MSN) program at Trine University will provide a quality, innovative educational experience that produces graduate nurses capable of delivering safe, culturally and contextually relevant, evidence-based care, education, and leadership in a variety of environments while also preparing them to positively impact individuals, groups, and communities through scholarship, leadership, and service.

### Student Learning Outcomes

#### Domain 1: Knowledge for Nursing Practice

*Descriptor: Integration, translation, and application of established and evolving disciplinary nursing knowledge and ways of knowing, as well as knowledge from other disciplines, including a foundation in liberal arts and natural and social sciences. This distinguishes the practice of professional nursing and forms the basis for clinical judgment and innovation in nursing practice.*

#### Competencies:

- 1.1 Demonstrate an understanding of the discipline of nursing's distinct perspective and where shared perspectives exist with other disciplines.
- 1.2 Apply theory and research-based knowledge from nursing, the arts, humanities, and other sciences.
- 1.3 Demonstrate clinical judgement founded on a broad knowledge base.

#### Domain 2: Person-Centered Care

*Descriptor: Person-centered care focuses on the individual within multiple complicated contexts, including family and/or*



*important others. Person-centered care is holistic, individualized, just, respectful, compassionate, coordinated, evidence-based, and*

*developmentally appropriate. Person-centered care builds on a scientific body of knowledge that guides nursing practice regardless of specialty or functional area.*

Competencies:

- 2.1 Engage with the individual in establishing a caring relationship.
- 2.2 Communicate effectively with individuals.
- 2.3 Integrate assessment skills in practice.
- 2.4 Diagnose actual or potential health problems and needs.
- 2.5 Develop plans of care.
- 2.6 Demonstrate accountability for care delivery.
- 2.7 Evaluate outcomes of care.
- 2.8 Promote self-care management.
- 2.9 Provide care coordination.

**Domain 3: Population Health**

*Descriptor: Population health spans the healthcare delivery continuum from public health prevention to disease management of populations and describes collaborative activities with both traditional and non-traditional partnerships from affected communities, public health, industry, academia, health care, local government entities, and others for the improvement of equitable population health outcomes.*

Competencies:

- 3.1 Manage population health.
- 3.2 Engage in effective partnerships.
- 3.3 Consider the socioeconomical impact of the delivery of health care.
- 3.4 Advance equitable population health policy.
- 3.5 Demonstrate advocacy strategies.
- 3.6 Advance preparedness to protect population health during disasters and public health emergencies.

**Domain 4: Scholarship for Nursing Practice**

*Descriptor: The generation, synthesis, translation, application, and dissemination of nursing knowledge to improve health and*

*transform health care.*

Competencies:

- 4.1 Advance the scholarship of nursing.
- 4.2 Integrate best evidence into nursing practice.
- 4.3 Promote the ethical conduct of scholarly activities.

#### **Domain 5: Quality and Safety**

*Descriptor: Employment of established and emerging principles of safety and improvement science. Quality and safety, as core values of nursing practice, enhance quality and minimize risk of harm to patients and providers through both system effectiveness and individual performance.*

Competencies:

- a. Apply quality improvement principles in care delivery.
- b. Contribute to a culture of patient safety.
- c. Contribute to a culture of provider and work environment safety.

#### **Domain 6: Interprofessional Partnerships**

*Descriptor: Intentional collaboration across professions and with care team members, patients, families, communities, and other stakeholders to optimize care, enhance the healthcare experience, and strengthen outcomes.*

Competencies:

- 6.1 Communicate in a manner that facilitates a partnership approach to quality care delivery.
- 6.2 Perform effectively in different team roles, using principles and values of team dynamics.
- 6.3 Use knowledge of nursing and other professions to address healthcare needs.
- 6.4 Work with other professions to maintain a climate of mutual learning, respect, and shared values.

#### **Domain 7: Systems-Based Practice**

*Descriptor: Responding to and leading within complex systems of health care. Nurses effectively and proactively coordinate resources to provide safe, quality, equitable care to diverse populations.*

Competencies:

7.1 Apply knowledge of systems to work effectively across the continuum of care.

7.2 Incorporate consideration of cost-effectiveness of care.

7.3 Optimize system effectiveness through application of innovation and evidence-based practice.

### **Domain 8: Information and Healthcare Technologies**

*Descriptor: Information and communication technologies and informatics processes are used to provide care, gather data, form information to drive decision making, and support professionals as they expand knowledge and wisdom for practice. Informatics processes and technologies are used to manage and improve the delivery of safe, high quality, and efficient healthcare services in accordance with best practice and professional and regulatory standards.*

Competencies:

8.1 Describe the various information and communication technology tools used in the care of patients, communities, and populations.

8.2 Use information and communication technology to gather data, create information, and generate knowledge.

8.3 Use information and communication technologies and informatics processes to deliver safe nursing care to diverse populations in a variety of settings.

8.4 Use information and communication technology to support documentation of care and communication among providers, patients, and all system levels.

8.5 Use information and communication technologies in accordance with ethical, legal, professional, and regulatory standards, and workplace policies in the delivery of care.

### **Domain 9: Professionalism**

*Descriptor: Formation and cultivation of a sustainable professional nursing identity, accountability, perspective, collaborative disposition, and comportment that reflects nursing's characteristics and values.*

Competencies:

9.1 Demonstrate an ethical comportment in one's practice reflective of nursing's mission to society.

9.2 Employ participatory approach to nursing care.

9.3 Demonstrate accountability to the individual, society, and the profession.

9.4 Comply with relevant laws, policies, and regulations.

9.5 Demonstrate the professional identity of nursing.

9.6 Integrate diversity, equity, and inclusion as core to one's professional identity.

### **Domain 10: Personal, Professional, and Leadership Development**

*Descriptor: Participation in activities and self-reflection that foster personal health, resilience, and well-being, lifelong learning, and support the acquisition of nursing expertise and assertion of leadership.*

Competencies:

10.1 Demonstrate a commitment to personal health and well-being.

10.2 Demonstrate a spirit of inquiry that fosters flexibility and professional maturity.

10.3 Develop capacity for leadership.

### Accreditation

The Master of Science in Nursing is an applicant for accreditation with the Commission on Collegiate Nursing Education (CCNE). Additional accreditation information can be found at <https://www.aacnursing.org/CCNE>.

### Degree Requirements

Nursing Core - 19 hours

Requirements

NRS 5101	Transition to Graduate Nursing	1
NRS 5202	Theoretical Foundations in NRS	2
NRS 5303	Research for Evidence-based Prac	3
NRS 5313	Statistics for Nursing Research	3
NRS 5314	Advanced Care Coordination	4
NRS 5324	Advanced Nursing Assessment	4
NRS 6902	Graduate Nurse Capstone	2

Specialization Track Options 16 hours

Choose either Option 1: Nurse Educator Specialization Track or Option 2: Nurse Leadership Specialization Track

Option 1: Nursed Educator Specialization Track

NRS 6213	Curriculum Design in Nursing	3
NRS 6223	Nursing Course Development	3
NRS 6233	Teaching Strategies in Nursing	3
NRS 6243	Assessment & Evaluation	3
NRS 6254	Nurse Educator Practicum	4

Option 2: Nurse Leadership Specialization Track

NRS 6403	Organizational Leadership in NRS	3
NRS 6413	Healthcare Finance	3
NRS 6423	Healthcare Quality Improvement	3
NRS 6433	Human Resources for Healthcare	3
NRS 6454	Nurse Leader Practicum	4

### Master of Physician Assistant Studies (117 hrs.)

The Master of Physician Assistant Studies\* at Trine University is a seven semester program designed to prepare students to succeed, lead and serve the community and the physician assistant (PA) profession. The PA program will be the beginning of a lifelong journey in the pursuit of knowledge, professional development, and personal growth. The program is also committed to maintaining the highest moral and ethical standards.

The PA program is a 117 credit hour 7 semester curriculum of approximately 29 months divided into didactic and experiential

phases.

### **Didactic Phase**

The didactic phase of the PA program comprises of four semesters and includes a total of 66 credit hours. Although primarily campus-based, students occasionally need to travel to clinical application obligations, including local inter-professional education activities.

### **Experiential Phase (Clinical Year)**

The clinical phase of the PA program encompasses approximately three semesters and is organized into nine 5-week clinical rotation periods. Students will be required to return to campus once every approximately five weeks for end-of-rotation activities and will also return to campus for the last two weeks of the final semester. Not all clinicals are local or a driving distance from campus. Students are responsible for their own travel and housing expenses and should expect to travel for one to two experiences. Students are not eligible for experiential phase courses until they have successfully completed all didactic phase courses. Concurrent with the clinical experiences are the Senior Seminar and Graduate Project course series.

There are seven program-required rotation areas and opportunities for elective experiences.

Required are rotations in:

- Family Medicine (5 weeks)
- Internal Medicine (5 weeks)
- Emergency Medicine (5 weeks)
- General Surgery (5 weeks)
- Women's Health (approximately 2.5 weeks)
- Pediatrics (approximately 2.5 weeks)
- Behavioral Health (approximately 2.5 weeks)

Elective rotations include (depending on preceptor availability):

- Orthopedics
- Plastic Surgery
- Hematology
- Genitourinary
- Gastroenterology
- Otorhinolaryngology
- Dermatology
- Cardiology
- Miscellaneous

### **Accreditation**

*\*The ARC-PA has granted **Accreditation-Provisional** status to the Trine University Physician Assistant Program sponsored by Trine University. Accreditation-Provisional is an accreditation status granted when the plans and resource allocation, if*

*fully implemented as planned, of a proposed program that has not yet enrolled students appear to demonstrate the program's ability to meet the ARC-PA Standards or when a program holding Accreditation-Provisional status appears to demonstrate continued progress in complying with the Standards as it prepares for the graduation of the first class (cohort) of students. Accreditation-Provisional does not ensure any subsequent accreditation status. It is limited to no more than five years from matriculation of the first class.*

### **Degree Requirements**

#### Didactic Phase - 66 Hours

##### Fall 1 (16 weeks – 16 hrs.)

PAS 5001	Clinical Genetics	1
PAS 5002	Diagnostic Techniques - Laboratory Medicine	2
PAS 5003	Clinical Physiology	3
PAS 5004	Clinical Anatomy	4
PAS 5012	Clinical Skills I: Medical Documentation & Interviewing	2
PAS 5022	Physician Assistant Professional Practice	2
PAS 5052	Clinical Application & Reflection Experience I	2

##### Spring 1 (16 weeks – 18 hrs.)

PAS 5102	Clinical Skills II: Physical Exam & Documentation	2
PAS 5110	Clinical Medicine & Therapeutics I	10
PAS 5112	Diagnostic Techniques - EKG	2
PAS 5152	Clinical Application & Reflection Experience II	2
PAS 5161	Clinical Pharmacology I	1
PAS 5171	Evidence Based Practice I	1

##### Summer 1 (12 weeks – 14 hrs.)

PAS 5205	Clinical Medicine & Therapeutics II	5
PAS 5212	Clinical Skills III - Special Populations	2
PAS 5213	Diagnostic Techniques - Imaging & PFT	3
PAS 5252	Clinical Application & Reflection Experience III	2
PAS 5261	Clinical Pharmacology II	1
PAS 5371	Evidence Based Practice II	1

##### Fall 2 (16 weeks – 18 hrs.)

PAS 5310	Clinical Medicine & Therapeutics III	10
PAS 5315	Clinical Skills IV - Procedures	5
PAS 5352	Clinical Application & Reflection Experience IV	2
PAS 5361	Clinical Pharmacology III	1

#### Supervised Clinical Practice Experiences (SCPE) - 51 Hours

##### Spring 2 (17 hrs.)

PAS 6015	Clinical Practicum I	5
PAS 6025	Clinical Practicum II	5
PAS 6035	Clinical Practicum III	5
PAS 6141	Senior Seminar I	1
PAS 6171	Graduate Project I	1

**Summer 2 (17 hrs.)**

PAS 6045	Clinical Practicum IV	5
PAS 6055	Clinical Practicum V	5
PAS 6065	Clinical Practicum VI	5
PAS 6241	Senior Seminar 2	1
PAS 6271	Graduate Project 2	1

**FALL 3 (17 hrs.)**

PAS 6075	Clinical Practicum VII	5
PAS 6085	Clinical Practicum VIII	5
PAS 6095	Clinical Practicum VIII	5
PAS 6341	Senior Seminar 3	1
PAS 6371	Graduate Project 3	1

**Master of Science in Speech Language Pathology (53 hrs.)****Program Mission**

Trine University's Master of Science in Speech Language Pathology prepares professionals to assess and treat individuals with communication and swallowing impairments through clinical training, inter-professional collaboration, and evidence-based practice.

**Program Vision Statement**

Trine's program graduates speech language pathologists who succeed, lead and serve in their field using knowledge, skill, and evidence-based practice.

**Program Goals**

- Prepare speech-language pathologists to evaluate and treat patients with communication and swallowing impairments in a variety of settings.
- Graduate professionals will develop critical thinking skills, lead with the highest standards of ethical principles and value inclusion.
- Support faculty and student engagement in research.
- Engage in professional development, community service, and cross-disciplinary training.
- Prepare speech language pathologists to work in an evolving health care and educational systems and serve the needs of an increasing diverse community.

**Student Learning Outcomes**

Students who graduate from Trine's Master of Science in Speech Language Pathology program will demonstrate:

- The ability to evaluate, diagnose, plan and provide intervention for individuals with communication and swallowing impairments across the lifespan using an evidence-based practice framework.
- An understanding of and observation of ASHA's code of ethics, and the standards or practice endorsed by the profession.
- Knowledge and skills of different organizational frameworks and clinical delivery models across education and health care settings.
- The skills to contribute to the profession and the community by engaging in lifelong learning, service, and community advocacy and education.

## Accreditation

The Master of Science in Speech-Language Pathology (M. S.) education program in speech-language pathology at Trine University is an Applicant for Candidacy by the Council on Academic Accreditation in Audiology and Speech-Language Pathology (CAA) of the American Speech-Language-Hearing Association, 2200 Research Boulevard, #310, Rockville, MD 20850, 800-498-2071 or 301-296-5700.

## Degree Requirements

### Program Requirements

SLP 5113	Articulation and Phonology Disorders	3
SLP 5122	Fluency Disorders	2
SLP 5133	Developmental Language Disorders	3
SLP 5143	Clinical Methods	3
SLP 5213	Augmentative Alternative Communication (AAC)	3
SLP 5222	Voice and Resonance	2
SLP 5233	Acquired Language Disorders and Cognitive Rehab	3
SLP 5243	Motor Speech Disorders	3
SLP 6322	Dysphagia	2
SLP 6313	Research Methods	3
SLP 6415	Capstone	5
SLP 5153	Practicum I	3
SLP 5253	Practicum II	3
SLP 6323	Practicum III	3
SLP 6426	Practicum IV	6
SLP 6516	Externship	6

## Course Schedule by Semester

### Requirements List

	Fall I (14 credit hours)	14
SLP 5113	Articulation and Phonology Disorders	3
SLP 5122	Fluency Disorders	2
SLP 5133	Developmental Language Disorders	3
SLP 5143	Clinical Methods	3
SLP 5153	Practicum I	3
	Spring I (14 credit hours)	14
SLP 5213	Augmentative Alternative Communication (AAC)	3
SLP 5222	Voice and Resonance	2
SLP 5233	Acquired Language Disorders and Cognitive Rehab	3
SLP 5243	Motor Speech Disorders	3
SLP 5253	Practicum II	3
	Summer I (8 credit hours)	8
SLP 6313	Research Methods	3
SLP 6322	Dysphagia	2
SLP 6323	Practicum III	3
	Fall II (11 credit hours)	11



SLP 6415	Capstone	5
SLP 6426	Practicum IV	6
	Spring II (6 credit hours)	6
SLP 6516	Externship	6

## Doctor of Physical Therapy (119 hrs.)

The Doctor of Physical Therapy Program (DPT) will provide students with the skills and expertise needed for a rewarding career as a professional physical therapist.

Students enrolled in Trine University's DPT program will be required to participate in clinical education experiences and internships in addition to the didactic coursework within the curriculum. These experiences will include part-time integrated clinical experiences (CARE) during the first five semesters and four full-time clinical internships. It is Trine University's DPT program philosophy "to bring students to the real world of physical therapy," therefore, 34 weeks of the curriculum are dedicated to full-time clinical internships. Students are required to complete clinical affiliations in a variety of settings with the intended goal to be an entry-level physical therapist at graduation.

### Mission

The Doctor of Physical Therapy Program at Trine University, by providing high-quality, professionally focused physical therapy education, enables its graduates and faculty to make a positive impact on the healthcare needs of their communities through service, leadership, and scholarship.

### Vision Statement

The Doctor of Physical Therapy Program at Trine University will be recognized as a premier provider of physical therapy education, adding value to the lives of its graduates and community members.

### Goals and Outcomes

**Goal 1:** Upon completion of all requirements of the Trine University Doctor of Physical Therapy Program, students will be prepared for entry-level physical therapy practice in a variety of settings to make a positive impact on the healthcare needs of their communities through service, leadership, and scholarship.

**Goal 2:** Graduates of the Trine University Doctor of Physical Therapy Program will be engaged in ethical, competent, and professionally rewarding physical therapy practice.

**Goal 3:** Faculty of the Trine University Doctor of Physical Therapy Program will advance the profession and inform their teaching through service, leadership, and scholarship.

**Goal 4:** Faculty of the Trine University Doctor of Physical Therapy Program will demonstrate a commitment to the utilization of best practices in education, continuous professional development, and the promotion of evidence-based approaches to physical therapy practice.

**Goal 5:** The Trine University Doctor of Physical Therapy Program will continually assess, develop, and improve the curriculum.

**Goal 6:** The Trine University Doctor of Physical Therapy Program will demonstrate a commitment to the physical therapy profession by facilitating collaborative activities for continuous professional growth in its communities.

### Accreditation

The Doctor of Physical Therapy Program at Trine University is accredited by the Commission on Accreditation in Physical Therapy Education (CAPTE), 1111 North Fairfax Street, Alexandria, Virginia 22314; telephone: 703-706-3245;

email: [accreditation@apta.org](mailto:accreditation@apta.org); website: <http://www.capteonline.org>.

## Degree Requirements

### Program Requirements

DPT 5111	CARE I	1
DPT 5124	Anatomy of Movement I	4
DPT 5134	Applied Physiology I	4
DPT 5143	Clinical Practice I	3
DPT 5152	Health Behavior Science	2
DPT 5162	Professional Development I	2
DPT 5211	CARE II	1
DPT 5224	Anatomy of Movement II	4
DPT 5234	Applied Physiology II	4
DPT 5243	Clinical Practice II	3
DPT 5254	Applied Neuroscience	4
DPT 5311	CARE III	1
DPT 5352	Pharmacology	2
DPT 5361	Outcome Assessment	1
DPT 5343	Clinical Practice III	3
DPT 5372	Evidence Based Practice I	2
DPT 5381	Integumentary System	1
DPT 6111	CARE IV	1
DPT 6124	Musculoskeletal PT I	4
DPT 6134	Neuromuscular PT I	4
DPT 6142	Imaging & Laboratory Testing	2
DPT 6242	Cardiopulmonary PT	2
DPT 6172	Evidence Based Practice II	2
DPT 6191	Anatomy Seminar I	1
DPT 6211	CARE V	1
DPT 6224	Musculoskeletal PT II	4
DPT 6233	Neuromuscular PT II	3
DPT 6342	Orthotics & Prosthetics	2
DPT 6152	Lifespan I: Growth & Development	2
DPT 6272	Evidence-Based Practice III	2
DPT 6282	Healthcare Delivery I	2
DPT 6291	Anatomy Seminar II	1
DPT 6314	First Full-Time Clinical Education Experience	4
DPT 6352	Primary Care Practice	2
DPT 6252	Lifespan II: Geriatrics	2
DPT 6362	Professional Development II	2
DPT 6382	Healthcare Delivery II	2
DPT 7118	Terminal Full-Time Clinical Education Experience I	8
DPT 7128	Terminal Full-Time Clinical Education Experience II	Other
DPT 7214	Terminal Full-Time Clinical Education Experience III	14
DPT 7262	Professional Development III	2

*DPT 6314: 5 wks*

*DPT 7118 and DPT 7128: 8wks*

*DPT 7214: 14 wks*

# Online Programs

## Undergraduate Degree Programs

### ASSOCIATE DEGREE PROGRAMS

- ASSOCIATE IN ACCOUNTING
- ASSOCIATE IN BUSINESS ADMINISTRATION
- ASSOCIATE IN CRIMINAL JUSTICE
- ASSOCIATE IN GENERAL STUDIES
- ASSOCIATE OF SCIENCE IN INFORMATION SYSTEMS
- ASSOCIATE OF SCIENCE IN MANUFACTURING TECHNOLOGY

### BACHELOR OF ARTS WITH A MAJOR IN:

- COMMUNICATION
- GENERAL STUDIES

### BACHELOR OF SCIENCE IN:

- HEALTHCARE ADMINISTRATION
- MANUFACTURING TECHNOLOGY
- NURSING
- ORGANIZATIONAL LEADERSHIP

### BACHELOR OF SCIENCE IN BUSINESS ADMINISTRATION MAJORS IN:

- ACCOUNTING
- APPLIED MANAGEMENT
- HUMAN RESOURCE MANAGEMENT
- INTERNATIONAL BUSINESS (GLOBAL PARTNERSHIP ONLY)
- MANAGEMENT

### BACHELOR OF SCIENCE WITH A MAJOR IN:

- CRIMINAL JUSTICE
- INFORMATION SYSTEMS
- PSYCHOLOGY

## Class Scheduling

There are three semesters per year, but the eight-week terms provide for six entry points and increased flexibility for adult students.

## Educational Delivery Systems

Students have a choice of educational delivery systems from which to choose. Available educational delivery systems include in class, campus-based learning and computer-based distance learning. Students may choose to blend the delivery systems in a way that best meets their needs, giving them optimal flexibility as they complete their degrees.

### Activities

CGPS students are encouraged to participate in activities at their respective education centers, but may also participate in main campus activities. Students who qualify are eligible for memberships in various scholastic honoraries, such as those in business or criminal justice. Students may use student ID cards to attend main campus events.

### Library

All CGPS students have the opportunity to use the main campus Library and Information Services, either in person or on the Web. Multiple resources are available to all students online through the library at *trine.edu/lis*. Students can access the Web-based catalog of the library's collection of books, media (tapes, DVDs, CDs, etc.), periodicals (journals, magazines, newspapers and other resources through magazines, newspapers), and other resources through computer labs on or off campus. Some electronic resources require a log-on for off campus use.

Students may request materials not available in the Trine University collection via the inter-library loan (ILL) service. Trine University library materials and ILL borrowed items and photocopies (periodical articles or book chapters) can be delivered to any education center. Trine University library books circulate for three-week periods and media for one-week periods. The lending library sets the loan periods for ILL borrowed items and these vary by institution. In addition, students can apply for a reciprocal borrowing card to access library collections in Indiana universities statewide. Librarians can provide research assistance and guides for using the library and its resources.

### Non-Collegiate Sponsored Instruction

Trine University awards credit for college-level courses offered by business and professional organizations as recommended by the American Council on Education in its National Guide to Educational Credit. Credit is awarded for coursework offered by the military as recommended by the American Council on Education in its Guide to the Evaluation of Educational Experiences in the Armed Services. Credits awarded are subject to the approval of the Office of the Registrar.

### Mission

The mission of the College of Graduate and Professional Studies/TrineOnline at Trine University is to focus on continuous improvement while providing a diverse population of learners a high-quality online education, where they will receive personalized support, preparing them to succeed in the organizations and communities they lead and serve.

## Associate Degrees

### Associate in Accounting (60 hrs.)

The associate in accounting program is designed to prepare students for immediate entry into the accounting field. It combines a concentration in accounting and computer science with business, economics and general education subjects. This program is especially appropriate for positions in businesses that require a small but knowledgeable accounting staff. As all of the credits are fully transferable to the four-year accounting major at Trine University, it serves as an excellent program for students who subsequently plan to seek a Bachelor of Science degree with an accounting major. A specified number of credit hours must be taken in each section described below. Prerequisites as shown in the Course Descriptions section of this catalog must be carefully observed. Excess credit hours in a section may not ordinarily be counted toward requirements in another section.

**Degree Requirements**

## General Education Requirements - 22 hours

## Communication – 6 hrs.

ENG 133	Technical Communication	3
	Or	
ENG 143	College Composition	3
HUM 203	Humanities Seminar	3

## Humanities and Social Science – 6 hrs.

ECO 213	Microeconomics	3
	Or	
ECO 223	Macroeconomics	3
	Humanities Elective (3)	3

## Mathematics and Science – 7 hrs.

MA 113	College Algebra	3
	Science Elective (3)	3
	Math or Science Elective (1)	1

## Other – 3 hrs.

SP 203	Effective Speaking	3
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## Additional Requirements - 8 hours

## Required

BA 201	Profession Development & Strategies	1
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## Take one of the below:

BA 101	University Experience for Ketner School of Business	1
BA 102	University Experience-Business Students	2
UE 101	University Experience	1
UE 111	Online Learning Orientation	1

## Select two of the following courses - 6 hrs.

BA 113	Business Computer Applications	3
COM 213	Business Communication	3
PSY 113	Principles of Psychology	3

## Content Requirements - 30 hours

## Associate Business Core - 15 hrs.

AC 203	Accounting I	3
AC 213	Accounting II	3
BA 123	Business Concepts	3
LAW 203	Business Law & Ethics	3
MK 203	Marketing	3

## Concentration Requirements - 15 hrs.

AC 303	Cost Accounting	3
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AC 323	Intermediate Accounting I	3
AC 333	Intermediate Accounting II	3
AC 373	Accounting Information Systems	3
AC 423	Personal Income Tax	3
	Or	
AC 463	Auditing	3

## Associate in Business Administration (60 hrs.)

The associate in business administration degree program is designed to prepare a person for entry into business with a broad understanding of various business activities and their interrelationships. It combines coursework in accounting, finance, marketing, business law, and management. Courses in economics, psychology, mathematics, computer science and communication are all part of this curriculum. Both traditional and non-traditional students will find this program of interest. All credits are transferable to a Trine University four-year business administration degree for those who choose to continue their education. A specified number of credit hours must be taken in each of the following sections. Prerequisites as shown in the Course Descriptions section of this catalog must be carefully observed. Excess credit hours in a section may not ordinarily be counted toward requirements in another section.

### Degree Requirements

#### General Education Requirements - 22 hours

#### Communication – 6 hrs.

ENG 133	Technical Communication	3
	Or	
ENG 143	College Composition	3
HUM 203	Humanities Seminar	3

#### Humanities and Social Science – 6 hrs.

ECO 213	Microeconomics	3
	Or	
ECO 223	Macroeconomics	3
	Humanities Elective (3)	3

#### Mathematics and Science – 7 hrs.

MA 113	College Algebra	3
	Science Elective (3)	3
	Math or Science Elective (1)	1

#### Other – 3 hrs.

SP 203	Effective Speaking	3
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#### Additional Requirements - 8 hours

#### Required

BA 201	Profession Development & Strategies	1
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#### Take one of the below:

BA 101	University Experience for Ketner School of Business	1
BA 102	University Experience-Business Students	2
UE 101	University Experience	1

UE 111	Online Learning Orientation	1
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Select two of the following courses - 6 hrs.

BA 113	Business Computer Applications	3
COM 213	Business Communication	3
PSY 113	Principles of Psychology	3

Content Requirements - 30 hours

Associate Business Core - 15 hrs.

AC 203	Accounting I	3
AC 213	Accounting II	3
BA 123	Business Concepts	3
LAW 203	Business Law & Ethics	3
MK 203	Marketing	3

Concentration Requirements - 15 hrs.

MGT 363	Organizational Behavior	3
	Electives (12)	12

*Electives: AC, BA, ECO, ENT, FIN, LAW, LDR, MGT, MK*

## Associate in Criminal Justice (60 hrs.)

### Degree Requirements

General Education Requirements - 21 hours

Communication – 6 hrs.

ENG 143	College Composition	3
HUM 203	Humanities Seminar	3

Humanities and Social Science – 6 hrs.

SOC 103	Principles of Sociology	3
	Humanities Elective (3)	3

Mathematics and Science – 6 hrs.

	Mathematics Elective (3)	3
	Science Elective (3)	3

Other General Education – 3 hrs.

POLS 113	Introduction to Government	3
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Additional Requirements - 15 hours

Required

UE 101	University Experience	1
	Or	
UE 111	Online Learning Orientation	1
	Electives (14)	14

## Content Requirements - 24 hours

## Required

CRJ 103	Introduction to Criminal Justice	3
CRJ 133	Criminal Justice Report Writing	3
CRJ 153	Juvenile Justice	3
CRJ 263	Introduction to Criminal Law & Justice	3
CRJ 273	Criminal Procedure & Evidence	3
CRJ 343	Criminalistics & Crime Scene Investigations I	3
PSY 113	Principles of Psychology	3
PSY 383	Forensic Psychology	3

## Associate in General Studies (60 hrs.)

## Degree Requirements

## General Education Requirements - 22 hours

## Communication – 6 hrs.

ENG 143	College Composition	3
HUM 203	Humanities Seminar	3

## Humanities and Social Science – 6 hrs.

Social Science Elective (3)	3
Humanities Elective (3)	3

## Mathematics and Science – 6 hrs.

Mathematics Elective (3)	3
Science Elective (3)	3

## Other – 4 hrs.

General Education Electives (4)	4
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## Additional Requirements - 1 hour

## Required

UE 101	University Experience	1
	Or	
UE 111	Online Learning Orientation	1

## Content Requirements - 37 hours

37 credit hours, to include at least 9 hours earned from two different academic departments

## Associate of Science in Information Systems (60 hrs.)

Trine University will prepare students enrolled in the Associate of Science in Information Systems (ASIS) program to enter information systems occupations in supporting roles, augment skill sets in their present occupation, or move on to pursuing a bachelor's degree in Information Systems. Throughout this program, students will be introduced to the basics of software applications, computer networking, and database management.



**Outcomes**

Identify computing practices and emerging technologies to enhance organizational efficiency.  
 Utilize computer-based systems, processes, components, and programs to meet organizational needs.  
 Explain the impact of computing technologies on individuals, organizations, and society.  
 Model ethical responsibility in information systems.

**Degree Requirements**

General Education Requirements - 21 hours

Communication – 6 hrs.

ENG 133	Technical Communication	3
HUM 203	Humanities Seminar	3

Humanities and Social Science – 6 hrs.

Social Science Elective (3)	3
Humanities Elective (3)	3

Mathematics and Science – 6 hrs.

MA 113	College Algebra	3
	Science Elective (3)	3

Other – 3 hrs.

BA 113	Business Computer Applications	3
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Additional Requirements - 15 hours

Required

UE 111	Online Learning Orientation	1
	Electives (14)	14

Core Requirements - 24 hours

Required

BA 123	Business Concepts	3
CSIT 103	Introduction to Information Systems	3
CSIT 123	Computing Infrastructure Basics	3
CSIT 163	Using Programming to Solve Problems	3
CSIT 223	Network Management	3
INF 263	Data Management	3
INF 393	Data Visualization	3
INF 403	Advanced Database Management	3

**Associate of Science in Manufacturing Technology (60 hrs.)**

The Associate of Science in Manufacturing Technology online degree is designed for those interested in the hands-on side of the manufacturing field. If you have an interest or experience in manufacturing, production or assembly operation and have knowledge of CAD programming, CNC machining, robotics or other manufacturing specialties, this manufacturing technology degree will prepare you to be a work-ready technologist.

**Degree Requirements**

General Education Requirements - 22 hours

Communication – 6 hrs.

ENG 143	College Composition	3
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HUM 203	Humanities Seminar	3
Humanities and Social Science – 6 hrs.		
ECO 203	Survey of Economics	3
	Humanities Elective (3)	3
Mathematics and Science – 6 hrs.		
MA 113	College Algebra	3
PH 154	College Physics I	4
Other – 3 hrs.		
MA 123	Trigonometry	3
Additional Requirements - 14 hours		
Required		
BA 201	Profession Development & Strategies	1
UE 111	Online Learning Orientation	1
MA 253	Statistics	3
	Electives (9)	9
Content Requirements - 24 hours		
Required		
ETD 103	Basic Technical Drawing	3
ETD 113	Geometric Dimensioning & Tolerancing	3
ETD 163	Environmental Health & Safety	3
ETD 173	Computer Aided 3-D Modeling	3
ETD 273	Electrical Fundamentals	3
MT 113	Manufacturing Processes & Materials	3
MT 253	Basic Dimensional Metrology	3
ME 403		3
ME 403 Quality Assurance for Manufacturing Technology - PENDING		

## Bachelor Degrees

### Bachelor of Arts - Communication Major (120 hrs.)

#### Degree Requirements

General Education Requirements - 42 hours

Communication – 9 hrs.

ENG 143	College Composition	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3

Humanities and Social Science – 12 hrs.

FLM 203	Film Appreciation	3
PSY 113	Principles of Psychology	3
	Literature Course	3
	Social Science Elective (3)	3

Mathematics and Science – 9 hrs.

	Mathematics Elective (3)	3
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	Science Elective (3)	3
	Math or Science Elective (3)	3
Other – 12 hrs.		
COM 123	History of the Media	3
COM 163	Interpersonal Communication	3
COM 203	Media & Society	3
	General Education Electives (3)	3

## Content Requirements - 63 hours

## Required

UE 101	University Experience	1
	Or	
UE 111	Online Learning Orientation	1
COM 111	Practices & Professions	1
COM 153	Principles of Public Relations	3
COM 183	Writing For The Media	3
COM 213	Business Communication	3
COM 233	Intercultural Communication	3
COM 243	Digital Media Creation	3
COM 253	Event Planning & Promotion	3
COM 293	Argumentation & Debate	3
COM 301	Media Practicum	1
COM 343	Web Content Management	3
COM 353	Public Relations Writing & Production	3
COM 363	Rhetoric and Persuasion	3
COM 383	Advanced Writing for the Media	3
COM 433	Media Law & Ethics	3
COM 453	Public Relations Planning & Campaigns	3

*COM 301: taken twice*

## Capstone and Internship – 3 hrs.

COM 4013	Senior Capstone Internship in Communication	3
	Or	
COM 4281	Senior Communication Project Proposal	1
	And	
COM 4292	Senior Communication Project	2

## Free Electives – 14 hrs.

Electives are determined in conjunction with an advisor and based

## COM+ Concentrations - 15 hours

Students choose one of the following professional preparation tracks.

## COM+ Criminal Justice – 15 hrs.

CRJ 103	Introduction to Criminal Justice	3
CRJ 133	Criminal Justice Report Writing	3
CRJ 153	Juvenile Justice	3
CRJ 263	Introduction to Criminal Law & Justice	3
CRJ 273	Criminal Procedure & Evidence	3

## COM+ Environment – 15 hrs.

Choose 15 hours from the list below. *Angola campus only*

BIO 124	Principles of Biology II	4
BIO 214	Conservation	4
BIO 334	Environmental Biology	4
EAS 213/GEO 213	Physical Geography	3
CE 3101	Environmental Engineering Lab	1
CE 3103	Environmental Engineering	3
CE 4113	Environmental Remediation	3

*NOTE: COM+ Environment may require pre-requisites. CE 3103 pre-requisite of CH 114 is waived for COM+ Environment students. Students should consult with their advisor.*

## COM+ Graphic Design – 15 hrs.

COM 303	Digital Photography	3
COM 393	Design Thinking	3
COM 413	Corporate & Organizational Communication	3
MK 203	Marketing	3
MK 373	Graphic Design Fundamentals	3

## COM+ Healthcare Administration – 15 hrs.

*Primarily online*

HC 213	Healthcare Market Analysis	3
HC 313	Professional Relationships	3
HC 323	Technology & Clinical Systems	3
HC 433	Applied Finance & Revenue Cycle	3
PHL 353	Ethical Issues in Medical Care	3

## COM+ Information Systems – 15 hrs.

*Primarily online*

CSIT 103	Introduction to Information Systems	3
CSIT 123	Computing Infrastructure Basics	3
CSIT 223	Network Management	3
INF 263	Data Management	3
INF 343	Information Security	3

## COM+ Leadership – 15 hrs.

*Primarily online*

LDR 103	Introduction to Organization Leadership	3
LDR 203	Leadership Strengths & Skills	3
LDR 303	Contemporary Leadership Theory & Practice	3
LDR 333	Organizational Leadership Development & Change	3
LDR 403	Creativity, Innovation, & Influence	3

## COM+ Sports – 15 hrs.

*Angola campus only*

EXS 103	Teaching Sport Skills I	3
EXS 123	Teaching Sport Skills II	3
EXS 203	Risk and Sports	3
EXS 221	Officiating	1

EXS 483 Professional Development in Exercise Science 3

COM+ Strategic Focus – 15 hrs.

Choose at least 15 hours in consultation with your COM major advisor. These courses must be approved by the HAC Department Chair to ensure they meet professional track requirements.

## Bachelor of Arts - General Studies Major (120 hrs.)

### Degree Requirements

General Education Requirements - 36 hours

Communication – 9 hrs.

ENG 143	College Composition	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3

Humanities and Social Science – 9 hrs.

HIS 103	American History I	3
HIS 113	American History II	3
	Humanities Elective (3)	3

Mathematics and Science – 9 hrs.

	Mathematics Elective (3)	3
	Science Elective (3)	3
	Math or Science Elective (3)	3

Other – 9 hrs.

CSIT 103	Introduction to Information Systems	3
POLS 113	Introduction to Government	3
PSY 113	Principles of Psychology	3

Content Requirements - 36 hours

Required

UE 101	University Experience	1
	Or	
UE 111	Online Learning Orientation	1

Free Electives – 35 hrs.

Electives are determined in conjunction with an advisor and based on student career objectives.

Concentrations - 48 hours

Select one of the Concentration options below.

Option A – Pre-Legal Studies Concentration – 48 hrs.

COM 213	Business Communication	3
COM 363	Rhetoric and Persuasion	3
ENG 2113	American Literature I	3
POLS 333	State & Local Government	3
POLS 403	American Constitutional Development	3
LE 153	Juvenile Justice	3

LE 263	Introduction to Criminal Law & Justice	3
	And	
LE 273	Criminal Procedure & Evidence	3
	Or	
	9 hours from BA or LAW	9
PHL 313	Ethics	3
PHL 343	Logic	3
PSY 373	Political Psychology	3
SOC 103	Principles of Sociology	3
SOC 323	The Family	3
PL 4003	Legal Capstone Experience	3
	Electives (6)	6

*Electives: 6 hours from LE, ENG, PSY, or COM*

Option B – Self-Designed Studies Concentration – 48 hrs.

15 to 30 hours must be taken from two to three different academic departments at the 300 level or higher.

GS 4003	Senior Capstone Project	3
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## Bachelor of Science – Criminal Justice Major (120 hrs.)

### Degree Requirements

General Education Requirements - 36 hours

Communication – 9 hrs.

ENG 143	College Composition	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3
	Or	
COM 163	Interpersonal Communication	3

Humanities and Social Science – 9 hrs.

HIS 103	American History I	3
HIS 113	American History II	3
	Or	
HIS 203	World Civilization I	3
HIS 213	World Civilization II	3
	Humanities Elective (3)	3

Mathematics and Science – 9 hrs.

BIO 1003	Plants and People (no lab)	3
	Mathematics Elective (3)	3
	Math or Science Elective (3)	3

Other – 9 hrs.

SOC 103	Principles of Sociology	3
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POLS 113	Introduction to Government	3
PSY 113	Principles of Psychology	3

## Content Requirements - 69 hours

## Required

UE 101	University Experience	1
	Or	
UE 111	Online Learning Orientation	1
CRJ 103	Introduction to Criminal Justice	3
CRJ 133	Criminal Justice Report Writing	3
CRJ 153	Juvenile Justice	3
CRJ 243	Introduction to Criminology	3
CRJ 263	Introduction to Criminal Law & Justice	3
CRJ 273	Criminal Procedure & Evidence	3
CRJ 343	Criminalistics & Crime Scene Investigations I	3
POLS 333	State & Local Government	3
POLS 403	American Constitutional Development	3
PSY 323	Abnormal Psychology	3

## Capstone and Internship – 6 hrs.

CRJ 433	Criminal Justice Capstone Demonstration	3
CRJ 473	Law Enforcement Internship	3

## Free Electives – 32 hrs.

Electives are determined in conjunction with an advisor and based on student career objectives.

## Concentrations - 15 hours

Select one of the following three concentrations.

## Option A – Criminal Justice Professional – 15 hrs.

CRJ 363	Institutional Corrections & Law	3
PSY 303	Research Methods in Psychology	3
CRJ 423	Criminal Justice Agency Administration	3
CRJ 453	Topics in Criminal Justice	3
SOC 323	The Family	3

## Option B – Psychology – 15 hrs.

PSY 223	Life Span Developmental Psychology	3
	Or	
PSY 353	Child & Adolescent Psychology	3
PSY 303	Research Methods in Psychology	3
PSY 333	Psychology of Personality	3
PSY 343	Social Psychology	3
PSY 423	Counseling Theories & Practices	3

## Option C – Indiana Law Enforcement – 15 hrs.

Successful completion of Indiana Law Enforcement Academy Basic Police Training Course.

CRJ 4015	Basic Police Training Course	15
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## Bachelor of Science in Information Systems Major (120 hrs.)

Trine University will prepare students enrolled in the Bachelor of Science in Information Systems (BSIS) program for cutting-edge careers in fields associated with software applications, system analysis, information and system security, database management and network administration. Throughout this program, students will use critical thinking and applied learning to master industry relevant skills. Additionally, students will choose a concentration in one of the following areas: management/leadership, healthcare, marketing, cybersecurity, game design and esports, or students can also transfer in prior experience into the information systems specialty concentration. The advancement of the digital revolution has opened the door for numerous career opportunities associated with information systems. By integrating computing and business practices, students will be prepared to enter or advance in the workforce.

### Outcomes

1. Recommend emerging technologies using computing practices to enhance organizational efficiency.
2. Design computer-based systems, processes, components, and programs to meet organizational needs.
3. Evaluate the impact of computing technologies on individuals, organizations, and society.
4. Develop project management processes to maximize productivity.
5. Demonstrate ethical accountability in information systems.

### Degree Requirements

General Education Requirements - 30 hours

Communication – 9 hrs.

ENG 133	Technical Communication	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3

Humanities and Social Science – 9 hrs.

PSY 113	Principles of Psychology	3
PHL 313	Ethics	3
	Humanities or Social Science Elective	3

Mathematics and Science – 9 hrs.

MA 113	College Algebra	3
MA 253	Statistics	3
	Science Elective (3)	3

Other – 3 hrs.

BA 113	Business Computer Applications	3
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Additional Requirements - 7 hrs.

BA 123	Business Concepts	3
BA 213	Business Spreadsheets	3
UE 111	Online Learning Orientation	1

Core Requirements - 39 hours

COM 343	Web Content Management	3
CSIT 103	Introduction to Information Systems	3
CSIT 123	Computing Infrastructure Basics	3
CSIT 153	Introduction to Operating Systems	3
CSIT 163	Using Programming to Solve Problems	3
CSIT 223	Network Management	3
CSIT 273	Enterprise Architecture	3
INF 263	Data Management	3
INF 343	Information Security	3



INF 393	Data Visualization	3
INF 403	Advanced Database Management	3
IS 483	Information Systems Capstone Proposal	3
IS 493	Information Systems Capstone Project	3

Concentration Requirements – 15 hrs.

Option 1: Management/Leadership

MGT 383	Principles of Project Management	3
	MGT/LDR Elective (300/400 Level)	3
	MGT/LDR Elective (300/400 Level)	3
	MGT/LDR Elective (300/400 Level)	3
	MGT/LDR Elective (300/400 Level)	3

Option 2: Healthcare

HC 203	US & World Healthcare Systems	3
HC 213	Healthcare Market Analysis	3
HC 323	Technology & Clinical Systems	3
HC 363	Information Systems Strategies	3
HC 463	Effective Quality Management	3

Option 3: Marketing

MK 203	Marketing	3
MK 323	Integrated Marketing Communication	3
MK 373	Graphic Design Fundamentals	3
MK 423	Professional Selling	3
MK 473	Digital Advertising (SEM/SEO)	3

Option 4: Information Systems Specialty

IS Specialty	Transfer 15 approved credits or MSIS coursework	3
IS Specialty	Transfer 15 approved credits or MSIS coursework	3
IS Specialty	Transfer 15 approved credits or MSIS coursework	3
IS Specialty	Transfer 15 approved credits or MSIS coursework	3
IS Specialty	Transfer 15 approved credits or MSIS coursework	3

Option 5: Cyber Security

CSIT 363	Certified Ethical Hacking I	3
CSIT 373	Certified Ethical Hacking II	3
CSIT 383	Certified Ethical Hacking III	3
CSIT 393	Certified Ethical Hacking IV	3
CSIT 403	Applications of Cybersecurity	3

Option 6: Game Design and Esports

CSIT 1013	Esports Administration	3
CSIT 1023	The History of Gaming	3
CSIT 253	Artificial Intelligence & Information	3
CSIT 2013	Esports Analytics	3
CSIT 4013	Game Design and Development	3

Free Electives – 29 hrs.

Electives are determined in conjunction with an advisor and based on student career objectives.

## Bachelor of Science – Psychology Major (120 hrs.)

### Degree Requirements

General Education Requirements - 36 hours

Communication – 9 hrs.

ENG 143	College Composition	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3
	Or	
COM 163	Interpersonal Communication	3

Humanities and Social Science – 12 hrs.

PSY 113	Principles of Psychology	3
POLS 113	Introduction to Government	3
SOC 103	Principles of Sociology	3
	Humanities Elective (3)	3

Mathematics and Science – 9 hrs.

	Mathematics Elective (3)	3
	Biology Elective (3)	3
	Math or Science Elective (3)	3

Other – 6 hrs.

HIS 103	American History I	3
	And	
HIS 113	American History II	3
	Or	
HIS 203	World Civilization I	3
	And	
HIS 213	World Civilization II	3

Content Requirements - 84 hours

Required

UE 101	University Experience	1
	Or	
UE 111	Online Learning Orientation	1

Electives – 35 hrs.

Students wishing to pursue graduate training in psychology should also take MA 113 College Algebra and MA 253 Statistics.

	Electives (35)	35
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Required Core – 6 hrs.

PSY 303	Research Methods in Psychology	3
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PSY 453	Clinical Internship I	3
	Or	
PSY 473	Psychology Capstone Demonstration	3

Subject Area Concentrations - 24 hrs.

Choose four of the following clinical core courses – 12 hrs.

PSY 323	Abnormal Psychology	3
PSY 363	Human Behavior & Counseling	3
PSY 403	Human Sexuality	3
PSY 413	The Psychology of Addiction	3
PSY 423	Counseling Theories & Practices	3

Choose two of the following social/cognitive core courses – 6 hrs.

PSY 333	Psychology of Personality	3
PSY 343	Social Psychology	3
PSY 373	Political Psychology	3

Choose two of the following developmental core courses – 6 hrs.

PSY 223	Life Span Developmental Psychology	3
PSY 353	Child & Adolescent Psychology	3
SOC 323	The Family	3

Additional Psychology Core Electives - 18 hrs.

Choose 18 hours from any above subject area courses not used or from the list below.

PSY 313	Topics in Psychology	3
PSY 383	Forensic Psychology	3
PSY 433	Issues of Substance Abuse in Family Systems	3
PSY 443	Advanced Forensic Psychology	3
PSY 483	Counseling Issues in Substance Abuse	3
PSY 493	Issues & Ethics in Psychology & Counseling	3
SOC 313	Topics in Sociology	3
SOC 343	Social Psychology	3
SM 393	Sport Psychology	3

## Bachelor of Science in Healthcare Administration (120 hrs.)

Trine University's Bachelor of Science in Healthcare Administration assists those new to healthcare as well as working professionals seeking academic or work advancement.

As a student in the online Healthcare Administration program, you will earn application-based knowledge as well as an understanding of the history, current state and future of healthcare delivery. You will explore the delivery system of today and focus on the application of concepts in healthcare leadership. Choose from one of the three tracks for this degree: information systems, organizational leadership or healthcare specialty.

### Degree Requirements

General Education Requirements - 42 hours

Communication – 9 hrs.

ENG 133	Technical Communication	3
	Or	
ENG 143	College Composition	3

HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3
Humanities and Social Science – 12 hrs.		
ECO 353	Healthcare Regulations	3
COM 233	Intercultural Communication	3
PHL 353	Ethical Issues in Medical Care	3
PSY 113	Principles of Psychology	3
Mathematics and Science – 9 hrs.		
MA 113	College Algebra	3
MA 253	Statistics	3
BIO 163	Medical Terminology	3
Other – 12 hrs.		
BA 213	Business Spreadsheets	3
COM 213	Business Communication	3
	General Education Electives (3)	3
Content Requirements - 78 hours		
Required		
UE 111	Online Learning Orientation	1
BA 201	Profession Development & Strategies	1
CSIT 103	Introduction to Information Systems	3
	Or	
	Computer Literacy	3
Electives – 28 hrs.		
Required Core – 30 hrs.		
CSIT 123	Computing Infrastructure Basics	3
HC 203	US & World Healthcare Systems	3
HC 213	Healthcare Market Analysis	3
HC 313	Professional Relationships	3
HC 323	Technology & Clinical Systems	3
HC 363	Information Systems Strategies	3
HC 433	Applied Finance & Revenue Cycle	3
HC 463	Effective Quality Management	3
HC 473	Healthcare Capstone	3
HR 343	Healthcare Human Resource Management	3
Subject Area Concentrations - 15 hrs.		
Option 1: Information Systems		
CSIT 163	Using Programming to Solve Problems	3
CSIT 223	Network Management	3
CSIT 253	Artificial Intelligence & Information	3
INF 263	Data Management	3
INF 343	Information Security	3
Option 2: Organizational Leadership		
LDR 103	Introduction to Organization Leadership	3

LDR 203	Leadership Strengths & Skills	3
LDR 333	Organizational Leadership Development & Change	3
LDR 343	Conflict Resolution	3
LDR 403	Creativity, Innovation, & Influence	3
<b>Option 3: Healthcare Specialty</b>		
	Healthcare Specialty courses	15
<b>Option 4: Communication</b>		
COM 153	Principles of Public Relations	3
COM 243	Digital Media Creation	3
COM 253	Event Planning & Promotion	3
COM 353	Public Relations Writing & Production	3
COM 413	Corporate & Organizational Communication	3

## Bachelor of Science in Manufacturing Technology (120 hrs.)

The Bachelor of Science in Manufacturing Technology online degree is designed for those interested in the hands-on side of the manufacturing field. This program is also an excellent fit if you have completed a two-year program in industrial technology, manufacturing technology, basic design technology, CNC machining, robotics or other relevant areas of manufacturing.

You also have an option to earn graduate credit toward a Master of Science in Engineering Management while working on this bachelor's degree.

### Degree Requirements

General Education Requirements - 43 hours

Communication – 9 hrs.

ENG 143	College Composition	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3

Humanities and Social Science – 12 hrs.

ECO 203	Survey of Economics	3
PSY 113	Principles of Psychology	3
	Humanities Elective (6)	6

Mathematics and Science –10 hrs.

MA 113	College Algebra	3
MA 123	Trigonometry	3
PH 154	College Physics I	4

Other – 12 hrs.

COM 213	Business Communication	3
CSIT 103	Introduction to Information Systems	3
MA 253	Statistics	3
	General Education Electives (3)	3

Additional Requirements - 23 hours

Required

BA 123	Business Concepts	3
BA 201	Profession Development & Strategies	1
UE 111	Online Learning Orientation	1

Electives (9)	9
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### Content Requirements - 42 hours

#### Required

ETD 103	Basic Technical Drawing	3
ETD 113	Geometric Dimensioning & Tolerancing	3
ETD 163	Environmental Health & Safety	3
ETD 173	Computer Aided 3-D Modeling	3
ETD 273	Electrical Fundamentals	3
MGT 323	Leadership	3
MT 113	Manufacturing Processes & Materials	3
MT 123	Introduction to AutoCAD Design	3
MT 253	Basic Dimensional Metrology	3
MT 313	Design for Manufacture & Assembly	3
MT 323	Use SolidWorks to Generate Working Drawings	3
MT 403	Quality Assurance for Manufacturing Technology	3
MT 413	Manufacturing Technology Capstone Proposal	3
MT 423	Manufacturing Technology Capstone Project	3

### Subject Area Concentrations - 12 hours

#### Option 1: Management (online)

MGT 333	Supervision	3
MGT 363	Organizational Behavior	3
MGT 373	Facility Management	3
MGT 383	Principles of Project Management	3

#### Option 2: Manufacturing Technology Specialty

Transfer 12 approved credits to complete this track

#### Option 3: Information Systems (online)

CSIT 123	Computing Infrastructure Basics	3
CSIT 223	Network Management	3
INF 263	Data Management	3
INF 343	Information Security	3

## Bachelor of Science in Organizational Leadership (120 hrs.)

Trine University will prepare students enrolled in the Bachelor of Science in Organizational Leadership (BSOL) for leadership roles in corporate and non-profit sectors. Organizations in a variety of industries seek leaders who can diagnose problems, motivate and inspire employees, implement change, and create innovative solutions to problems. In keeping with the mission of Trine University to “succeed, lead and serve,” BSOL students will identify and exemplify leadership theories that can be applied to today’s increasingly complex organizational environments. These theories will allow students to utilize evidence-based leadership competencies including: critical thinking, interpersonal relations, decision-making and problem solving. In addition, the curriculum focuses on organizational innovation, team dynamics, organizational culture and diversity, influence and motivation, conflict resolution, and leadership communication preparing students to enter or advance in the workforce, further their education, and/or make a positive impact in their communities.

**Outcomes**

Identify critical behaviors that can positively impact the ability to lead and influence organizations' members.  
 Recommend strategies that will positively impact team, culture, and communication efforts within organizations.  
 Apply decision-making and problem-solving skills that address the importance of ethical behavior.  
 Describe the capabilities and personal characteristics needed from leaders to positively innovate organizations.  
 Apply diversity, equity, inclusion, and belonging practices to organizational leadership.

**Degree Requirements**

## General Education Requirements - 33 hours

## Communication – 9 hrs.

ENG 143	College Composition	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3

## Humanities and Social Science – 9 hrs.

ECO 203	Survey of Economics	3
COM 233	Intercultural Communication	3
PSY 113	Principles of Psychology	3

## Mathematics and Science – 9 hrs.

MA 113	College Algebra	3
MA 163	Applied Math w/Business Concepts	3
	Science Elective (3)	3

## Other – 6 hrs.

BA 213	Business Spreadsheets	3
COM 213	Business Communication	3

## Business Requirements - 16 hrs.

BA 123	Business Concepts	3
BA 201	Profession Development & Strategies	1
LAW 203	Business Law & Ethics	3
MGT 383	Principles of Project Management	3
MK 203	Marketing	3
MK 323	Integrated Marketing Communication	3

## Content Requirements - 39 hours

DEI 243	Org Emotional Intelligence	3
DEI 333	Recog/Mitigate Unconscious Bias	3
DEI 413	Diverse/Inclusive Org Culture	3
FIN 393	Financial Leadership	3
LDR 203	Leadership Strengths & Skills	3
LDR 313	Topics in Organizational Leadership	3
LDR 323	Leading Effective Teams	3
LDR 333	Organizational Leadership Development & Change	3
LDR 343	Conflict Resolution	3
LDR 403	Creativity, Innovation, & Influence	3
LDR 453	Leadership Capstone	3
MGT 313	Human Resource Management	3
MGT 363	Organizational Behavior	3

Additional Program Requirements – 4 hrs.		
BA 113	Business Computer Applications	3
UE 111	Online Learning Orientation	1
Electives – 28 hrs.		
	Electives (28)	28

*Optional Industrial Leadership Specialization*

Complete the below courses (15 credits) for an Industrial Leadership Specialization.

ETD 163 Environmental Health & Safety  
 MGT 333 Supervision  
 MGT 373 Facility Management  
 MGT 363 Organizational Behavior  
 MGT 383 Principles of Project Management

## Bachelor of Science in Business Administration – Accounting Major (120 hrs.)

In the dynamic and increasingly complex business world, students need to acquire a broad education in addition to specialized skills and knowledge of the profession. Accounting education provides the technical skills necessary to function in today's business environment and provides an understanding of all aspects of business.

### UNIFORM CERTIFIED PUBLIC ACCOUNTING EXAMINATION CANDIDATES

The state of Indiana and many other states require that a first-time Uniform Certified Public Accounting (CPA) Examination candidate must have at least 150 semester hours of college credit, including a baccalaureate or higher degree, with an accounting concentration or its equivalent. An accounting major wishing to meet this requirement should plan an individualized program with his or her advisor.

### Degree Requirements

#### General Education Requirements - 39 hours

#### Communication – 12 hrs.

ENG 133	Technical Communication	3
	Or	
ENG 143	College Composition	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3
COM 213	Business Communication	3

#### Humanities and Social Science – 9 hrs.

ECO 213	Microeconomics	3
ECO 223	Macroeconomics	3

Or

ECO 203	Survey of Economics	3
	Social Science Elective (3)	3
	Humanities Elective (3)	3

#### Mathematics and Science – 12 hrs.

MA 113	College Algebra	3
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MA 173	Essential Calculus	3
	Or	
MA 163	Applied Math w/Business Concepts	3
MA 253	Statistics	3
	Science Elective (3)	3
Other – 6 hrs.		
BA 213	Business Spreadsheets	3
PSY 113	Principles of Psychology	3

## Additional Requirements - 81 hours

Take one of the below:

BA 101	University Experience for Ketner School of Business	1
BA 102	University Experience-Business Students	2
UE 101	University Experience	1

\*UE 111 Online Learning Orientation for students in the online program

## Business Core – 37-39hrs.

AC 203	Accounting I	3
AC 213	Accounting II	3
BA 123	Business Concepts	3
BA 201	Profession Development & Strategies	1
BA 3113	Business Internship	3
BA 453	Global Strategic Management	3
FIN 303	Managerial Finance	3
FIN 353	Personal Finance	3
LAW 203	Business Law & Ethics	3
MGT 353	Designing Operations	3
MGT 363	Organizational Behavior	3
MGT 483	Capstone	3
MK 203	Marketing	3

BA 3113: Advisor will determine the appropriate class anywhere between BA 3111 and BA 3113 (1 - 3 credits worth of internship work)

## Concentration Requirements - 30 hrs.

AC 303	Cost Accounting	3
AC 323	Intermediate Accounting I	3
AC 333	Intermediate Accounting II	3
AC 373	Accounting Information Systems	3
AC 403	Advanced Accounting	3
AC 423	Personal Income Tax	3
AC 463	Auditing	3
FIN 413	Advanced Managerial Finance	3
	Business Electives (6)	6

Business Electives: 300-400 level from AC or FIN

Electives – 12-14 hrs.

Free Electives (12-14)	12-14
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## Bachelor of Science in Business Administration - Applied Management (120 hrs.)

The BSBA with a major in Applied Management degree is designed to prepare an individual with an interest in management in a field where technical competence, has at a minimum, been partially acquired. This program is available to individuals who have already completed some equivalent training in a business, health, technical field, or other specialty area not offered at Trine University. The degree is designed specifically for individuals who acquired training at community colleges, technical institutes, military service schools, industry related schools, etc., and who want to continue their education in the area of management. The program's goal is to equip students with the quality educational tools needed for a career in management.

### TECHNICAL SPECIALTY

Students completing the Bachelor of Applied Management degree program must complete a minimum of 27 semester hours in a business or technical field acquired through occupational, technical training or classroom instruction. As many as 3 additional semester hours in a technical specialty may count as electives.

### Degree Requirements

#### General Education Requirements - 39 hours

##### Communication – 12 hrs.

ENG 133	Technical Communication	3
	Or	
ENG 143	College Composition	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3
COM 213	Business Communication	3

##### Humanities and Social Science – 9 hrs.

ECO 213	Microeconomics	3
ECO 223	Macroeconomics	3
	Or	
ECO 203	Survey of Economics	3
	Social Science Elective (3)	3
	Humanities Elective (3)	3

##### Mathematics and Science – 12 hrs.

MA 113	College Algebra	3
MA 173	Essential Calculus	3
	Or	
MA 163	Applied Math w/Business Concepts	3
MA 253	Statistics	3
	Science Elective (3)	3

##### Other – 6 hrs.

BA 213	Business Spreadsheets	3
PSY 113	Principles of Psychology	3

**Additional Requirements - 81 hours**

Take one of the below:

BA 101	University Experience for Ketner School of Business	1
BA 102	University Experience-Business Students	2
UE 101	University Experience	1

\*UE 111 Online Learning Orientation for students in the online program

**Business Core – 37 - 39 hrs.**

AC 203	Accounting I	3
AC 213	Accounting II	3
BA 123	Business Concepts	3
BA 201	Profession Development & Strategies	1
BA 3113	Business Internship	3
BA 453	Global Strategic Management	3
FIN 303	Managerial Finance	3
FIN 353	Personal Finance	3
LAW 203	Business Law & Ethics	3
MGT 353	Designing Operations	3
MGT 363	Organizational Behavior	3
MGT 483	Capstone	3
MK 203	Marketing	3

BA 3111 - BA 3113: Advisor will determine the appropriate class anywhere between BA 3111 and BA 3113 (1 -3 credits worth of internship work)

**Concentration Requirements - 30 hrs.**

Business courses with approval of Advisor or Chair – Student must be transferring in all 27 hours of a technical field/concentration. If a student can't transfer in all 27 hours, it must be a field that can be completed at Trine such as Criminal Justice. If the student does not have 27 hours and it can't be completed at Trine, the transfer credits can't be accepted as an applied management concentration. They should be considered as a normal transfer evaluation.

Technical Field/Concentration Courses	27
Business Elective/Technical Specialty (3)	3

Business Elective/Technical Specialty: AC, ENT, FIN, HR, LAW, LDR, MGT, MK

Electives – 12-14 hrs.

Free Electives (12-14)	12-14
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**Bachelor of Science in Business Administration - Human Resource Management (120 hrs.)****Degree Requirements**

General Education Requirements - 39 hours

Communication – 12 hrs.

ENG 133	Technical Communication	3
	Or	
ENG 143	College Composition	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3
COM 213	Business Communication	3

Humanities and Social Science – 9 hrs.		
ECO 213	Microeconomics	3
ECO 223	Macroeconomics	3
	Or	
ECO 203	Survey of Economics	3
	Social Science Elective (3)	3
	Humanities Elective (3)	3
Mathematics and Science – 12 hrs.		
MA 113	College Algebra	3
MA 173	Essential Calculus	3
	Or	
MA 163	Applied Math w/Business Concepts	3
MA 253	Statistics	3
	Science Elective (3)	3
Other – 6 hrs.		
BA 213	Business Spreadsheets	3
PSY 113	Principles of Psychology	3
Additional Requirements - 81 hours		
Business Core – 38 hrs.		
UE 111	Online Learning Orientation	1
AC 203	Accounting I	3
AC 213	Accounting II	3
BA 123	Business Concepts	3
BA 201	Profession Development & Strategies	1
FIN 303	Managerial Finance	3
LAW 203	Business Law & Ethics	3
MGT 353	Designing Operations	3
MGT 363	Organizational Behavior	3
MK 203	Marketing	3
MGT 483	Capstone	3
BA 453	Global Strategic Management	3
FIN 353	Personal Finance	3
BA 3113	Business Internship	3
	Or	
MGT 473	Capsim Business Simulation	3
Concentration Requirements - 30 hrs.		
HR 303	Compensation & Benefits	3
HR 323	Safety & Health Management	3
LAW 403	Employment Law	3
MGT 303	Risk Management	3
MGT 313	Human Resource Management	3
MGT 323	Leadership	3
MGT 343	Human Resource Development	3

MGT 383	Principles of Project Management	3
PSY 363	Human Behavior & Counseling	3
	Business Elective (3)	3

Business Electives: 300-400 level from AC, BA, ENT, FIN, HR, LAW, LDR, MGT, MK

Additional Requirements – 3

BA 113	Business Computer Applications	3
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Electives – 10 hrs.

## Bachelor of Science in Business Administration - Management Major (120 hrs.)

Management pervades all facets of a business organization. Operations management studies the manufacturing and service processes where many new quantitative techniques are applied. Human resources involves the study of the human factor in business organizations. Students who select this major are preparing themselves for positions in firms regardless of size or organizational structure.

### Degree Requirements

General Education Requirements - 39 hours

Communication – 12 hrs.

ENG 133	Technical Communication	3
	Or	
ENG 143	College Composition	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3
COM 213	Business Communication	3

Humanities and Social Science – 9 hrs.

ECO 213	Microeconomics	3
ECO 223	Macroeconomics	3
	Or	
ECO 203	Survey of Economics	3
	Social Science Elective (3)	3
	Humanities Elective (3)	3

Mathematics and Science – 12 hrs.

MA 113	College Algebra	3
MA 173	Essential Calculus	3
	Or	
MA 163	Applied Math w/Business Concepts	3
MA 253	Statistics	3
	Science Elective (3)	3

Other – 6 hrs.

BA 213	Business Spreadsheets	3
PSY 113	Principles of Psychology	3

## Additional Requirements - 81 hours

Take one of the below:

BA 101	University Experience for Ketner School of Business	1
BA 102	University Experience-Business Students	2
UE 101	University Experience	1

\*UE 111 Online Learning Orientation for students in the online program

## Business Core – 35-37 hrs.

AC 203	Accounting I	3
AC 213	Accounting II	3
BA 123	Business Concepts	3
BA 201	Profession Development & Strategies	1
BA 3113	Business Internship	3
BA 453	Global Strategic Management	3
FIN 303	Managerial Finance	3
FIN 353	Personal Finance	3
LAW 203	Business Law & Ethics	3
MGT 353	Designing Operations	3
MGT 363	Organizational Behavior	3
MGT 483	Capstone	3
MK 203	Marketing	3

BA 3111 - 3113: Advisor will determine the appropriate class anywhere between BA 3111 and BA 3113 (1 - 3 credits worth of internship work).

## Concentration Requirements - 30 hrs.

BA 433	Business Analytics	3
MGT 303	Risk Management	3
MGT 313	Human Resource Management	3
MGT 323	Leadership	3
MGT 383	Principles of Project Management	3
	Management Elective	6
	Business Electives (9)	9

Management Electives - Choose any MGT 300/400 Level (6 hrs.)

## Business Electives - 9 hours

Applicable courses with following prefixes that align with student career goals and based upon advisor recommendation and approval (AC, BA, COM, ECO, ENT, FIN, GM, HC, HR, INF, LAW, LDR, MGT, MK, SM)

Electives – 12-14 hrs.

Free Electives (12-14)	12-14
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**Bachelor of Science in Business Administration - Marketing Major (120 hrs.)**

Marketing involves creating and satisfying the demands of consumers. It is the study of the organizations and systems involved in the rendering of personal services to the consumer and the physical distribution of goods from the producer to the consumer. The marketing major will discover career opportunities in the fields of sales management, advertising, market research, retailing, brand/product management, merchandising, and marketing management.

**Degree Requirements**

## General Education Requirements - 39 hours

## Communication – 12 hrs.

ENG 133	Technical Communication	3
	Or	
ENG 143	College Composition	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3
COM 213	Business Communication	3

## Humanities and Social Science – 9 hrs.

ECO 213	Microeconomics	3
ECO 223	Macroeconomics	3
	Or	
ECO 203	Survey of Economics	3
	Social Science Elective (3)	3
	Humanities	3

## Mathematics and Science – 12 hrs.

## Other – 6 hrs.

BA 213	Business Spreadsheets	3
PSY 113	Principles of Psychology	3

## Additional Requirements - 81 hours

## Take one of the below:

BA 101	University Experience for Ketner School of Business	1
BA 102	University Experience-Business Students	2
UE 101	University Experience	1

\*UE 111 Online Learning Orientation for students in the online program

## Business Core – 38 hrs.

AC 203	Accounting I	3
AC 213	Accounting II	3
BA 123	Business Concepts	3
BA 201	Profession Development & Strategies	1
BA 453	Global Strategic Management	3
FIN 303	Managerial Finance	3
FIN 353	Personal Finance	3
LAW 203	Business Law & Ethics	3
MGT 353	Designing Operations	3
MGT 363	Organizational Behavior	3
MGT 483	Capstone	3
MK 203	Marketing	3
MGT 473	Capsim Business Simulation	3

BA 3113	Or Business Internship	3
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## Concentration Requirements - 30 hrs.

MK 323	Integrated Marketing Communication	3
MK 363/PSY 3063	Commerce and Consumer Behavior	3
MK 423	Professional Selling	3
MK 433	Marketing Strategy	3
MK 463	Marketing Research	3
	Business Electives (15)	15

## Business Elective (300/400 Level) - 15 hours

Applicable courses with following prefixes that align with student career goals and based upon advisor recommendation and approval (AC, BA, COM, ECO, ENT, FIN, GM, HC, HR, INF, LAW, LDR, MGT, MK, SM)

## Electives – 13 hrs.

BA 113	Business Computer Applications	3
	Free Electives (10)	10

## Bachelor of Science in Business Administration - International Business Major (Global Partnership Only) (120 hrs.)

### Degree Requirements

## General Education Requirements - 42 hours

## Communication – 9 hrs.

ENG 133	Technical Communication	3
	Or	
ENG 143	College Composition	3
HUM 203	Humanities Seminar	3
SP 203	Effective Speaking	3

## Humanities and Social Science – 12 hrs.

ECO 213	Microeconomics	3
ECO 223	Macroeconomics	3
	Humanities Elective (6)	6

## Mathematics and Science – 12 hrs.

MA 113	College Algebra	3
MA 173	Essential Calculus	3
MA 253	Statistics	3
	Science Elective (3)	3

## Other – 9 hrs.

BA 213	Business Spreadsheets	3
PSY 113	Principles of Psychology	3
COM 213	Business Communication	3



## Additional Requirements - 78 hours

## Business Core – 35 hrs.

UE 111	Online Learning Orientation	1
AC 203	Accounting I	3
AC 213	Accounting II	3
BA 123	Business Concepts	3
BA 201	Profession Development & Strategies	1
BA 343	International Business	3
FIN 303	Managerial Finance	3
LAW 203	Business Law & Ethics	3
MGT 353	Designing Operations	3
MGT 363	Organizational Behavior	3
MGT 453	Strategic Management	3
MK 203	Marketing	3
BA 3113	Business Internship	3
	Or	
MGT 473	Capsim Business Simulation	3

## Concentration Requirements - 30 hrs.

COM 233	Intercultural Communication	3
ECO 383	International Economics	3
ENT 303	Entrepreneurial Leadership	3
FIN 323	Money & Banking	3
FIN 343	International Finance	3
FIN 413	Advanced Managerial Finance	3
LAW 413	International Law	3
MK 343	International Marketing	3
MK 353	The Global Consumer	3
	Business Electives (6)	6

*Business Electives: 300-400 level from AC, BA, ENT, FIN, HR, LAW, LDR, MGT, MK*

## Additional Requirements – 3

BA 113	Business Computer Applications	3
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## Electives – 10 hrs.

# Graduate Programs

## Culture of Graduate Learning

Graduate learning, teaching and scholarship differ from the undergraduate educational experience through the intensity of learning and the role of applicable research. All graduate experiences should reflect an in-depth study of a particular curricular field and should lead students to independent thinking, learning and knowledge acquisition.

## Affirmative Action Statement

Trine University is committed to the equitable treatment of students, faculty and staff; therefore, all who work, live, study and teach in the Trine Community will be valued on the basis of scholastic achievement and academic potential without regard to race, religion, color, gender, sexual orientation, or age.

## School of Education Graduate Certificate Programs

The Franks School of Education has designed a series of graduate certificates for in-service educators to earn for knowledge and career advancement. Graduate credit also significantly contribute to state recognized professional growth points (PGP) that are required in the state of Indiana to maintain a teacher's license. To earn a graduate certificate, students must complete a minimum of 12 graduate credit hours.

Certificates include:

Classroom Behavior and Management (K-12)

Early Childhood Education (EC)

English Language Arts Instruction (K-12)

English Language Learners (K-12)

Instructional Design (K-12)

Special Education: Mild Interventions (K-12)

Trauma-Informed Instruction (P-12)

## Classroom Behavior and Management (K-12)

### Degree Requirements

Requirements List - Need to complete all 13 credits in the following:

EDUV 5002	Advanced Classroom Management: Children as Change Agents (K-12)	2
EDUV 5003	Behavior is Language: Strategies for Managing Disruptive Behavior (5-12)	3
EDUV 5082	Harassment, Bullying & Cyber-Intimidation in Schools (K-12)	2
EDUV 5203	Understanding Aggression: Coping with Aggressive Behavior in the Classroom (P-12)	3
EDUV 5303	Violence in Schools: Identification, Prevention & Intervention Strategies (P-12)	3

## Early Childhood Education (EC)

### Degree Requirements

Requirements List - Need to complete all 13 credits in the following:

EDUV 5013	Early Childhood: Observation & Assessment (EC)	3
EDUV 5023	Early Childhood: Program Planning (EC)	3
EDUV 5033	Early Childhood: Typical & Atypical Development (EC)	3
EDUV 5062	Early Childhood: Family-Centered Services (EC)	2
EDUV 5102	Infant & Toddler Mental Health: Issues & Information for Educators (EC)	2

## English Language Arts Instruction (K-12)

### Degree Requirements

Requirements List - Need to complete 12 of 17 credits available

EDUV 5073	Reading Fundamentals #3: The Elements of Effective Reading Instruction & Assessment (K-12)	3
EDUV 5103	Try DI!: Planning & Preparing a Differentiated Instruction Program (K-12)	3
EDUV 5202	Reading & Writing in Content Area (5-12)	2
EDUV 5302	Reading Fundamentals #1: An Introduction to Scientifically-based Research (K-6)	2
EDUV 5402	Reading Fundamentals #2: Laying the Foundation for Effective Reading Instruction (K-6)	2
EDUV 5403	Why DI?: An Introduction to Differentiated Instruction (K-8)	3
EDUV 5502	Six Traits of Writing Model: Teaching & Assessing (P-12)	2

## English Language Learners (K-12)

### Degree Requirements

Requirements List - Need to complete 12 of 19 credits available

EDUV 5043	English Language Learner: Language Acquisition (K-12)	3
EDUV 5053	English Language Learner: Methods & Materials (K-12)	3
EDUV 5202	Reading & Writing in Content Area (5-12)	2
EDUV 5403	Why DI?: An Introduction to Differentiated Instruction (K-8)	3
EDUV 5503	English Language Learner: Evaluation & Assessment (K-12)	3

EDUV 5603	English Language Learner: Linguistics (K-12)	3
EDUV 5702	Teaching Diversity: Influences & Issues in the Classroom (K-12)	2

## Instructional Design (K-12)

### Degree Requirements

Requirements List - Need to complete 12 of 28 credits available

EDUV 5002	Advanced Classroom Management: Children as Change Agents (K-12)	2
EDUV 5032	Build School Communities: Brain Smart Classroom Management (K-12)	2
EDUV 5072	Educational Assessment: Assessing Student Learning in the Classroom (K-12)	2
EDUV 5083	Response to Intervention: Practical Information for the Classroom Teacher (K-12)	3
EDUV 5092	Working with Students with Special Needs in General Education Classrooms (K-12)	2
EDUV 5093	Teaching Secondary Math Conceptually: Meeting Mathematics Standards (5-12)	3
EDUV 5103	Try DI!: Planning & Preparing a Differentiated Instruction Program (K-12)	3
EDUV 5112	Understanding & Implementing Common Core Standards (K-12)	2
EDUV 5202	Reading & Writing in Content Area (5-12)	2
EDUV 5403	Why DI?: An Introduction to Differentiated Instruction (K-8)	3
EDUV 5802	Teaching Elementary Math Conceptually: A New Paradigm (K-6)	2
EDUV 5602	Talented & Gifted: Working with High Achievers (K-6)	2

## Special Education: Mild Interventions (K-12)

### Degree Requirements

Requirements List - Need to complete 12 of 19 credits available

EDUV 5003	Behavior is Language: Strategies for Managing Disruptive Behavior (5-12)	3
EDUV 5012	Attention Deficit/Hyperactivity Disorder: Information & Interventions for Effective Teaching (K-6)	2
EDUV 5022	Autism & Asperger's Disorder: Information & Effective Intervention Strategies (K-12)	2
EDUV 5062	Early Childhood: Family-Centered Services (EC)	2
EDUV 5063	Learning Disabilities: Practical Information for the Classroom Teacher (K-12)	3
EDUV 5083	Response to Intervention: Practical Information for the Classroom Teacher (K-12)	3
EDUV 5092	Working with Students with Special Needs in General Education Classrooms (K-12)	2
EDUV 5902	Traumatized Child: The Effects of Stress,	2

## Trauma & Violence on Student Learning (P-12)

### Trauma-Informed Instruction (P-12)

#### Degree Requirements

Requirements List - Need to complete 12 of 17 credits available

EDUV 5003	Behavior is Language: Strategies for Managing Disruptive Behavior (5-12)	3
EDUV 5042	Child Abuse: Working with Abused & Neglected Children (P-12)	2
EDUV 5052	Drugs & Alcohol in Schools: Understanding Substance Use & Abuse (5-12)	2
EDUV 5102	Infant & Toddler Mental Health: Issues & Information for Educators (EC)	2
EDUV 5203	Understanding Aggression: Coping with Aggressive Behavior in the Classroom (P-12)	3
EDUV 5303	Violence in Schools: Identification, Prevention & Intervention Strategies (P-12)	3
EDUV 5902	Traumatized Child: The Effects of Stress, Trauma & Violence on Student Learning (P-12)	2

### Graduate Certificate in Healthcare Informatics

The Graduate Certificate in Healthcare Informatics offered through the College of Graduate and Professional Studies at Trine University will prepare students for high level positions in the healthcare industry by exposing students to various topics in health informatics, including: health data collection, management, processing, storage, analysis, and development of new products. Additionally, students will develop their healthcare informatics skills by using tools such as Electronic Health Records (EHR), the latest advances in Health Information Technologies (HIT), and Health Information Privacy and Health Data Security. The certificate program will prepare students to advance in the workforce or to pursue a master's program, such as a Master of Science in Healthcare Informatics.

#### Outcomes

Compare the relationship between informatics and healthcare.

Measure the role of informatics in diagnostics and medical management through medical terminology, diagnostic and treatment modalities, and patient privacy and security.

Predict health outcomes of individuals, organizations, and communities using large data systems.

Adopt new technologies to improve care processes in healthcare using diverse and multicultural perspectives.

Adapt effective communication skills needed to present, propose and negotiate ideas to varying stakeholders.

Solve health and biomedical informatics problems by integrating information technology, analytics, human behavior, and health management theories.

#### Graduate Certificate in Healthcare Informatics

##### Program Requirements

GE 5103	Project Management	3
IS 5113	Data Mining & Data Visualization	3
IS 5213	Data Science & Big Data	3
HCI 5003	Intro to Health Informatics	3
HCI 5013	Health Research and Analytics	3
HCI 5023	Interoperability Healthcare & Data	3

## Master of Education in Early Childhood Montessori Education (34 hrs.)

The Master of Education in Early Childhood Montessori Education consists of eight weeks of full-time coursework and a nine-month clinical practicum in a Montessori classroom under the guidance of an experienced Montessori guide, with supporting guidance and additional academic content from Trine. Teacher candidates will be instructed in all academic and theoretical aspects of Montessori early childhood education, including child development and the use of Montessori hands-on materials for learning.

### Accreditation

The Center for Montessori Education at Trine University is an application for accreditation with the Montessori Accreditation Council for Teacher Education, which provides rigorous standards for effective preparation of Montessori teachers. Applicant for accreditation status in no way determines the outcome of the accreditation decision by MACTE. More information may be found at <http://www.macte.org>.

The Master of Education in Early Childhood Montessori Education program is pending 2021 approval by the Higher Learning Commission.

### Mission

**Franks School of Education Mission:** The mission of the Montessori Teacher Education Program in the Franks School of Education at Trine University is to advance equitable access to Montessori teacher preparation that elevates the child to the center of learning and the prepared environment to the center of engagement.

**The Center for Montessori Education Mission:** The mission of The Center for Montessori Education at Trine University is to advance equitable access to Montessori teacher preparation that elevates the child to the center of learning and the prepared environment to the center of engagement.

### Program Objectives

#### FSOE PROGRAM OBJECTIVES

1. **Learner Development.** The teacher candidate understands how learners grow and develop, recognizing that patterns of learning and development vary individually within and across the cognitive, linguistic, social, emotional, and physical areas, and designs and implements developmentally appropriate and challenging learning experiences.
2. **Learning Differences.** The teacher candidate uses understanding of individual differences and diverse cultures and communities to ensure inclusive learning environments that enable each learner to meet high standards.
3. **Learning Environments.** The teacher candidate works with others to create environments that support individual and collaborative learning, and that encourage positive social interaction, active engagement in learning, and self-motivation.
4. **Content Knowledge.** The teacher candidate understands the central concepts, tools of inquiry, and structures of discipline(s) he or she teaches and creates learning experiences that make the discipline accessible and meaningful for learners to assure mastery of the content.
5. **Application of Content.** The teacher candidate understands how to connect concepts and use differing perspectives to engage learners in critical thinking, creativity, and collaborative problem solving related to authentic local and global issues.
6. **Assessment.** The teacher candidate understands and uses multiple methods of assessment to engage learners in their own growth, to monitor learner progress, and to guide the teacher's and learner's decision making.
7. **Planning for Instruction.** The teacher candidate plans instruction that supports every student in meeting rigorous learning goals by drawing upon knowledge of content areas, curriculum, cross-disciplinary skills, and pedagogy, as well as knowledge of learners and the community context.

8. **Instructional Strategies.** The teacher candidate understands and uses a variety of instructional strategies to encourage learners to develop deep understanding of content areas and their connections, and to build skill to apply knowledge in meaningful ways.
9. **Professional Learning and Ethical Practice.** The teacher candidate engages in ongoing professional learning and uses evidence to continually evaluate his/her practice, particularly the effects of his/her choices and actions on others (learners, families, other professionals, and the community), and adapts practice to meet the needs of each learner.
10. **Leadership and Collaboration.** The teacher candidate seeks appropriate leadership roles and opportunities to take responsibility for student learning and development, to collaborate with learners, families, colleagues, other school professionals, and community members to ensure learner growth, and to advance the profession.

### MACTE Montessori accrediting body Competencies

#### MACTE (Montessori accrediting body) COMPETENCIES

##### I. Content Knowledge

- 1a. Montessori Philosophy
- 1b. Human Growth and Development
- 1c. EC Practical Life Subject Matter

##### II. Pedagogical Knowledge

- 2a. Correct use of Montessori materials
- 2b. Scope and sequence of curriculum (spiral curriculum)
- 2c. The prepared environment
- 2d. Parent/Teacher/Family/Community partnership
- 2e. The purpose and methods of observation
- 2f. Planning for instruction
- 2g. Assessment and documentation
- 2i. Support and intervention for learning differences
- 2j. Culturally responsive methods

##### III. Practice

- 3a. Classroom leadership
- 3b. Authentic assessment
- 3c. Montessori philosophy and methods (materials)
- 3d. Professional responsibilities

### Degree Requirements

#### Required

EDU 5012	Montessori Philosophy/Theory/Peace Education	2
EDU 5013	Montessori Cultural Studies Curriculum (Physical/Life Science and Social Studies Curriculum)	3
EDU 5022	Montessori Practical Life/Everyday Living Curriculum	2
EDU 5023	Montessori Art, Music & Movement Curriculum	3
EDU 5032	Montessori Sensorial Curriculum	2
EDU 5033	Montessori Classroom Leadership	3
EDU 5042	Montessori Language Curriculum	2
EDU 5043	Montessori Early Childhood Practicum Teaching I	3

EDU 5052	Montessori Math Curriculum	2
EDU 5053	Montessori Early Childhood Practicum Teaching II	3
EDU 5062	Montessori Child Development/Psychology	2
EDU 5072	Montessori Early Childhood Practicum Seminar I	2
EDU 5082	Montessori Early Childhood Practicum Seminar II	2
EDU 5333	Research Methods	3

## Master of Business Administration (30 hrs.)

The Master of Business Administration (MBA) offered through the College of Graduate and Professional Studies at Trine University will prepare students for executive level positions associated with its core courses: communication, finance, statistics, economics, and marketing. In this program, students will develop and demonstrate their business acumen through meaningful and relevant coursework. Additionally, students will choose a specialization in one of the following areas: accounting, analytics, finance, management, human resource management, marketing, or students can design their own specialization. The well-rounded integration of different fields of study will prepare students to advance in the workforce or to pursue a doctoral program, such as a Ph.D. in Business Administration

### Outcomes

Adapt effective communication skills needed to present, propose, and negotiate ideas to varying stakeholders.

Recommend solutions to organizational challenges based on qualitative and quantitative analysis.

Develop processes to enhance organizational efficiency using tools from various areas of business (i.e., accounting, economics, finance, marketing, management, etc.).

Apply systems thinking and ethical practices to organizational decision making.

Improve organizational decisions using diversity and multicultural perspectives.

### Master of Business Administration (30 hrs.)

Program Core Courses - 21 hrs.

BA 5223	Executive Communication	3
FIN 5063	Corporate Finance	3
AC 5023	Managerial Accounting for MBA	3
MK 6943	Strategic Marketing Management	3
ECO 5033	Micro & Macro Economic Decision Making	3
BA 6933	Statistics & Quantitative Methods	3
BA 6963	Business Administration Capstone	3

### Specialization Options

Option 1: Self-Design (Choose a combination of 9 credits from any of the program electives below)

Self-Design	Choose from Program Electives Below	3
Self-Design	Choose from Program Electives Below	3
Self-Design	Choose from Program Electives Below	3

### Program Elective Options for Self-Design Specialization

Option 2: Accounting

AC 5003	Advanced Auditing	3
AC 533	Corporate Taxation	3



AC 553	Federal Taxation of Pass-Through Entities	3
<b>Option 3: Analytics</b>		
BA 6953	Managing Business Information Systems	3
BAN 5003	Operations Analytics	3
BAN 5023	Data Driven Decision-Making	3
<b>Option 4: Finance</b>		
FIN 5823	Financial Modeling	3
FIN 5843	Financial Markets & Institutions	3
FIN 5853	Investment Analysis & Portfolio Management	3
<b>Option 5: Management</b>		
GE 5103	Project Management	3
GE 5113	New Product Development & Innovation Strategies	3
GE 5133	Lean Six Sigma	3
	Or	
BA 5103	Business Ethics	3
<b>Option 6: Human Resource Management</b>		
HR 5923	Strategic Human Resources Management	3
LDR 5063	Organizational Development & Change	3
BA 5103	Business Ethics	3
<b>Option 7: Marketing</b>		
MK 6513	Services Marketing	3
MK 6523	Sales Management	3
BAN 5003	Operations Analytics	3

## Master of Science in Business Analytics (30 hrs.)

The Master of Science in Business Analytics is offered through the College of Graduate and Professional Studies. The program is a combination of hard and soft skills expected to improve the short and long-term career opportunities of the business analyst graduate. The Master of Science in Business Analytics prepares individuals to apply data science to generate insights from data and identify and predict trends. Lastly, it is a program designed to prepare individuals to apply data science to solve business challenges.

**Experiential Track** In the Experiential Track, an internship experience is an integral part of the program of study. Therefore, international students (F-1) admitted to the Experiential Track are required to be enrolled immediately in an internship course for credit, and be engaged in an active internship experience, whether full or part-time.

**Non-Experiential Track** In the Non-Experiential Track, international graduate students (F-1) must have been enrolled for one academic year in order to apply for work/internship authorization (CPT).

### Program Educational Objectives

The program has established the following educational objectives:

1. To prepare students to employ technical expertise in collecting, analyzing, and interpreting data
2. To examine how data analyses are used to develop strategic business insights and decisions
3. To apply the basic skills of computer science fundamentals using a breadth of tools, data sources, and analytical techniques

4. To equip students with a depth of financial acumen for planning, accounting and analysis
5. To produce students who are prepared to present and communicate information for decision making purposes
6. To provide insights and understanding of business operations to develop the student's ability to identify trends and patterns and answer a wide range of business questions
7. To Show the student how and why leadership and teamwork skills are essential in today's workplace

### **Program Learning Outcomes**

1. Evaluate methods and technologies to organize and normalize data for statistical analysis
2. Assess the project management cycle from initial implementation through project delivery
3. Communicate effectively in multiple forms (oral, written, and graphically)
4. Analyze key performance indicators (KPI), financial reports, and predictive modeling using software applications
5. Solve supply chain, logistics, production and process problems using business analytics theories
6. Use statistics to create regression models, develop data models for forecasting and profit planning

### **Degree Requirements**

#### Program Requirements

GE 5103	Project Management	3
BA 6933	Statistics & Quantitative Methods	3
BAN 5003	Operations Analytics	3
BAN 5013	Analytics Software & Tools	3
IS 5113	Data Mining & Data Visualization	3
IS 5213	Data Science & Big Data	3
FIN 5063	Corporate Finance	3
FIN 5823	Financial Modeling	3
BAN 5023	Data Driven Decision-Making	3
BAN 6093	Business Analytics Capstone	3

## **Master of Science in Engineering Management (30 hrs.)**

The Master of Science in Engineering Management is offered through the College of Graduate and Professional Studies and is designed specifically for professionals who already hold an engineering degree and will focus on manufacturing and engineering businesses.

### Experiential Track

In the Experiential Track, an internship experience is an integral part of the program of study. Therefore, international students (F-1) admitted to the Experiential Track are required to be enrolled immediately in an internship course for credit, and be engaged in an active internship experience, whether full or part-time.

### Non-Experiential Track

In the Non-Experiential Track, international graduate students (F-1) must have been enrolled for one academic year in order to apply for work/internship authorization (CPT).

### **Program Educational Objectives**

The program has established the following educational objectives:

1. Develop and lead a technical group or organization.
2. Drive the fiscal and financial processes of a corporation at a managerial level.
3. Develop professional communication skills in public speaking, public relations, and electronic media.
4. Manage, direct, and evaluate the output of a technical organization to ensure that the work meets the quality, cost, delivery, and ethical standards.

**Program Learning Outcomes**

- 1.1 Leadership skills to develop, motivate, and lead people
- 1.2 Develop strategic thinking processes for decision-making
- 1.3 Development of a professional ethical framework
- 2.1 Knowledge application of financial and managerial accounting concepts
- 2.2 Understanding of financial statement analysis to drive decision-making
- 2.3 Knowledge application of financial instruments and capital markets
- 2.4 Understanding of portfolio analytics and investment management
- 1.1 Effective public speaking at team, group, and company level
- 1.1 Understanding of strategies and processes for developing innovative products
- 1.2 Use of quantitative decision and business analysis to solve engineering management issues
- 4.3 Application of quantitative project management skills

**Degree Requirements**

Core Courses - 21 Hours

BA 5103	Business Ethics	3
BA 5223	Executive Communication	3
BA 6933	Statistics & Quantitative Methods	3
FIN 5203	Finance for Engineers	3
GE 5113	New Product Development & Innovation Strategies	3
GE 5103	Project Management	3
MGT 5093	Business Strategy & Decision Making	3

Program Electives – 9 hours

Choose 9 hours from below

GE 5093	Design Thinking	3
GE 5133	Lean Six Sigma	3
GE 5163	Engineered Quality	3
LAW 5003	Law & the Engineering Professional	3
MGT 543	Operations Strategy & Management	3
MGT 5013	Advanced Plant Management	3

**Master of Science in Information Studies (30 hrs.)**

The Master of Science in Information Studies (MSIS) is offered through the College of Graduate and Professional Studies. The

program is focused on providing students with an opportunity to develop technological leadership in the analysis, design, development, maintenance and operation of information systems. The Master of Science in Information Studies will require 30 credit hours.

#### Experiential Track

In the Experiential Track, an internship experience is an integral part of the program of study. Therefore, international students (F-1) admitted to the Experiential Track are required to be enrolled immediately in an internship course for credit, and be engaged in an active internship experience, whether full or part-time.

#### Non-Experiential Track

In the Non-Experiential Track, international graduate students (F-1) must have been enrolled for one academic year in order to apply for work/internship authorization (CPT).

### Program Educational Objectives

The program has established the following educational objectives:

1. Utilize managerial processes and tools for effective management and leadership.
2. Assess and leverage the impact of information technology to enhance business competitiveness and optimize business management.
3. Develop professional communication skills in public speaking, public relations, and electronic media.

### Degree Requirements

#### Program Requirements

GE 5103	Project Management	3
FIN 5203	Finance for Engineers	3
INF 503	Advanced Database	3
IS 5103	Object-Oriented Programming in Java	3
IS 5113	Data Mining & Data Visualization	3
IS 5203	Network Management	3
IS 5213	Data Science & Big Data	3
IS 5403	Cybersecurity	3
IS 5803	Information Studies Capstone	3
BA 6933	Statistics & Quantitative Methods	3

### Master of Science with a Major in Criminal Justice (30 hrs.)

The Master of Science with a major in Criminal Justice (MSCJ) program is offered through the College of Graduate and Professional Studies. It is an accelerated degree program that provides education for both pre- and mid-career individuals serving their communities as law enforcement, corrections, or court practitioners. The curriculum is designed to prepare these professionals to assume key leadership roles within the justice system or the private sector.

The program prepares students to assume key leadership roles as professionals working in fire safety, law enforcement, social work, and other related fields. Students will learn to analyze criminal justice issues and implement change within the criminal justice system by developing skills in program planning and evaluation, policy formation and analysis, and critical thinking.

Designed for working professionals, the program consists of 10 courses offered online or on campus that can be completed in 12 months. Courses consist of eight week terms.

Pursuing this degree could open doors for students to pursue a variety of opportunities. Whether they plan to enhance their career in criminal justice, teach, or pursue their doctorate, a degree from Trine will give students the competitive edge they need to be successful.

The Master of Science with a major in Criminal Justice degree program is open to persons holding bachelor's degrees from regionally accredited institutions of higher learning and those approved by the program director.

An undergraduate degree in criminal justice is preferred; however, if the undergraduate degree is other than criminal justice, a core of criminal justice prerequisite courses may be required. At the discretion of the CGPS Director of Criminal Justice, these course prerequisites may be waived for applicants who have exemplified outstanding academic credentials at the undergraduate level, or for those applicants with a significant amount of documented professional experience with a criminal justice agency.

### **Degree Requirements**

#### **Program Requirements**

CRJ 503	Seminar Law & Social Control	3
CRJ 513	Criminology	3
CRJ 543	Criminal Justice Research & Writing	3
CRJ 553	Applied Statistics for Criminal Justice	3
CRJ 653	Crisis Intervention for Law Enforcement	3
CRJ 663	Child Welfare and The Family	3
FPY 613	Psychopathology	3
FPY 643	Victimology	3
CRJ 593	Criminal Justice Capstone Preparation	3
CRJ 683	Criminal Justice Demonstration Capstone	3

### **Lou Holtz Master of Science in Organizational Leadership (30 hrs.)**

The Lou Holtz Master of Science in Organizational Leadership (MSOL) is offered through the College of Graduate and Professional Studies. The degree program offers adults holding bachelor's degrees in business, engineering, arts and sciences a new career dimension - leadership. Visionary, strategic leadership skills enhance success in all of these career areas.

Designed for working professionals, the MSOL develops the theoretical and applied leadership knowledge, capabilities and characteristics needed to positively impact organizations across multiple sectors.

### **Degree Requirements**

#### **Program Requirements**

LDR 5003	Leadership Philosophy	3
LDR 5023	Decision Making for Leaders	3
LDR 5043	Organizational Systems & Cultures	3
LDR 5063	Organizational Development & Change	3
LDR 5083	Conflict Resolution for Leaders	3
LDR 5203	Leadership Ethics	3
LDR 5223	Organizational Communication for Leaders	3
LDR 5253	Technology Topics for Leaders	3
LDR 5333	Research Methods	3
LDR 6563	Organizational Leadership Capstone	3

# Minors

Trine University minors are open to all main campus undergraduate bachelor degree seeking students. Some minors are restricted to specified majors, as indicated in the minor description.

## Accounting Minor (24 hrs.)

### Ketner School of Business

#### Requirements

##### Core Courses (18 hrs.)

AC 303	Cost Accounting	3
AC 323	Intermediate Accounting I	3
AC 333	Intermediate Accounting II	3
AC 373	Accounting Information Systems	3
AC 423	Personal Income Tax	3
FIN 413	Advanced Managerial Finance	3

##### Accounting or Finance Electives (6 hrs.)

AC or FIN 300 level or above (including graduate courses)

## Aerospace Engineering Minor (27 hrs.)

### Allen School of Engineering and Computing - Mechanical Engineering Department

The curriculum is designed to prepare students for professional engineering careers in the aerospace industry or for graduate studies in the aeronautical engineering field. A grade of C or better is required in MAE courses in the minor.

#### Requirements

##### Engineering Science Courses (6 hrs.)

ES 253	Electrical Science	3
ES 343	Heat Transfer	3

##### Mathematics Course (3hrs.)

MA 313	Introduction to Linear Algebra	3
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##### Required Mechanical Engineering Courses (6 hrs.)

MAE 3033	Fluid Dynamics for Mechanical Engineers	3
MAE 4023	System Dynamics & Controls	3
	Or	
MAE 453	Mechanical Vibration	3

##### Elective Mechanical Engineering Courses (12 hrs.)

MAE 473	Applied Aerodynamics	3
MAE 483	Vehicle Structures	3
MAE 493	Aerodynamics Laboratory	3
MAE 4163	Introduction to Rocket Propulsion	3
MAE 4173	Gas Turbines	3
MAE 4183	Aircraft Stability & Control	3

## Athletic Training Minor (15 hrs.)

### Rinker-Ross School of Health Sciences - Exercise Science Department

This minor enables students to gain experiences in athletic training and prepares them for potential certification as a trainer. The student desiring certification must meet the requirements of the NATA, which entails additional coursework and training. Trine University does not certify athletic trainers.

#### Requirements

##### Core Courses (9 hrs.)

EXS 243	Athletic Training	3
EXS 423	Evaluation of Athletic Injuries	3
EXS 483	Professional Development in Exercise Science	3

##### Choose 6 Credit Hours from the following Courses (6 hrs.)

EXS 203	Risk and Sports	3
EXS 273	Nutrition	3
EXS 343	Principles of Human Performance	3
SM 393	Sport Psychology	3

*SM 393: or other PSY 200 level or above*

## Biology Minor (26 hrs.)

### Rinker-Ross School of Health Sciences - Science Department

#### Requirements

##### Core Courses (23 hrs.)

BIO 114	Principles of Biology I	4
BIO 124	Principles of Biology II	4
BIO 154	Human Body Systems	4
BIO 274	General Ecology	4
BIO 324	Microbiology	4
BIO 233	Cell Biology	3

##### Biology Electives (3 hrs.)

BIO		3
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## Biomedical Engineering Minor (27 hrs.)

### Allen School of Engineering and Computing - Biomedical Engineering Department

#### Requirements

##### Biomedical Courses (17 hrs.)

BIO 384	Human Anatomy & Physiology I	4
BIO 394	Human Anatomy & Physiology II	4
BME 2011	Intro to BME Programming MATLAB	1
	Or	
MAE 201	Introduction to Programming in MATLAB	1
BME 2012	Intro to Biomedical Engineering	2
BME 3003	Musculoskeletal Biomechanics	3
BME 3103	Introduction to Biomaterials	3

## Engineering Science Courses (10 hrs.)

ES 141	Biology for Engineers	1
ES 223	Dynamics	3
ES 233	Engineering Materials	3

## Choose one of the following two (2) Options

ES 243	Solid Mechanics	3
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## Or one of:

ES 253	Electrical Science	3
ECE 213	Circuit Analysis	3

## Bioprocess Engineering Minor (24-25 hrs.)

**Allen School of Engineering and Computing - Chemical Engineering Department**

There is increased focus on optimizing the ability of biological organisms to produce industrially relevant products. Biological engineering techniques are utilized in the production of biofuels, pharmaceuticals, medical devices, food processing, and consumer products. This increased focus from an industrial standpoint has resulted in increased demand for prospective employees that have a strong background in both engineering and life sciences. The curriculum is designed to provide students with a foundation to pursue a career in these industries.

**Requirements**

## Science Courses (12 hrs.)

CH 204	Organic Chemistry I	4
BIO 324	Microbiology	4
BIO 434	Biochemistry I	4

## Engineering Courses (3 hrs.)

CHE 303	Chemical Engineering Fluid Dynamics	3
	Or	
BME 4603	Bio fluid Mechanics	3

## Choose two of the following 3-Credit Courses (6 hrs.)

CHE 4073/BME 4303	Biochemical Engineering	3
	Or	
BME 4303	Biochemical Engineering	3
CHE 4173	Bio-Separation Processes	3
BME 4503	Tissue Engineering	3

## Advanced Bio-Elective Courses (3-4 hrs.)

## Departmental Approval Needed. Examples include

BME 4503	Tissue Engineering	3
CHE 4273	Pharmaceutical Processes	3
BIO 304	Plant Biology	4
BIO 314	Animal Biology	4
BIO 233	Cell Biology	3
BIO 374	Forensic Biology	4
BIO 384	Human Anatomy & Physiology I	4
	Or	



BIO 444/CH 444	Biochemistry II	4
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## Business Minor (21 hrs.)

### Ketner School of Business

The business minor is designed for students in a degree program outside of the Ketner School of Business. Prerequisites as shown in the Course Descriptions section of this catalog must be carefully observed.

#### Requirements

##### Core Courses

AC 203	Accounting I	3
AC 213	Accounting II	3
BA 123	Business Concepts	3
FIN 303	Managerial Finance	3
LAW 203	Business Law & Ethics	3
MGT 363	Organizational Behavior	3
MK 203	Marketing	3

## Chemistry Minor (24 hrs.)

### Rinker-Ross School of Health Sciences - Science Department

(FOR NON-EDUCATION STUDENTS WITH ANOTHER MAJOR)

#### Requirements

##### Core Courses (12 hrs.)

CH 104	General Chemistry I	4
CH 114	General Chemistry II	4
CH 234	Quantitative Chemical Analysis	4

##### Chemistry Electives (12 hrs.)

CH		12
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## Coaching Minor (18 hrs.)

### Rinker-Ross School of Health Sciences - Exercise Science Department

#### Requirements

##### Core Course (3 hrs.)

EXS 483	Professional Development in Exercise Science	3
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##### Choose 15 Credits from the following Courses (15 hrs.)

BIO 154	Human Body Systems	4
EXS 103	Teaching Sport Skills I	3
EXS 203	Risk and Sports	3
	Or	
MGT 303	Risk Management	3
EXS 273	Nutrition	3
EXS 343	Principles of Human Performance	3
EXS 493	Strength and Conditioning Preparation	3

LDR 203	Leadership Strengths & Skills	3
	Or	
MGT 323	Leadership	3
SM 393	Sport Psychology	3

### Communication Minor (15 hrs.)

#### Jannen School of Arts and Sciences - Language and Humanities Department

(FOR A STUDENT WITH ANOTHER MAJOR)

##### Requirements

Core Course (3 hrs.)

COM 163	Interpersonal Communication	3
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Communication Electives (12 hrs.)

COM prefix courses with at least six hours at the 300-level or above.

### Criminal Justice Minor (15 hrs.)

#### Jannen School of Arts and Sciences - Criminal Justice Department

(FOR A STUDENT WITH ANOTHER MAJOR)

##### Requirements

Core Courses (15 hrs.)

CRJ 103	Introduction to Criminal Justice	3
CRJ 153	Juvenile Justice	3
CRJ 243	Introduction to Criminology	3
CRJ 263	Introduction to Criminal Law & Justice	3
CRJ 273	Criminal Procedure & Evidence	3

### Cybersecurity Minor (15 hrs.)

#### Allen School of Engineering and Computing - Computer Science & Information Technology Department

##### Requirements

Core Courses (15 hrs.)

CSIT 123	Computing Infrastructure Basics	3
CSIT 223	Network Management	3
INF 343	Information Security	3
CSIT 363	Certified Ethical Hacking I	3
CSIT 373	Certified Ethical Hacking II	3

### Data Science Minor (15 hrs.)

#### Allen School of Engineering and Computing - Computer Science & Information Technology Department

(For non-Informatics, non-Computer Information Science, non-Computer Information Systems, non-Computer Science, and non-Computer Science & Information Technology Majors)

**Requirements**

## Core Courses (15 hrs.)

CSIT 103	Introduction to Information Systems	3
	Or	
BA 113	Business Computer Applications	3
INF 263	Data Management	3
INF 393	Data Visualization	3
INF 433	Data Mining & Visualization	3
MA 203	Discrete Math for Information Sciences	3

**Energy Engineering Minor (27 hrs.)****Allen School of Engineering and Computing - Electrical & Computer Engineering Department**

The minor curriculum is designed to prepare students for professional engineering careers in both the traditional and renewable branches of the electrical energy industry or for graduate studies in the energy field. A grade of C or better is required for all courses in the minor.

**Requirements**

## Engineering Science Courses (12 hrs.)

ES 213	Statics	3
ES 223	Dynamics	3
ES 233	Engineering Materials	3
ES 313	Thermodynamics	3

## Mechanical Engineering Courses (3 hrs.)

MAE 4023	System Dynamics & Controls	3
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## Electrical Engineering Courses (12 hrs.)

ECE 213	Circuit Analysis	3
	Or	
ES 253	Electrical Science	3
ECE 303	Electrical Machines	3
ECE 313	Electrical Power	3
ECE 403	Direct Generation Techniques	3

**English Minor (15 hrs.)****Jannen School of Arts and Sciences - Language and Humanities Department****Requirements**

## Choose two of the five Literature Surveys (6 hrs.)

ENG 253	World Literature	3
ENG 2013	British Literature I	3
ENG 2023	British Literature II	3
ENG 2113	American Literature I	3
ENG 2123	American Literature II	3

## Choose 9 Credits from the following Courses (9 hrs.)

THE 103	Introduction to Theatre	3
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FLM 203	Film Appreciation	3
ENG 153	Introduction to Literature	3
ENG		3

*ENG: 200 level or higher*

## Entrepreneurship Minor for Business Students (24hrs.)

### **Ketner School of Business**

The entrepreneurship minor is designed for students who are interested in starting a business. Open to students from any Ketner School of Business program, the entrepreneurship minor uses collaborative, problem-based learning, assessment of learning outcomes, and collaboration among students, faculty, and business partners to deliver a dynamic program. Courses in the entrepreneurship program will help students develop an “entrepreneurial mindset,” so that they can be innovative thinkers and leaders in a startup company or an existing company.

### **Requirements**

#### Core Courses (12 hrs.)

ENT 423	Entrepreneurship & Venture Planning	3
FIN 323	Money & Banking	3
FIN 363	Venture Finance	3
MGT 323	Leadership	3

#### Select 12 Hours from the following Courses (12 hrs.)

AC 423	Personal Income Tax	3
FIN 353	Personal Finance	3
MGT 313	Human Resource Management	3
MGT 333	Supervision	3
MGT 443	Managing Operations	3
MK 363/PSY 3063	Commerce and Consumer Behavior	3
MK 423	Professional Selling	3
MK 463	Marketing Research	3
MK 473	Digital Advertising (SEM/SEO)	3

## Entrepreneurship Minor for Non-Business Students (24hrs.)

### **Ketner School of Business**

The entrepreneurship minor is designed for non-business students.

### **Requirements**

#### Core Courses (18 hrs.)

AC 203	Accounting I	3
BA 123	Business Concepts	3
ENT 423	Entrepreneurship & Venture Planning	3
LAW 203	Business Law & Ethics	3
MGT 323	Leadership	3
MK 203	Marketing	3

#### Select 6 Hours from the following Courses (6 hrs.)

AC 423	Personal Income Tax	3
FIN 353	Personal Finance	3
MGT 313	Human Resource Management	3
MGT 333	Supervision	3

MGT 443	Managing Operations	3
MK 363/PSY 3063	Commerce and Consumer Behavior	3
MK 423	Professional Selling	3
MK 463	Marketing Research	3
MK 473	Digital Advertising (SEM/SEO)	3

## Environmental Engineering Minor (27 hrs.)

### Allen School of Engineering and Computing - Civil Engineering Department

In the past, the environmental impacts of an engineering project or design were considered as an afterthought. Today, environmental concerns strongly influence almost all aspects of engineering practice. The curriculum is designed to provide students with a foundation to pursue a career in environmental engineering and an understanding of the environmental consequences of their designs.

#### Requirements

##### Science Courses (11 hrs.)

CH 104	General Chemistry I Or	4
CH 104H		4
CH 114	General Chemistry II Or	4
CH 114H		4
ES 323	Fluid Mechanics	3

*CHE 303 can also be taken in place of ES 323.*

##### Environmental Engineering Breadth Courses (7 hrs.)

CE 3101	Environmental Engineering Lab	1
CE 3103	Environmental Engineering	3
CE 4103	Pollution Control Technologies	3

##### Choose three of the following 3-Credit Courses Environmental Engineering Depth Courses (9 hrs.)

CE 4113	Environmental Remediation	3
CE 4123	Water & Wastewater Treatment	3
CE 4323	Engineering Hydrology Or	3
CE 4333	Design of Water Distribution Systems & Sewers Or	3
CE 4303	Open Channel Hydraulics	3
CHE 453	Chemical Engineering Kinetics	3
CHE 4073/BME 4303	Biochemical Engineering	3
CHE 4083	Plant Management	3

## Exercise Science Minor (15 hrs.)

### Rinker-Ross School of Health Sciences - Exercise Science Department

**Requirements**

Core Course (3 hrs.)		
EXS 483	Professional Development in Exercise Science	3
Choose 12 Credits from the following (12 hrs.)		
BIO 154	Human Body Systems	4
EXS 102	Lifetime Wellness	2
EXS 103	Teaching Sport Skills I	3
EXS 273	Nutrition	3
EXS 283	Fitness Evaluation Assessment	3
EXS 333	Kinesiology	3
EXS 353	Exercise Physiology	3
EXS 373	Health Promotion & Problems	3

**Finance Minor (24 hrs.)****Ketner School of Business****Requirements**

Core Courses (12 hrs.)		
FIN 323	Money & Banking	3
FIN 353	Personal Finance	3
FIN 403	Investments	3
FIN 413	Advanced Managerial Finance	3

Accounting or Finance Electives (6 hrs.)

AC or FIN Electives 300 level or above (including Graduate courses)

Accounting, Business, Economic, Entrepreneurship, Finance, Management or Marketing Electives (6 hrs.)

AC, BA, ECO, ENT, FIN, MGT, or MK Electives 300 level or above (Including Graduate courses)

**Forensic Psychology Minor (15 hrs.)****Jannen School of Arts and Sciences - Psychology and Social Sciences Department****Requirements**

Core Courses (15 hrs.)		
PSY 113	Principles of Psychology	3
PSY 383	Forensic Psychology	3
PSY 443	Advanced Forensic Psychology	3
PSY 323	Abnormal Psychology	3
CRJ 103	Introduction to Criminal Justice	3

**Thomas and Joy Lacour Golf Management Minor (24 hrs.)****Ketner School of Business****Requirements**

Core Courses (18 hrs.)		
GM 203	Golf Shop Management	3

GM 213	Club Design, Repair & Fitting	3
GM 323	Teaching the Golf Swing	3
MGT 373	Facility Management	3
MGT 383	Principles of Project Management	3
MGT 403	Principles of Hospitality Management	3
Golf Management, Management or Marketing Electives (6 hrs.)		
	GM, MGT, or MK Electives 300-400 level	6
	Or	
BA 3113	Business Internship	3

*BA 3113: Golf Internship and GM, MGT or MK Elective 300-400 level*

## Game Design and Esports Minor (18 hrs.)

### Allen School of Engineering and Computing - Computer Science and Information Technology

#### Requirements

##### Core Courses (15 hours)

CSIT 1013	Esports Administration	3
CSIT 1023	The History of Gaming	3
CSIT 163	Using Programming to Solve Problems	3
CSIT 2013	Esports Analytics	3
CSIT 4013	Game Design and Development	3

##### Choose one of the following (3 hrs.)

CSIT 253	Artificial Intelligence & Information	3
COM 243	Digital Media Creation	3
EXS 273	Nutrition	3
MGT 383	Principles of Project Management	3
MK 203	Marketing	3
SM 393	Sport Psychology	3

Please note that MK 203 and MGT 383 have BA 123 as a prerequisite.

## History Minor (15 hrs.)

### Jannen School of Arts and Sciences - Psychology and Social Sciences Department

#### Requirements

##### Choose any 2 of the following history courses (6 hrs.)

HIS 103	American History I	3
HIS 113	American History II	3
HIS 203	World Civilization I	3
HIS 213	World Civilization II	3

##### History Electives (9 hrs.)

HIS prefix, at least 3 credit hours 300 level or above

## Leadership Minor (24 hrs.)

### Ketner School of Business

**Requirements**

## Core Courses (18 hrs.)

COM 163	Interpersonal Communication	3
LDR 403	Creativity, Innovation, & Influence	3
LDR 433	Leadership Practicum	3
MGT 323	Leadership	3
PHL 313	Ethics	3
PSY 113	Principles of Psychology	3

## Leadership Electives (6 hrs.)

Choose two courses from the following:

BA 333	Social Media For Business	3
COM 213	Business Communication	3
COM 233	Intercultural Communication	3
COM 363	Rhetoric and Persuasion	3
COM 413	Corporate & Organizational Communication	3
POLS 343	American Political Thought	3
POLS 373	Political Psychology	3
MGT 313	Human Resource Management	3
MGT 333	Supervision	3
MGT 343	Human Resource Development	3
MGT 363	Organizational Behavior	3
MGT 413	Management Of Quality	3
MGT 443	Managing Operations	3
MGT 453	Strategic Management	3
PSY 343	Social Psychology	3
PSY 373	Political Psychology	3
SM 313	Principles of Sport & Recreation Management	3
SM 393	Sport Psychology	3
SM 413	Organization & Administration of Physical Education & Athletics	3

**Management Minor (24 hrs.)****Ketner School of Business****Requirements**

## Core Courses (18 hrs.)

MGT 313	Human Resource Management	3
MGT 323	Leadership	3
MGT 353	Designing Operations	3
MGT 373	Facility Management	3
MGT 383	Principles of Project Management	3
MGT 413	Management Of Quality	3

## Electives (6 hrs.)

MGT

**Marketing Minor (24 hrs.)****Ketner School of Business**



**Requirements**

## Core Courses (18 hrs.)

BA 123	Business Concepts	3
ECO 213	Microeconomics	3
	Or	
ECO 203	Survey of Economics	3
MK 203	Marketing	3
MK 323	Integrated Marketing Communication	3
MK 423	Professional Selling	3
MK 473	Digital Advertising (SEM/SEO)	3

## Marketing Electives (6 hrs.)

COM 301	Media Practicum	1
COM 343	Web Content Management	3
COM 353	Public Relations Writing & Production	3
COM 363	Rhetoric and Persuasion	3
COM 373	Topics In Communication	3
COM 383	Advanced Writing for the Media	3
COM 413	Corporate & Organizational Communication	3
COM 433	Media Law & Ethics	3
COM 453	Public Relations Planning & Campaigns	3
COM 483	Public Affairs Reporting	3
MK 313	Retail Management	3
MK 343	International Marketing	3
MK 353	The Global Consumer	3
MK 363/PSY 3063	Commerce and Consumer Behavior	3
MK 373	Graphic Design Fundamentals	3
MK 433	Marketing Strategy	3
MK 453	Strategic Digital Marketing Certification	3
MK 463	Marketing Research	3
MK 483	Senior Seminar in Marketing	3
MK 493	Selected Topics in Marketing	3
MK 6943	Strategic Marketing Management	3
PSY 333	Psychology of Personality	3
PSY 343	Social Psychology	3
SM 393	Sport Psychology	3

**Mathematics Minor (25 hrs.)****Jannen School of Arts and Sciences - Mathematics and Physics Department**

(FOR STUDENTS WITH ANOTHER MAJOR) A grade of “C” or higher is required for each mathematics course in the minor.

**Requirements**

## Core Courses (17 hrs.)

MA 134	Calculus I	4
MA 164	Calculus II	4
MA 213	Calculus III	3
MA 233	Differential Equations	3

MA 313	Introduction to Linear Algebra	3
Choose 8+ credits from:		
MA 333	Number Theory	3
MA 353	Vector Analysis	3
MA 363	Advanced Differential Equations	3
MA 3093	Probability	3
MA 393	Probability & Statistics	3
MA 413	Advanced Linear Algebra	3
MA 453	Point-Set Topology	3
MA 373	Abstract Algebra	3
MA 423	Complex Variables	3
MA 473	Graph Theory & Combinatorics	3
MA 312	Historical Aspects of Mathematics	2

## Metallurgical Engineering Minor (24 – 26 hrs.)

### Allen School of Engineering and Computing - Mechanical Engineering Department

The curriculum is designed to prepare students for professional engineering careers that require specialized training in metallurgy or for graduate studies in the metallurgical engineering field. A grade of C or better is required for MAE courses in the minor.

#### Requirements

##### Science Course (3-5 hrs.)

CH 103	General Chemistry I (no lab)	3
	Or	
CH 104	General Chemistry I	4
	Or	
CH 155H	Advanced Honors General Chemistry	5

##### Engineering Science Course (3 hrs.)

ES 233	Engineering Materials	3
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##### Mathematics Course (3 hrs.)

MA 393	Probability & Statistics	3
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##### Required Mechanical Engineering Courses (6 hrs.)

MAE 242	Manufacturing Processes & Equipment	2
MAE 241	Manufacturing Processes & Equipment Laboratory	1
MAE 4193	Metal Casting	3

##### Elective Mechanical Engineering Courses (9 hrs.)

MAE 383	Metallurgical Thermodynamics	3
MAE 393	Metallurgical Transport Processes	3
MAE 443	Engineering Metallurgy	3
MAE 4143	Physical Metallurgy	3

## Music Minor (25 hrs.)

### Jannen School of Arts and Sciences - Music Department

**Requirements**

## Core Courses (17 hrs.)

MUS 112	Piano Lab	2
MUS 113	Music Theory I	3
MUS 123	Music History I	3
MUS 213	Music Theory II	3
MUS 223	Music History II	3
MUS 253	Techniques of Conducting	3

## Select Applied Studies (4 hrs.)

MUS 1011	Applied Studies	1
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*MUS 1011: Woodwind, Brass, Percussion, String, Voice*

## Select Ensemble Studies (4 hrs.)

MUS 1141	Chamber Orchestra	1
MUS 1151	Marching Band	1
MUS 1161	Wind Ensemble/Pep Band	1
MUS 1171	University Choir	1
MUS 1181	Jazz Band	1
MUS 1191	Jazz/Show Choir	1

**Plastics Engineering Minor (25 hrs.)****Allen School of Engineering and Computing - Design Engineering Technology Department**

Available to all Engineering and Technology students.

**Requirements**

## Core Courses (16 hrs.)

PET 353	Thermodynamics & Heat Transfer for Engineering Technology	3
PET 223	Polymer Structures, Properties & Applications	3
PET 224	Plastics Processing & Testing	4
PET 323	Plastics Product Design	3
PET 333	Plastics Mold Engineering & Design	3

## Electives (9 hrs.)

## Choose three courses

ETD 313	Design for Manufacture & Assembly	3
ETD 433	Computer Numerical Control Principles	3
GE 413	Design of Experiments	3
GE 313	SPC & Lean Manufacturing	3
MGT 413	Management Of Quality	3

**Political Science Minor (15 hrs.)****Jannen School of Arts and Sciences - Psychology and Social Sciences Department****Requirements**

## Core Course (3 hrs.)

POLS 113	Introduction to Government	3
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## Choose 12 Credits from the following Courses (12 hrs.)

POLS 313	Comparative Governments	3
POLS 323	The Contemporary World	3
	Or	
HIS 323	The Contemporary World	3
POLS 333	State & Local Government	3
POLS 343	American Political Thought	3
	Or	
HIS 343	American Political Thought	3
POLS 363	United States Foreign Policy	3
	Or	
HIS 363	United States Foreign Policy	3
POLS 373	Political Psychology	3
	Or	
PSY 373	Political Psychology	3
POLS 403	American Constitutional Development	3
	Or	
HIS 403	American Constitutional Development	3
POLS 423	The United States as a World Power	3
	Or	
HIS 423	The United States as a World Power	3

## Psychology Minor (15 hrs.)

**Jannen School of Arts and Sciences - Psychology and Social Sciences Department****Requirements**

## Core Course (3 hrs.)

PSY 113	Principles of Psychology	3
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## Choose 1 from Clinical Core Courses (3 hrs.)

PSY 323	Abnormal Psychology	3
PSY 363	Human Behavior & Counseling	3
PSY 413	The Psychology of Addiction	3
PSY 423	Counseling Theories & Practices	3

## Choose 1 from Social Core Courses (3 hrs.)

PSY 333	Psychology of Personality	3
PSY 343	Social Psychology	3
PSY 373	Political Psychology	3

## Choose 1 from Developmental Core Courses (3 hrs.)

PSY 223	Life Span Developmental Psychology	3
SOC 323	The Family	3
PSY 353	Child & Adolescent Psychology	3

## Electives (3 hrs.)

PSY prefix course 200 level or above

**Robotics Minor (29 hrs.)****Allen School of Engineering and Computing - Mechanical Engineering Department**

The field of robotics has been constantly growing for the last several decades. With industries struggling to keep costs down by implementing more automation, there is a strong desire to hire students with a background in robotics. The curriculum is designed to prepare students for professional engineering careers that require specialized training in robotics or for graduate studies in robotics. A grade of C or better is required for 200 level and above ECE and MAE courses in the minor.

**Requirements**

## Computer Science Course (3 hrs.)

CS 1113	Introduction to Object-Oriented Program	3
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## Engineering Science Courses (12 hrs.)

ES 213	Statics	3
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ES 223	Dynamics	3
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ES 243	Solid Mechanics	3
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ES 253	Electrical Science	3
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	Or	
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ECE 213	Circuit Analysis	3
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## Electrical Engineering Courses (11 hrs.)

ECE 112	Prototyping & Projects	2
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ECE 263	Digital Systems	3
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ECE 261	Digital Systems Laboratory	1
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ECE 273	Microcontrollers	3
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ECE 271	Microcontrollers Laboratory	1
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## Mechanical Engineering Course (3 hrs.)

MAE 363	Introduction to Mechatronics	3
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**Social Innovation Minor (15 hrs.)****Ketner School of Business****Requirements**

## Core Courses (9 hrs.)

PHL 213	Theories & Philosophies of Social Innovation	3
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	Or	
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SI 213	Theories & Philosophies of Social Innovation	3
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LDR 403	Creativity, Innovation, & Influence	3
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SI 403	Social Innovation Practicum	3
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## Elective (6 hrs.)

Select 6 hours of major-or-career related tactical and/or theoretical courses from the below Course Bank. Other courses can be reviewed and approved in collaboration with student's academic advisor.

BA 123	Business Concepts	3
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BA 343	International Business	3
BIO 214	Conservation	4
BIO 274	General Ecology	4
BIO 392	Aquatic Biology	2
BIO 334	Environmental Biology	4
BME 4853	Biomedical Engineering Design I	3
BME 4863	Biomedical Engineering Design II	3
CE 3103	Environmental Engineering	3
CE 4103	Pollution Control Technologies	3
CE 4113	Environmental Remediation	3
CE 4123	Water & Wastewater Treatment	3
CE 4333	Design of Water Distribution Systems & Sewers	3
CE 4613	Construction Methods & Equipment	3
CE 4713	Foundation Engineering	3
CHE 222	Sustainability & Process Measurement Laboratory	2
COM 153	Principles of Public Relations	3
COM 213	Business Communication	3
COM 233	Intercultural Communication	3
COM 253	Event Planning & Promotion	3
COM 453	Public Relations Planning & Campaigns	3
CRJ 563	Planning & Program Evaluation	3
ECO 203	Survey of Economics	3
ECO 323	Money & Banking	3
ECO 383	International Economics	3
EM 253	Disaster Relief & Recovery	3
EM 343	Incident Management	3
EM 383	Preparedness & Response Operations	3
EM 423	Social Dimensions Of Disaster	3
ES 382	Engineering Economics	2
ES 4703	Operations Management & Quantitative Decision Analysis	3
ETD 163	Environmental Health & Safety	3
ETD 313	Design for Manufacture & Assembly	3
ETD 323	Product Design & Development	3
EXS 233	Drug Education	3
EXS 273	Nutrition	3
EXS 373	Health Promotion & Problems	3
EXS 383	Nutrition Counseling	3
EXS 433	Developing Health Promotion Program for Adults	3
EXS 473	Global Perspectives Health & Wellness	3
FIN 343	International Finance Or	3
FIN 5833	International Finance	3
FIN 363	Venture Finance	3
FIN 403	Investments	3
FIN 5203	Finance for Engineers	3
GEO 303	Human Geography	3
LDR 343	Conflict Resolution	3

MGT 303	Risk Management	3
MGT 323	Leadership	3
MGT 363	Organizational Behavior	3
MGT 373	Facility Management	3
MGT 383	Principles of Project Management	3
MGT 443	Managing Operations	3
MK 323	Integrated Marketing Communication	3
MK 343	International Marketing	3
MK 353	The Global Consumer	3
MK 363/PSY 3063	Commerce and Consumer Behavior	3
MK 373	Graphic Design Fundamentals	3
MK 423	Professional Selling	3
PET 323	Plastics Product Design	3
PET 333	Plastics Mold Engineering & Design	3
PSY 343	Social Psychology	3
	Or	
SOC 343	Social Psychology	3
PSY 363	Human Behavior & Counseling	3
PSY 373	Political Psychology	3
PSY 413	The Psychology of Addiction	3
PSY 433	Issues of Substance Abuse in Family Systems	3
SOC 323	The Family	3

## Software Engineering Minor (24 hrs.)

### Allen School of Engineering and Computing - Computer Engineering Department

#### Requirements

#### Computer Science Course (18 hrs.)

CS 1113	Introduction to Object-Oriented Program	3
CS 1123	C++ & Object Oriented Design	3
CS 2103	Algorithm Design & Analysis	3
SE 353	Software Engineering	3
SE 393	Software Patterns & Team Development	3
BA 123	Business Concepts	3

#### Computer Science/Software Engineering Electives (6 hrs.)

CS/SE Electives above 300/3000 level, or CS 2213

## Spanish Minor (15 hrs.)

### Jannen School of Arts and Sciences - Language and Humanities Department

Students who plan to enroll in the Spanish Minor must demonstrate a second semester competency in Spanish (SPN 123). Students can enroll in SPN 113 and SPN 123 at Trine. If they seek credit for first year Spanish as a heritage speaker or due to several years of study in high school, students must take either the CLEP exam and pass with a score of 4 or higher or the AP exam and pass with a 3 or higher. A grade of C or higher in all courses counting toward the minor is required.

**Requirements**

## Core Courses (15 hrs.)

SPN 203	Spanish III	3
SPN 213	Spanish IV	3
SPN 303	Spanish Language	3
SPN 313	Spanish Writing & Composition	3
SPN 323	Spanish Culture	3

**Sport Management Minor (15 hrs.)****Ketner School of Business****Requirements**

## Core Courses (6 hrs.)

LAW 203	Business Law & Ethics	3
SM 313	Principles of Sport & Recreation Management	3

## Choose 3 courses from the following list (9 hrs.)

BA 123	Business Concepts	3
EXS 243	Athletic Training	3
EXS 263	Motor Learning	3
EXS 373	Health Promotion & Problems	3
MGT 303	Risk Management	3
	Or	
EXS 203	Risk and Sports	3
MGT 323	Leadership	3
MK 203	Marketing	3
SM 133	Contemporary Issues in Sport	3
SM 393	Sport Psychology	3

**Sport Psychology Minor (15 hrs.)****Jannen School of Arts and Sciences - Psychology and Social Sciences Department****Requirements**

## Core Courses (15 hrs.)

PSY 113	Principles of Psychology	3
EXS 103	Teaching Sport Skills I	3
SM 393	Sport Psychology	3
EXS 343	Principles of Human Performance	3
PSY 413	The Psychology of Addiction	3

**Structural Engineering Minor (30 hrs.)****Allen School of Engineering and Computing - Civil Engineering Department**

Structural engineering is traditionally viewed as a branch of civil engineering dealing with the analysis and design of structures to support or resist loads. The curriculum is designed to provide students with (a) a foundation to pursue graduate studies or a career in structural engineering and (b) an understanding of the theory, behavior, and design of individual structural elements and structural systems. Please contact Reiners Department of Civil and Environmental Engineering if you are interested in this



program.

### Requirements

#### Engineering Science Courses (6 hrs.)

ES 223	Dynamics	3
ES 243	Solid Mechanics	3

#### Structural Engineering Breadth Courses (18 hrs.)

CE 3201	Civil Engineering Materials Laboratory	1
CE 3203	Civil Engineering Materials	3
CE 3501	Structural Analysis Laboratory	1
CE 3503	Structural Analysis I	3
CE 3521	Structural Design Laboratory	1
CE 3523	Structural Design I	3
CE 4503	Structural Analysis II	3
CE 4523	Structural Design II	3

#### Structural Engineering Depth Courses (6 hrs.)

(Choose two of the following 3-credit courses)

MAE 453	Mechanical Vibration	3
CE 4553	Timber Design	3
CE 4563	Bridge Engineering	3
CE 4713	Foundation Engineering	3

### Theatre Minor (15 hrs.)

#### Jannen School of Arts and Sciences - Language and Humanities Department

### Requirements

#### Core Courses (15 hrs.)

THE 103	Introduction to Theatre	3
THE 100	Theatre Production (no credit)	0
	Or	
THE 101	Theatre Production	1
ENG 423	Drama	3
	Or	
ENG 433	Shakespeare & His Times	3
COM 373	Topics In Communication	3

*COM 373 Repeated 3 times with a different theatre emphasis*

# Courses

## AC-Accounting

### **AC 203 - Accounting I (3)**

A study of the accounting process and the use of accounting information in business decisions. Topics include the processing of accounting information, income measurement, accrual accounting and accounting for assets, liabilities and equity in the corporate environment. The complete accounting cycle for a service and merchandising business and software applications are included. Prerequisite: MA 113

Prerequisite: MA 113.

### **AC 213 - Accounting II (3)**

This course includes the accumulation and use of accounting information by management in planning, control and decision-making. Topics include product costing, budgeting, cost-volume-profit relationships, variable costing and statement of cash flows. Software applications are included. Prerequisite: AC 203

Prerequisite: AC 203.

### **AC 303 - Cost Accounting (3)**

Managerial accounting concepts, objectives, techniques, and systems are examined to provide information about financial and non-financial performance measurement. Cost accumulation, allocation, and variance analysis are studied in the context of performance evaluation and responsibility accounting in an organization. Emerging cost concepts and systems are also examined. The course uses computer applications. Prerequisite: AC 213

Prerequisite: AC 213.

### **AC 323 - Intermediate Accounting I (3)**

This course introduces accounting theory and practice needed to prepare students for careers in public/corporate/private accounting.

Preparing/reporting relevant information to decision-makers inside and outside the firm is explored in areas such as cash, receivables, inventories, fixed assets, and intangible assets. Revenue recognition and using the time-value of money in accounting are also covered. This course uses computer applications.

Prerequisite: AC 213.

### **AC 333 - Intermediate Accounting II (3)**

This is a continuation of Intermediate Accounting I. Together, these classes provide the core of financial reporting knowledge that students will use throughout their professional accounting careers. Areas covered include liabilities, stockholder's equity, leases, accounting changes and error corrections, statement of cash flows, pensions, and income taxes. This course uses computer applications.

Prerequisite: AC 323.

### **AC 353 - Tax & Legal Issues for Small Business (3)**

This course covers tax and legal topics pertinent to small businesses, including; forming of a business organization, creating or acquiring a small business, tax planning, benefit and retirement plans, personal asset protection, and estate and succession planning. Prerequisite: AC 213

Prerequisite: AC 213.

**AC 373 - Accounting Information Systems (3)**

This course is designed to provide a working knowledge of accounting information system concepts. The course will emphasize designing and/or evaluating accounting systems in terms of both system controls and meeting internal control objectives. The course uses computer applications. Prerequisites: AC 213, BA 213

Prerequisite: AC 213, BA 213.

**AC 383 - Volunteer Income Tax Assistance (VITA) I (3)**

Students will be trained in tax preparation services and a supporting software program. Students will then prepare federal and state income tax returns for qualifying elderly and low-income individuals. The Volunteer Income Tax Assistance (VITA) program offers free tax help to low-income people, persons with disabilities and limited English speaking taxpayers who need assistance in preparing their own tax returns. Students will gain experience in providing income tax service to clients and in preparing actual returns. Prerequisites: AC 423

Prerequisite: AC 423.

**AC 403 - Advanced Accounting (3)**

This course covers consolidated financial statement preparation for business combinations, translation of foreign currency transactions and financial statements, accounting for reorganizations and liquidations, accounting for partnerships, and introduction to governmental accounting. This course uses computer applications.

Prerequisite: AC 333.

**AC 413 - Governmental Non-For-Profit Accounting (3)**

This course introduces fund accounting and covers the theory and accounting process for governmental and not-for-profit organizations. The accounting for estates and trusts is also included. This course uses computer applications. Prerequisite: AC 333

Prerequisite: AC 333.

**AC 423 - Personal Income Tax (3)**

This course introduces basic concepts of tax law with the emphasis on the underlying concepts common to all entities as they relate to everyday economic life. Special emphasis is placed on taxation of individuals and corporations. Computerized income tax preparation and research are included. Prerequisite: AC 213

Prerequisite: AC 213.

**AC 433 - Corporate Income Tax (3)**

This course includes specialized topics including taxation of partnerships and other conduit entities. Property transactions, specialized topics and tax research are covered. Computerized preparation of tax returns for various entities is included.

Prerequisite: AC 423

Prerequisite: AC 423.

**AC 463 - Auditing (3)**

Auditing theory, objectives, and procedures leading to the auditor's opinion on the financial statements are studied. Internal control and its evaluation, auditing standards, and the use of statistical sampling in the audit process are covered in depth. This course uses auditing software applications. Prerequisite: AC 323

Prerequisite: AC 323.

**AC 473 - CPA Topics (3)**

This course is designed for those accounting majors planning to sit for the CPA exam. It includes the solving of practical accounting problems, advanced topics such as current statements of the Financial Accounting Standards Board, current statements on auditing procedures, and tax topics. This course uses software applications. Prerequisite: AC 333

Prerequisite: AC 333.

**AC 483 - Volunteer Income Tax Assistance (VITA) II (3)**

Students will be trained in tax preparation services and a supporting software program. Students will then prepare federal and state income tax returns for qualifying elderly and low-income individuals. The Volunteer Income Tax Assistance (VITA) program offers free tax help to low-income people, person with disabilities and limited English speaking taxpayers who need assistance in preparing their own tax returns. Students will gain experience in providing income tax service to clients and in preparing actual returns. Students will serve as supervisors of first-year students participating in the program. They will provide training, scheduling, problem resolution and auditing services. Prerequisites: AC 383

Prerequisite: AC 383.

**AC 493 - Selected Topics in Accounting (3)**

This course treats specific or current accounting issues and problems in depth.

**AC 533 - Corporate Taxation (3)**

The course seeks to develop in participants an understanding and ability to assess corporate income tax issues. In particular, the focus will be on corporate formations, capital structure issues, dividends, stock redemptions and partial liquidations, complete liquidations, corporate divisions and reorganizations and S Corporation elections and related issues. Prerequisite: Must be admitted to either the MBA or Certificate Program

Prerequisite: Must be admitted to either the MBA or Certificate Program.

**AC 553 - Federal Taxation of Pass-Through Entities (3)**

The course seeks to develop in participants a broad understanding and ability to assess tax issues associated with partnerships and LLCs. The course will cover partnership formations, partner distributions, sales and liquidations of partnership interests, terminations, issues associated with accounts receivable and inventory and family limited partnerships. Prerequisite: Graduate Standing

Prerequisite: Graduate Standing.

**AC 5003 - Advanced Auditing (3)**

Advanced Audit provides an in-depth analysis of current auditing issues, especially those involved in completing the audit: auditors' reporting responsibilities, internal control over reporting for public companies, the requirements of the Sarbanes-Oxley Act and auditing of information technology systems. In addition, the course focuses on compliance concepts and techniques, detailed attestation and review services, and the professional judgment process model for auditing financial statements. Recognized standards, such as the International Auditing Standards (IAS) and the Generally Accepted Government Auditing Standards (GAGAS), are discussed in detail. Prerequisite: AC 463

Prerequisite: AC 463.

**AC 5013 - Managerial Accounting (3)**

This course is an introduction and examination of essential accounting and finance principles, teaching students how to use accounting and financial information for effective decision making, planning, and controlling the operations of business enterprises. Significant emphasis is placed upon determining cost of products and pricing decisions. Other topics include break-even analysis and pricing, capital budgeting, cost-volume-profit analysis and operating budget analysis. Prerequisite: Graduate Standing

Prerequisite: Graduate Standing.

### **AC 5023 - Managerial Accounting for MBA (3)**

This course is an introduction and examination of essential managerial accounting principles. Students will use these principles for effective decision making, planning, and controlling. Emphasis is placed upon determining cost of products and pricing decisions. Other topics include break-even analysis and pricing, cost-volume-profit analysis, operating budget analysis, capital budgeting, and variance analysis.

## **ARC-Architecture**

### **ARC 293 - Architecture Appreciation (3)**

An introduction to the built environment, this course examines buildings and infrastructure from prehistory to present day. Through lectures and assignments students will be introduced to architectural terminology and historical, cultural, and innovatively significant buildings. Structures will be examined based on design, materials, geographic location, physical environment, social and cultural contexts, and past and present use. The role of the architect, engineer, client and user will be examined.

### **ARC 293 - Architecture Appreciation (3)**

An introduction to the built environment, prehistoric to modern, focusing on public/reverential, commercial and residential architecture. Students will be introduced to terminology, some construction techniques, socio-legal implications of high-rise structures, and architectural styles from ancient to postmodern. Structures from around the world will be viewed and discussed.

## **ART-Art**

### **ART 253 - Art Appreciation (3)**

Designed as an introduction to the arts, this course develops aesthetic-critical responses and seeks to enhance the enjoyment of works of art. Painting, sculpture, architecture and other types of art are analyzed in terms of the elements of art, subject, function, medium, organization, style and aesthetic response.

## **AS-Air Science-ROTC**

### **AS 100 - Air Force Leadership Laboratory I (0)**

A study on Air Force customs and courtesies, drills and ceremonies. Also includes studying the environment of an Air Force officer and learning about areas of opportunity available to commissioned officers. Corequisite: AS 101

Corequisite: AS 101.

### **AS 101 - The Foundations of the United States Air Force I (1)**

A survey course designed to introduce students to the United States Air Force and Air Force ROTC. Featured topics include: mission of the Air Force, officership and professionalism, military customs and courtesies, Air Force officer opportunities, and an introduction to communication skills.

### **AS 110 - Air Force Leadership Laboratory II (0)**

A study on Air Force customs and courtesies, drills and ceremonies. Also includes studying the environment of an Air Force officer and learning about areas of opportunity available to commissioned officers. Corequisite: AS 111

Corequisite: AS 111.

### **AS 111 - The Foundations of the United States Air Force II (1)**

Additional study of the organizational structure of the Air Force, with emphasis on leadership and communication skills.

**AS 200 - Air Force Leadership Laboratory III (0)**

Further study on Air Force customs and courtesies, drill and ceremonies, and military commands. Also includes additional emphasis on the environment of an Air Force officer and learning about areas of opportunity available to commissioned officers. Corequisite: AS 201

Corequisite: AS 201.

**AS 201 - The Evolution of USAF Air & Space Power II (1)**

A course designed to examine general aspects of air and space power through a historical perspective. Utilizing the perspective, the course covers a time period from the first balloons and dirigibles through the Korean War and into the Cold War era.

**AS 210 - Air Force Leadership Laboratory IV (0)**

Further study on Air Force customs and courtesies, drill and ceremonies, and military commands. Also includes additional emphasis on the environment of an Air Force officer and learning about areas of opportunity available to commissioned officers. Corequisite: AS 211

Corequisite: AS 211.

**AS 211 - The Evolution of USAF Air & Space Power II (1)**

Further study from the Vietnam War to the space-age global positioning systems of the Persian Gulf War. Effective communication techniques are also emphasized.

**AS 300 - Air Force Leadership Laboratory V (0)**

Activities classified as leadership and management experiences involving the planning and controlling of military activities of the cadet corps, and the preparation and presentation of briefings and other oral and written communications. Also include interviews, guidance, and information which will increase the understanding, motivation, and performance of other cadets. Corequisite: AS 303

Corequisite: AS 303.

**AS 303 - Air Force Leadership Studies I (3)**

A study leadership, management fundamentals, professional knowledge, and communication skills required of an Air Force junior officer. Case studies are used to examine Air Force leadership and management situations as a means of demonstrating and exercising practical application of the concepts being studied.

**AS 310 - Air Force Leadership Laboratory VI (0)**

Further activities classified as leadership and management experiences. They involve the planning and controlling of military activities of the cadet corps, and the preparation and presentation of briefings and other oral and written communications. Also include interviews, guidance, and information which will increase the understanding, motivation, and performance of other cadets. Corequisite: AS 313

Corequisite: AS 313.

**AS 313 - Air Force Leadership Studies II (3)**

Further study of Air Force personnel and evaluation systems, leadership ethics and additional communication skills.

**AS 400 - Air Force Leadership Laboratory VII (0)**

Further activities classified as leadership and management experiences. They involve the planning and controlling of military activities of the cadet corps, and the preparation and presentation of briefings and other oral and written communications. Also include interviews, guidance, and information which will increase the understanding, motivation, and performance of other cadets. Corequisite: AS 403

Corequisite: AS 403.

**AS 403 - National Security Affairs/Preparation for Active Duty II (3)**

An examination of the national security process, regional studies, advanced leadership ethics, and Air Force doctrine.

**AS 410 - Air Force Leadership Laboratory VIII (0)**

Further activities classified as leadership and management experiences. They involve the planning and controlling of military activities of the cadet corps, and the preparation and presentation of briefings and other oral and written communications. Also include interviews, guidance, and information which will increase the understanding, motivation, and performance of other cadets. Corequisite: AS 413

Corequisite: AS 413.

**AS 413 - National Security Affairs/Preparation for Active Duty II (3)**

An examination of the national security process, regional studies, advanced leadership ethics, and Air Force doctrine.

## AST-Astronomy

**AST 201 - Astronomy Laboratory (1)**

An introductory laboratory study of basic observational astronomy and the tools of astronomy as students explore the sky. The stars, the planets and the universe of galaxies are observed and measured by observation or computer simulation. Corequisite or Prerequisite: AST 203

Corequisite: AST 203.

**AST 203 - Astronomy (3)**

An introduction to the field of astronomy, this course is a study of the planets and the stars and their formation and life cycles. The history of the Milky Way Galaxy and the history of the cosmos are studied, with an emphasis on the solar system and methods of observation and measurement.

## BA-Business Administration

**BA 101 - University Experience for Ketner School of Business (1)**

This course offers resources for success in learning for students new to Trine University. This course will assist students in becoming more efficient learners, understanding self and others, and learning personal life skills. This course will present information about Trine University offices and services to familiarize students with resources and procedures.

**BA 102 - University Experience-Business Students (2)**

This course offers resources for success in learning for students new to Trine University. This course will assist students in becoming more efficient learners, understanding self and others, and learning personal life skills. This course will present information about Trine University offices and services to familiarize students with recourses and procedures. The course will introduce the student to fields of study and careers in business. Students will begin the career planning process.

**BA 113 - Business Computer Applications (3)**

This course emphasizes predominant software packages in word processing, spreadsheets, presentation graphics, database management, and e-mail usage.

**BA 123 - Business Concepts (3)**

A survey course designed to introduce the student to business issues and practices in the United States. All major functions of business are included (management, marketing, law, finance, economics, operations, accounting, information technology) as well as issues facing the business person (ethics, globalization, motivation, etc.) Suitable for students considering a career in

business as well as for non-business majors who will interact with the business enterprises (e.g., educators, engineers).

### **BA 201 - Profession Development & Strategies (1)**

This is a practical course to assist the student in the development of a professional job search portfolio (i.e. resume, cover letter, follow-up letters). The course includes self-appraisal and career goal setting, job interview techniques, and familiarization with employment resources. Professional strategies are emphasized in the areas of business attire, etiquette and protocol, ethics, human relations, and corporate culture. Prerequisite: Sophomore standing

Prerequisite: Sophomore standing.

### **BA 213 - Business Spreadsheets (3)**

This course will teach you to become an advanced Excel user. Concepts include data organization, workbook security, using tables to analyze and report data, integrating and manipulating data from external sources, creating and auditing complex formulas, automation features, advanced data analysis, using charts and graphs to analyze and communicate business information, statistical analysis, and reporting.

Prerequisite: none. Corequisite: none.

### **BA 233 - Business Capstone Demonstration (3)**

This capstone course will provide students the opportunity to integrate and synthesize previous coursework in business. In addition, to the Capstone Demonstration Project, students will be required to take the Major Field Test for the associate in business degree program. Prerequisite: All required coursework in the Associate of Business Core

Prerequisite: All required coursework in the Associate of Business Core.

### **BA 2001 - Selected Topics in Business (1)**

Offered to treat specific or current business topics in depth.

### **BA 2002 - Selected Topics in Business (2)**

Offered to treat specific or current business topics in depth.

### **BA 2003 - Selected Topics in Business (3)**

Offered to treat specific or current business topics in depth.

### **BA 313 - Insurance (3)**

This course includes the fundamental principles and practices as they relate to life, compensation, fire, marine, and automobile insurance. Prerequisites: LAW 203, MK 203

Prerequisite: LAW 203, MK 203.

### **BA 323 - Real Estate (3)**

This course is the study of problems of buying and leasing real property for residence or investment purposes, including the principal commercial and financial transactions involved. Prerequisites: LAW 203, MK 203

Prerequisite: LAW 203, MK 203 .

### **BA 333 - Social Media For Business (3)**

Concepts include using digital and social media in a business/industry setting. Concepts include setting up and using wikis, blogs, Facebook, MySpace, Twitter, YouTube, LinkedIn, Ning, Flickr, and other online modalities as a way to increase business, marketing, research, and customer service opportunities. Group work at local businesses will be required.

Prerequisite: BA 113



Prerequisite: BA 113.

**BA 343 - International Business (3)**

This course is a study of international business as applied to political, economic, legal and cultural environments. In addition, this course will apply the principles comparative advantages, international trade, world geography, manufacturing and resources both human and natural. Attention will be given to the application of international business management and operations. Prerequisites: BA 123

Prerequisite: BA 123.

**BA 3111 - Business Internship (1)**

The course involves a meaningful work experience related to the student's field of study or other functional areas of business in an approved company. The assignment and company must be approved by the School of Business Internship Coordinator. A maximum of 6 semester credit hours can be counted toward degree requirements, with a maximum of 3 credit hours for any one work session. Prerequisite: BA 123

Prerequisite: BA 123.

**BA 3112 - Business Internship (2)**

The course involves a meaningful work experience related to the student's field of study or other functional areas of business in an approved company. The assignment and company must be approved by the School of Business Internship Coordinator. A maximum of 6 semester credit hours can be counted toward degree requirements, with a maximum of 3 credit hours for any one work session. Prerequisite: BA 123

Prerequisite: BA 123.

**BA 3113 - Business Internship (3)**

The course involves a meaningful work experience related to the student's field of study or other functional areas of business in an approved company. The assignment and company must be approved by the School of Business Internship Coordinator. A maximum of 6 semester credit hours can be counted toward degree requirements, with a maximum of 3 credit hours for any one work session. Prerequisite: BA 123

Prerequisite: BA 123.

**BA 403 - Business & Public Policy (3)**

This course includes an analysis of the legal, political, and economic framework that has shaped public policy toward business in the United States. It will include the methods as to how public policy is created and its implications for management decision making. The issues that this course will be concerned with are: how public policy is related to societal, community, employee, consumer, and environmental concerns and their implication for business. (Same as ECO 453) Corequisite: MGT 363

Corequisite: MGT 363. Crosslisted as: ECO 453.

**BA 423 - Entrepreneurship (3)**

This course focuses on entrepreneurship and small business management. Through case studies, simulations, guest lectures, reading and business plan development, students become aware of the unique challenges facing small business owners and entrepreneur. Students become familiar with the resources available to small business owners, by developing and presenting a business start-up plan. Prerequisite: MGT 353, MGT 363

Prerequisite: MGT 353, MGT 363.

**BA 433 - Business Analytics (3)**

Data accumulation, data filtering and informational dissemination grants organizations a competitive edge in the way they can use simulation or models to make more informed decisions regarding the deployment of capital, market development or

resource management. Having an understanding of how data is generated, stored, compiled and manipulated through modeling provides a baseline for individuals and businesses to incrementally defend themselves in the race for societal impact and capital accumulation. This course is designed to help students learn methods to identify and analyze data to better help incorporate data into applicable models to help create informational visualization efficiently in order to generate better educated business decisions.

Prerequisite: BA 213 Business Spreadsheets and MA 253 Statistics. Corequisite: none.

### **BA 453 - Global Strategic Management (3)**

This course is a study of key theories and business principles in strategy analysis, formulation and implementation in a domestic and global context. The importance of the external and competitive environment of an industry will be examined. Evaluation methods of an organizations strengths and weaknesses will be emphasized. Integration of principles relating to organizational strategies at the business, corporate and international level. Key global concepts that will be explored are the Diamond of National Advantage along with evaluation of the risks factors for countries. Special emphasis on the management concerns relating to ethical and cultural variations in different countries and regions of the world. Prior knowledge of the functional areas of business will be a foundation for strategy formulation and implementation.

Prerequisite: Senior (last two semesters of school).

### **BA 4000 - Independent Research in Business (0)**

Independent research under the direction of an individual instructor can be taken. A research paper is required. Research may be done in any business major. (Course may be taken up to 3 times for credit)

### **BA 4001 - Independent Research in Business (1)**

Independent research under the direction of an individual instructor can be taken. A research paper is required. Research may be done in any business major. (Course may be taken up to 3 times for credit)

### **BA 4002 - Independent Research in Business (2)**

Independent research under the direction of an individual instructor can be taken. A research paper is required. Research may be done in any business major. (Course may be taken up to 3 times for credit)

### **BA 4003 - Independent Research in Business (3)**

Independent research under the direction of an individual instructor can be taken. A research paper is required. Research may be done in any business major. (Course may be taken up to 3 times for credit)

### **BA 4100 - Ehinger Fellows Leadership Development (no credit) (0)**

The Ehinger Fellows Leadership Development course is a required component of membership in the Ehinger Fellows leader/mentor/ambassador program. Students will engage in experiential leadership, communication, and strategic planning learning activities, create and implement discipline-specific and university-wide events, and learn how to be effective mentors and models of the dedication and professionalism expected of successful Trine University students. (Course may be taken up to 4 times for credit.) Prerequisite: Nomination and selection as an Ehinger Fellow

Prerequisite: Nomination and selection as an Ehinger Fellow.

### **BA 4101 - Ehinger Fellows Leadership Development (1)**

The Ehinger Fellows Leadership Development course is a required component of membership in the Ehinger Fellows leader/mentor/ambassador program. Students will engage in experiential leadership, communication, and strategic planning learning activities, create and implement discipline-specific and university-wide events, and learn how to be effective mentors and models of the dedication and professionalism expected of successful Trine University students. (Course may be taken up to 4 times for credit.) Prerequisite: Nomination and selection as an Ehinger Fellow

Prerequisite: Nomination and selection as an Ehinger Fellow.

**BA 4200 - Martin Executive in Residence (no credit) (0)**

The Martin Executive in Residence Program supports intellectual stimulation through personal one-on-one professional development to help students succeed, lead and serve within their communities throughout their career. Mentors will offer a high-impact experience by helping students form a professional skill set, including power skills sought after by employers, build extensive professional networks, and establish attainable but ambitious career goals. Students are matched with an experienced professional who has worked or is currently working in their area of study or industry. Students will be challenged to do extensive self-evaluation while also learning to continually build on their strengths. The Martin Executive in Residence Program in the Ketner School of Business will help shape future business leaders by inspiring students to not only achieve academic excellence but to achieve excellence after college. Prerequisite: BA 201 and faculty approval

Prerequisite: BA 201 and faculty approval.

**BA 4201 - Martin Executive in Residence (1)**

The Martin Executive in Residence Program supports intellectual stimulation through personal one-on-one professional development to help students succeed, lead and serve within their communities throughout their career. Mentors will offer a high-impact experience by helping students form a professional skill set, including power skills sought after by employers, build extensive professional networks, and establish attainable but ambitious career goals. Students are matched with an experienced professional who has worked or is currently working in their area of study or industry. Students will be challenged to do extensive self-evaluation while also learning to continually build on their strengths. The Martin Executive in Residence Program in the Ketner School of Business will help shape future business leaders by inspiring students to not only achieve academic excellence but to achieve excellence after college. Prerequisite: BA 201 and faculty approval

Prerequisite: BA 201 and faculty approval.

**BA 5002 - Graduate Independent Study (2)**

This course is to be used when approved by Program Director, in rare circumstances for a student to earn either 1, 2 or 3 credits for an independent study of the subject matter in the program.

**BA 5003 - Graduate Independent Study (3)**

This course is to be used when approved by Program Director, in rare circumstances for a student to earn either 1, 2 or 3 credits for an independent study of the subject matter in the program.

**BA 5103 - Business Ethics (3)**

This course will cover ethics in a systematic and comprehensive way. Students will analyze techniques of moral reasoning and the argumentation needed to analyze moral issues in business. They will raise basic questions about the morality of economic systems, especially the United State. Discuss corporate governance to workers' rights to legitimate computer use. Human behavior and business consistency evolve, this course will mirror the ethical issues raised by those changes, most notably, information technology and the globalization of business. We will discuss the dimension of virtue, character, and caring; three concepts that have taken on increasing importance in recent years. Moral language must be used with care and caution when applied outside of the realm of human individuals and their actions. Special problems arise when considering the morality of corporations, nations and people - problems that concern the meaning of moral terms, and problems that must be faced and clarified if we are to be clear about our moral judgements in these areas.

**BA 5223 - Executive Communication (3)**

This course will expose students to the fundamentals of business communication in multiple modalities, including those in the continually-evolving digital world. It will focus particularly on the needs of business audience (e.g. concision, document design, and the creation and delivery of professional presentation).

**BA 6000Z - Graduate Internship (.5)**

This graduate course is designed to combine classroom theory with practical application through job-related experiences. Students are actively employed in diverse organizations and agencies that relate to their graduate academic training and career

objectives. Students will create obtainable SMART goals that apply to their personal and professional goals. Students will build skills related to interviewing etiquette to assist in successful job acquisition. Additionally, students will have the opportunity to reflect on supervisor feedback and their overall experience in the graduate internship.

Prerequisite: None.

### **BA 6003 - CPT Internship (3)**

The course involves the work experience related to the international students' field of study in a graduate program, to combine classroom theory with practical application through job-related experiences. The assignment and company must be approved by the Graduate Program Director. The areas of business attire, etiquette and protocol, ethics, human relations, and corporate culture will also be covered. This course is an optional course that students may take for further learning relating to their specified area of study in the graduate program and can only be taken in the initial semester.

### **BA 6933 - Statistics & Quantitative Methods (3)**

Throughout this course, students will examine statistical tools and techniques. This course presents an overview of the various primary and secondary research methodologies used in the business world. Students will apply statistical techniques to business strategies. This course will be business oriented providing students with business examples and cases studies.

Prerequisite: Business Administration Concentration content courses.

### **BA 6953 - Managing Business Information Systems (3)**

This course examines methodologies to assist in analyzing and designing computer-based information systems for business applications. This course addresses policy and management issues surrounding information systems in today's enterprises: strategic use, organizational impact, project management, human resource issues and other topics germane to understanding management information systems.

### **BA 6963 - Business Administration Capstone (3)**

This course is designed to provide students with the opportunity to prove the knowledge base acquired within the Master of Business Administration program by conducting a substantial analysis of business administration problems through the presentation of a business plan for a newly minted entrepreneurship. Students are expected to show their proficiency in problem formulation, design of solutions, identification of best methods through validation testing and solution implementation/control, as well as the executive demonstration of project reporting. Each student brings his or her own projects to solve within this course, no projects defined by the faculty member or strategic marketing plan created in MK 6943 will be presented. This course is focused on demonstrating mastery of those learning objectives/outcomes identified within the Capstone Course Matrix. Prerequisites: This course must be completed in the student's final term of the MBA program.

Prerequisite: This course must be completed in the student's final term of the MBA program.

## **BAN-Business Analytics**

### **BAN 5003 - Operations Analytics (3)**

This course is an introduction to the principles and techniques of operations analytics. Operations and supply management is defined as the design, operation, and improvement of the systems that create and deliver the organization's primary products and services. In this course, students will learn models and techniques that work with large data sources. This course will demonstrate the application of operations models that are currently being used in industry incorporating big data. Topics considered include process analysis, workforce issues, materials management, quality and productivity, technology, and strategic planning, together with relevant analytical techniques.

### **BAN 5013 - Analytics Software & Tools (3)**

This course introduces multiple analytics software, provides overview in data analytical tools and techniques. Through practical case studies and illustrations students will learn to extract information from various types of data by utilizing business analytics including advanced spreadsheets; SQL queries; statistical language R; and Python.

### **BAN 5023 - Data Driven Decision-Making (3)**

This course examines the tools and techniques utilized for making business decisions. The emphasis of the course will be on applications and interpretation of the results for making real life business decision, understanding customer behavior, and customizing business tactics to increasingly complex business segments.

### **BAN 6093 - Business Analytics Capstone (3)**

This capstone project is the last course of the Master of Science in Business Analytics program in which students provide analytical solutions to a real-world problem sponsored by industry or assigned by an instructor. Students will be guided to complete an individual project aimed at providing a substantive and relevant business analytics solutions to a business problem integrating skills acquired during the program of study in statistical analysis, data management, and modeling. The project requires synthesis of program contents in communication, statistical and operational analysis, analytical software, predictive models, and other applications and techniques. Students are challenged to assess modern data opportunities, formulate a problem definition, and derive multidiscipline business insights from data.

## **BIO-Biology**

### **BIO 103 - General Biology (no Lab) (3)**

An introduction to the basic principles of biology with an emphasis on: biological chemistry, cell biology, metabolism, genetics, diversity of organisms, evolution, and ecology. A background in high school chemistry is strongly recommended. Open to non-science majors only.

### **BIO 104 - General Biology (4)**

An introduction to the basic principles of biology with an emphasis on: biological chemistry, cell biology, metabolism, genetics, diversity of organisms, evolution, and ecology. A background in high school chemistry is strongly recommended. Open to non-science majors only. This course cannot be substituted for BIO 114 for either science or engineering majors.

Corequisite: Lab Required.

### **BIO 114 - Principles of Biology I (4)**

Five basic topics are discussed in some detail: biological chemistry, cell biology, metabolism, genetics, and animal organization and homeostasis. Laboratory exercises designed to introduce the student to scientific investigation and the structure and function of biological systems are an essential part of the course.

Corequisite: Lab Required.

### **BIO 123 - Microbiology for Health Sciences (3)**

This course prepares students to apply knowledge of microorganisms as they relate to the infection process and disease transmission in the health care setting. This includes the causes of disease and pathological conditions, the body's response mechanisms to diseases and wound healing, and the importance of protective measures.

### **BIO 124 - Principles of Biology II (4)**

A continuation of Biology 114, including evolutionary principles, examination of diversity of living things, diversity, structure and function of plants, animal behavior, populations, communities, ecosystems, the biosphere, and the conservation of each. Prerequisite: "C" or better in BIO 114. Corequisite: Lab Required

Prerequisite: C or better in BIO 114. Corequisite: Lab Required.

### **BIO 154 - Human Body Systems (4)**

Human Body Systems will explore the structure and function of the human body. The class and laboratory will cover the different systems that make up the body and how they work to maintain homeostasis. The laboratory will cover the different systems and include model identification and dissection which will facilitate student learning. Prerequisite: BIO 114 or BIO

163 or ES 141

Prerequisite: BIO 114 or BIO 163 or ES 141. Corequisite: Lab Required.

### **BIO 163 - Medical Terminology (3)**

This course introduces building and utilizing a medical vocabulary through the use of prefixes, suffixes, word roots, and combining forms/vowels. Emphasis is placed on correct spelling, pronunciation, and knowing the correct definitions of many medical terms.

### **BIO 1003 - Plants and People (no lab) (3)**

An introduction to the basic principles of plant biology and the interrelationship between plants and humans with an emphasis on basic plant anatomy and physiology, economic and historical importance, and the roles of plants in the biosphere. Open to non-science majors only.

### **BIO 202 - Introduction to Biological Literature & Communication (2)**

A course focusing on the nature and use of biological literature and the communication of scientific knowledge. The student will gain experience in searching literature, properly citing and referencing sources, and writing a documented research paper. Oral Communication of their work will also be a component of this course. Prerequisite: ENG 133 or ENG 143 or HUM 203 and one Biology course 200-Level or above

Prerequisite: ENG 133 or ENG 143 or HUM 203 and one Biology course 200-Level or above.

### **BIO 212 - Pharmacology for Surgical Technologist (2)**

This course examines the various types of drugs and familiarizes the student with the forms by which medications are administered, utilization of proper injection techniques, and preparation of parental and oral medications. The student is instructed in the proper use of the Physician's Desk Reference (PDR) and will work with it in classroom assignments.

### **BIO 214 - Conservation (4)**

A study of biodiversity, including the negative impact of human society and what can be done to preserve it. Topics include measurement of biodiversity, ecosystem function, extinction, habitat destruction, fragmentation, degradation, over-exploitation, invasive species, climate change, conservation planning and priorities, fire, human interaction with the environment, human-modified landscapes and experimental design. Meets Ecology requirement for Biology majors. The lab focuses on communities and small populations by using GIS, GPS, computer modeling and the design, management and restoration practices of natural areas. Includes a variety of field trips to natural areas and implementation of hands-on management and restoration practices, including seed collection and processing, wildlife management and controlled burning. Prerequisite: BIO 274

Prerequisite: BIO 274. Corequisite: Lab Required.

### **BIO 222 - Field Ecology (2)**

Travel course to observe native habitats and communities and how they are impacted by human activities. The course will incorporate cultural and historical context pertinent to the system of interest. Students will learn how to design field experiments, to do hypothesis testing, collect & analyze data, and interpret results. May include kayaking, canoeing, hiking, camping, boating, and/or snorkeling. Prerequisite: BIO 124

Prerequisite: BIO 124.

### **BIO 233 - Cell Biology (3)**

Understanding of cell biology has grown rapidly over the past two decades along with the development of genetics, biochemistry, and molecular biology. This course will introduce students to this unifying discipline which explores organization and function of the cell including structure of cellular organelles, membrane transport, cellular communication, flow of genetic material, and cell division. Prerequisite: A 'C' or better in BIO 114 or ES 141

Prerequisite: A 'C' or better in BIO 114 or ES 141.

**BIO 274 - General Ecology (4)**

A study of the interactions of organisms and environments, this course focuses on individuals, populations, communities, ecosystems, landscapes and cycling of matter within energy systems. Investigations focus on techniques to gauge interactions between the biological and physical environments, field and conceptual sampling methods, statistical analysis, population models, and an exploration of emerging technologies in ecology. Prerequisites: BIO 124, MA 253

Prerequisite: BIO 124, MA 253. Corequisite: Lab Required.

**BIO 302 - Professional Practice in Science (2)**

This course will provide students with the professional tools necessary to be successful in the fields of biology, chemistry, biochemistry, and forensic science. The course will help students construct an application packet (curriculum vitae and statement of purpose), give them experience researching relevant literature and presenting information in a professional setting, and learn about different areas of specialization of the faculty within the Department of Science. Prerequisite: BIO 202, Junior Standing or Permission of the Chair

Prerequisite: BIO 202, Junior Standing or Permission of the Chair.

**BIO 304 - Plant Biology (4)**

The structure and function of the major plant phyla are studied. Methods of classification are illustrated. The physiology and evolutionary relationships are explained. Prerequisite: BIO 124

Prerequisite: BIO 124. Corequisite: Lab Required.

**BIO 314 - Animal Biology (4)**

The structure and function of the major animal phyla are studied. Methods of classification are illustrated. The behavioral, physiological, and evolutionary relationships are explained. Prerequisite: BIO 114 or ES 141

Prerequisite: BIO 114 or ES 141. Corequisite: Lab Required.

**BIO 324 - Microbiology (4)**

The isolation, growth, structure, function, heredity, and identification of microorganisms with emphasis on their relationship to humans. Prerequisites: BIO 114 OR ES 141

Prerequisite: BIO 114 or ES 141. Corequisite: Lab Required.

**BIO 334 - Environmental Biology (4)**

A study of the impacts and interactions of human society and the environment including ethics, risk management, economics, policy making, population growth, energy, pollution, land use planning, soils, agriculture, and water, and their consequences. Labs include field trips to assess environmental conditions and hazards, public perception, and human impacts to the environment. Prerequisite: BIO 124

Prerequisite: BIO 124. Corequisite: Lab Required.

**BIO 364 - Toxicology (4)**

The methods and design of both acute and chronic toxicity tests will be surveyed. Probits of percent mortality versus log dose and other appropriate statistical methods of toxin analysis are applied to laboratory data. Emphasis will be given to mechanisms of action and metabolic detoxification and elimination. Federal regulations involving manufacture use categories and proper disposal are reviewed. (SAME AS CH 364) Prerequisites: BIO 114 or ES 141; CH 114 or CH 155H; CH 204 and BIO/CH 434 Recommended

Prerequisite: BIO 114 or ES 141; CH 114 or CH 155H; CH 204 and BIO 434 Recommended. Corequisite: Lab Required.

Crosslisted as: CH 364.

**BIO 374 - Forensic Biology (4)**

This course will introduce students to basic scientific principles and their application in professional practice of Forensic Biology. The lecture and laboratory portions will provide students with a scientific grounding to understand the application of the science of biology to legal investigations. Students will learn the principles and analytical methods over a variety of fields such as pathology, entomology, animal biology, anatomy and physiology, microbiology, serology, and molecular biology as they apply to forensic biology. Laboratory safety, quality assurance, and quality control are also discussed. Prerequisite: BIO 414

Prerequisite: BIO 414. Corequisite: Lab Required.

**BIO 383 - Introduction to Pharmacology (3)**

This introduction to pharmacology will focus on the study of drugs. This course will explain various therapeutic and adverse effects associated with medications. It will cover several body systems and conditions affecting them, as well as the pharmacological treatment of them. Topics will include, muscle relaxants, anesthetics, and pain medication. This course is to help individuals gain knowledge of how various medications affect the body. Prerequisite: CH 114 or CH 155H; BIO 394

Prerequisite: CH 114 or CH 155H; BIO 394.

**BIO 384 - Human Anatomy & Physiology I (4)**

Develops a comprehensive understanding of the close inter-relationship between anatomy and physiology as seen in the human organism. Introduces students to the cell, which is the basic structural and functional unit of all organisms, and covers tissues, integument, skeleton, muscular and nervous systems as an integrated unit. Prerequisite: BIO 114 or ES 141; CH 104

Prerequisite: BIO 114 or ES 141; CH 104. Corequisite: Lab Required.

**BIO 392 - Aquatic Biology (2)**

An introduction to organisms and processes in the aquatic environments, including function, biodiversity, and ecology of organisms. Topics include: the chemical and physical environment; the ecology of pelagic and benthic organisms, including those from lentic and lotic systems, benthic plants and phytoplankton; zooplankton; invertebrates, fishes; productivity and fisheries; freshwater pollution and conservation. The course will also include application of identification, sampling and analytical techniques to aquatic organisms and their habitats of local lakes and streams, and several required field trips.

Prerequisite: BIO 274

Prerequisite: BIO 274.

**BIO 394 - Human Anatomy & Physiology II (4)**

Develops a comprehensive understanding of the close inter-relationship between anatomy and physiology as seen in the human organism. Continues the study of the inter-relationships of the systems of the human body. Introduces students to the study of the endocrine, cardiovascular, lymphatic, respiratory, digestive, urinary and reproductive systems. Prerequisite: BIO 384

Prerequisite: BIO 384. Corequisite: Lab Required.

**BIO 404 - Embryology (4)**

Study of structural, physiological, and molecular levels of development processes. A descriptive and experimental analysis of developing systems with emphasis on chordates. Prerequisite: BIO 394

Prerequisite: BIO 394. Corequisite: Lab Required.

**BIO 413 - Entomology (3)**

Integrated studies of the principal morphological, physiological, ecological and systematic relationships of insects.



Prerequisite: BIO 114.

**BIO 414 - Genetics (4)**

This course provides the principles of classical and molecular genetics. Topics include Mendelian inheritance, chromosome function, linkage and recombination mapping, cellular processing of biological information, new genetic tools, evolutionary genetics, and genomics. Quality assurance is also discussed. The course will mainly consist of lectures, chromosome level experiments, and problem sets that students will solve and return. Prerequisite: BIO 114 or ES 141; CH 204; BIO 343 Recommended

Prerequisite: BIO 114 or ES 141; CH 204; BIO 343 Recommended. Corequisite: Lab Required.

**BIO 434 - Biochemistry I (4)**

The chemical and physical behavior of biologically important compounds such as carbohydrates, lipids, proteins, nucleic acids, and enzymes are discussed. The various metabolic pathways are discussed in light of their organic mechanisms. (Same as CH 434) Prerequisites: BIO 114 or ES 141; CH 204

Prerequisite: BIO 114 or ES 141; CH 204. Corequisite: Lab Required. Crosslisted as: CH 434.

**BIO 443 - Pathology (3)**

The course is an introduction to pathology, which is the study of disease. An overview of a variety of diseases will be discussed including cardiovascular disease, asthma, infection, cancer, epilepsy, multiple sclerosis, rheumatoid arthritis, Crohn's disease, anemia, leukemia, and Alzheimer's dementia. The subspecialty of forensic pathology will also be discussed. Prerequisites: BIO 114 or ES 141; Junior and Senior Standing

Prerequisite: BIO 114 or ES 141; Junior and Senior Standing.

**BIO 444 - Biochemistry II (4)**

A second semester in Biochemistry would include topics in biosynthesis of the following: amino acids; purines and pyrimidines; proteins; nucleic acids. Topics in nitrogen metabolism and control of protein synthesis would also be discussed. Laboratories would supplement the lecture material. Prerequisites: BIO 434 or CH 434 (Same as CH 444)

Prerequisite: BIO 434 or CH 434. Corequisite: Lab Required. Crosslisted as: CH 444.

**BIO 454 - Molecular Biology (4)**

This course is designed to provide a comprehensive overview of the key concepts in molecular biology and their applications. It will cover structure and function of nucleic acids, chromosome structure, and regulation of gene expression, as well as biological techniques used in the area of molecular biology. Additional topics will include advances in genetic engineering, gene therapy, protein functions, and programmed cell death. Prerequisites: BIO 414 or Permission of Instructor

Prerequisite: BIO 414 or Permission of Instructor. Corequisite: Lab Required.

**BIO 482 - Biostatistics (2)**

Advanced experimental design and analysis for biology and chemistry majors. Data description and display, identifying an experimental design appropriate to test hypotheses, and learning the appropriate univariate statistic to analyze the collected data will be emphasized. Experiments and data types specific to the disciplines of chemistry, biology and health sciences will be presented. Prerequisite: MA 253

Prerequisite: MA 253.

**BIO 4001 - Special Assignments in Biological Sciences (1)**

Directed reading, independent study, or research, supervised laboratory or field work. The number of credit hours will be determined by the scope of the assignment. Prerequisite: Permission of Department Chair

Prerequisite: Permission of Department Chair.

**BIO 4002 - Special Assignments in Biological Sciences (2)**

Directed reading, independent study, or research, supervised laboratory or field work. The number of credit hours will be determined by the scope of the assignment. Prerequisite: Permission of Department Chair

Prerequisite: Permission of Department Chair.

**BIO 4003 - Special Assignments in Biological Sciences (3)**

Directed reading, independent study, or research, supervised laboratory or field work. The number of credit hours will be determined by the scope of the assignment. Prerequisite: Permission of Department Chair

Prerequisite: Permission of Department Chair.

**BIO 4004 - Special Assignments in Biological Sciences (4)**

Directed reading, independent study, or research, supervised laboratory or field work. The number of credit hours will be determined by the scope of the assignment. Prerequisite: Permission of Department Chair

Prerequisite: Permission of Department Chair.

## BME-Biomedical Engineering

**BME 2011 - Intro to BME Programming MATLAB (1)**

An introduction to numerical methods for solving engineering problems. Introduction to programming in MATLAB.

Prerequisite: None. Corequisite: None.

**BME 2012 - Intro to Biomedical Engineering (2)**

An introduction to various topics of biomedical engineering. Lecture focuses on the interrelationship between mathematics, natural sciences, and fundamental biomedical engineering principles.

Corequisite: Co-Req: CH104 or CH 155, MA134.

**BME 2013 - Introduction to Biomedical Engineering (3)**

An introduction to various topics of biomedical engineering. Lecture focuses on the interrelationship between mathematics, natural sciences, and fundamental biomedical engineering principles. Corequisite: CH 104 or CH 155H, and MA 134

Corequisite: CH 104 or CH 155H, and MA 134.

**BME 2401 - BME Design and Manufacturing Lab (1)**

Demonstrations of metal casting (sand casting, lost foam casting, investment casting), additive manufacturing, material removal processes (turning, milling, drilling, grinding), deformation processes, and welding processes. Application of these processes for the design and manufacturing of a relevant biomedical technology. Corequisite: BME 2402

Corequisite: BME 2402.

**BME 2402 - BME Design and Manufacturing (2)**

An examination of engineering materials and manufacturing processes for designing, developing, and manufacturing biomedical technologies. Corequisite: BME 2401

Corequisite: BME 2401.

**BME 3003 - Musculoskeletal Biomechanics (3)**

This course provides an introduction to fundamental approaches used to analyze human movement from a mechanical perspective, including forward and inverse dynamics, and also examines the properties of various musculoskeletal tissues (e.g. muscle, bone cartilage). Students study the basic principles of two-and-three-dimensional kinematics, kinetics, electromyography, and musculoskeletal structure and function. Students also apply these concepts to quantitative movement analysis, with an emphasis on the mechanics of typical and pathologic gait. This course relies on a blend of traditional instruction and experiential learning techniques. Prerequisites: ES 223 and "C" or better in BME 2013

Prerequisite: ES 223 and "C" or better in BME 2013.

**BME 3103 - Introduction to Biomaterials (3)**

Introduction to the study of both biological materials and synthetic materials (metals, ceramics and polymers) for medical applications. Topics include structural and physical properties; degradation; processing; bulk and surface properties; interaction between biological tissues and biomaterials; biocompatibility; ASTM Standards, and FDA. Prerequisites: ES 233 and "C" or better in BME 2013

Prerequisite: ES 233 and "C" or better in BME 2013.

**BME 3202 - Biomedical Engineering Laboratory Techniques (2)**

Introduction to basic laboratory techniques used in the development of human diagnostics and therapeutics. Prerequisites: CH 104 or CH 155H and ES 141 or BIO 114; Corequisite: BME 2013

Prerequisite: CH 104 or CH 155H and ES 141 or BIO 114. Corequisite: BME 2013.

**BME 3203 - BME Laboratory Techniques (3)**

Introduction to basic laboratory techniques used in the development of human diagnostics and therapeutics. Corequisites: BME 2011 and BME 2012

Corequisite: BME 2011 and BME 2012.

**BME 3212 - Biomedical Engineering Research Techniques (2)**

Integration of laboratory techniques and research processes as related to the biomedical engineering field. Prerequisites: BME 3202

Prerequisite: BME 3202.

**BME 3223 - Biostatistics and Probability (3)**

Basic principles and methods of statistics and probability with biomedical applications for data analysis using statistics software. Fundamentals in basic statistics and probability include hypothesis testing, sampling, distributions, regression and correlation analysis, analysis of variance, data analysis, and experimental design. Prerequisite: MA 213; Corequisite: BME 3212

Prerequisite: MA 213. Corequisite: BME 3212.

**BME 4003 - Advanced Topics in Biomechanics (3)**

A survey of advanced topics in biomechanics. Topics covered will include orthopedic biomechanics, soft tissue mechanics, injury mechanisms and rehabilitation. Prerequisites: BME 3003

Prerequisite: BME 3003.

**BME 4213 - Introduction to BioMEMS (3)**

This course introduces students to the multidisciplinary field of Biomedical Micro-Electro-Mechanical Systems (BioMEMS),

as applied to medicine and biology. It teaches the underlying physical and transport phenomena at the microscale, methods of microfabrication (including soft lithography, laser writing, micropatterning, wax printing, and 3D printing), and substrate materials for developing biomedical microdevices. The course will also highlight the application of BioMEMS in areas including, but not limited to, medical diagnostics, cell and tissue engineering, and cancer biology.

Corequisite: BME 4603.

### **BME 4303 - Biochemical Engineering (3)**

Microbiological and biochemical phenomena are treated from an engineering standpoint. Course topics include an overview of basic biological concepts along with the modern techniques of biotechnology. Mathematical models of enzyme and whole cell systems are derived and discussed. Commercial and laboratory reactors, as well as separation techniques, are studied.

Prerequisite: MA 233 (BME 4303 same as CHE 4073)

Prerequisite: MA 233. Crosslisted as: CHE 4073.

### **BME 4403 - Biomedical Engineering Measurements & Instrumentation I (3)**

Principles of design and analysis of electronic instrumentation for medical applications. Topics include frequency domain analysis, various electrodes and transducers for physiological measurement, and biopotential amplifiers. Prerequisite: PH 234 and ECE 213

Prerequisite: PH 234 and ECE 213. Corequisite: Lab Required.

### **BME 4413 - Biomedical Engineering Measurements & Instrumentation II (3)**

Continuation of principles of design and analysis of electronic instrumentation and measurement for medical applications. Topics include modalities for physiological measurement, biological signal acquisition and processing, medical imaging modalities and electrical safety. Prerequisite: BME 4403

Prerequisite: BME 4403. Corequisite: Lab Required.

### **BME 4503 - Tissue Engineering (3)**

Study of cell-cell and cell-matrix interactions in the context of the function of normal and pathological tissues. Applications may include cell trafficking, cellular delivery of drugs, and regeneration of tissues. Prerequisite: BME 3202

Prerequisite: BME 3202.

### **BME 4603 - Bio fluid Mechanics (3)**

Fundamentals of fluid mechanics as it relates to anatomy and physiology of the human body. Properties, characteristics, parameters, and governing equations of fluid flow in laminar and turbulent regimes. Detailed understanding of relationships involving the physiological modeling of biological flow. Prerequisite: ES 313, MA 233, and BIO 384

Prerequisite: ES 313, MA 233, and BIO 384.

### **BME 4613 - Biological Mass & Energy Transport (3)**

Fundamentals of heat and mass transport. Concepts of conduction, convection, thermal properties of materials, mass diffusion and compartmental modeling. Principles applied to physiological systems. Prerequisite: BME 4603

Prerequisite: BME 4603.

### **BME 4853 - Biomedical Engineering Design I (3)**

Introduction to design methodology and practice. Product specifications. Concept generation and selection. Product design. Design for manufacturing. Economics of product development. Prototyping. Introduction to topics of product regulations. Teams of students work on a design project in the area of biomechanical engineering. Design project work will continue in BME 4863. Prerequisite: BME 3103, BME 3212, BME 4403, and "C" or better in BME 4603

Prerequisite: BME 3103, BME 3212, BME 4403, and "C" or better in BME 4603.

**BME 4863 - Biomedical Engineering Design II (3)**

Conclusion of biomechanical engineering design project. Preparation of a formal written design report and oral presentation of the design. Course must be taken the semester immediately following BME 4853. Prerequisite: BME 4853 and MA 393

Prerequisite: BME 4853 and MA 393.

**BME 4901 - Special Topics in Biomedical Engineering (1)**

An elective course for biomedical engineering students to study special topics of interest. Prerequisites: Permission from the Department Chair

Prerequisite: Permission from Department Chair.

**BME 4902 - Special Topics in Biomedical Engineering (2)**

An elective course for biomedical engineering students to study special topics of interest. Prerequisites: Permission from the Department Chair

Prerequisite: Permission from Department Chair.

**BME 4903 - Special Topics in Biomedical Engineering (3)**

An elective course for biomedical engineering students to study special topics of interest. Prerequisites: Permission from the Department Chair

Prerequisite: Permission from Department Chair.

**BME 4904 - Special Topics in Biomedical Engineering (4)**

An elective course for biomedical engineering students to study special topics of interest. Prerequisites: Permission from the Department Chair

Prerequisite: Permission from Department Chair.

## CE-Civil Engineering

**CE 1021 - Computer Tools for Civil Engineering (1)**

This course is required for all freshmen civil engineering students. Its purpose is to introduce students to computer software that can assist them in engineering problem solving. Basic programming skills will also be introduced, allowing students to customize software to meet the unique needs of specific civil engineering problems. A wide variety of problem solving approaches will be highlighted throughout the class, including iteration, optimization, and database manipulation.

**CE 1023 - Engineering Math (3)**

This course is required for all freshman civil engineering students. It provides an overview of important mathematical concepts that will be used repeatedly in the civil engineering program and introduces computer software that can assist in the application of these concepts to solve engineering problems. Topics include algebraic manipulation of expressions, algebraic solution of equations and systems of equations, trigonometry and analytic geometry, differentiation with applications, and integrals with applications. Basic programming skills will also be introduced, allowing students to apply software to meet the unique needs of specific civil engineering problems.

**CE 2001 - Basic Surveying Laboratory (1)**

Field work component of the basic surveying course. Some of the field work will include the use of automatic and laser levels, total station instruments and data collectors, and basic GPS devices. Corequisite: CE 2003

Corequisite: CE 2003.

**CE 2003 - Basic Surveying (3)**

An introductory course in the theory and practice of basic land surveying. Course topics include measurements of angles, directions, and distances; traverse computations; simple vertical and horizontal curves; earthwork and GP. Corequisite: MA 134, CE 2001

Corequisite: MA 134, CE 2001.

**CE 3101 - Environmental Engineering Lab (1)**

Standard methods for analysis of water and wastewater; measurement of fundamental properties and characteristics of dissolved and particulate constituents in water; sampling techniques and preservation of samples; presentation and interpretation of analytical data. Corequisite: CE 3103

Corequisite: CE 3103.

**CE 3103 - Environmental Engineering (3)**

Environmental issues associated with air pollution, water quality, water treatment, wastewater treatment, solid & hazardous waste, and radioactive waste will be discussed and evaluated. Impacts to groundwater and surface water resources will also be examined. Regulations pertaining to each pollution scenario will be stressed, along with mass balances, environmental chemistry, and biological principles needed to accurately discuss environmental impacts. Prerequisite: CH 114; Corequisite: CE 3101

Prerequisite: CH 114. Corequisite: CE 3101.

**CE 3201 - Civil Engineering Materials Laboratory (1)**

Testing and evaluation of physical and mechanical properties of engineering materials such as steel, Portland cement, concrete, masonry, asphaltic concrete, and timber. Corequisite: CE 3203

Corequisite: CE 3203.

**CE 3203 - Civil Engineering Materials (3)**

Testing and evaluation of physical and mechanical properties of engineering materials. Origin, manufacture, and structural applications of metals, aggregates, bituminous materials (including superpave), portland cement, and concrete. Corequisite: CE 3201, ES 243

Corequisite: CE 3201, ES 243.

**CE 3301 - Hydraulic Engineering Lab (1)**

Flow measurement; energy losses in pipe networks; momentum of jet; Bernoulli's Equation; water surface profiles and controls; hydraulic jumps, specific energy in open channels. Corequisite: CE 3303

Corequisite: CE 3303.

**CE 3303 - Hydraulic Engineering (3)**

Fundamental principles and design of water and wastewater supply, storm water and sanitary sewer systems and their components, including pipes, pumps, storage facilities, detention basins, open-channels, and culverts. Prerequisite: Grade of "C" or better in ES 323; Corequisite: CE 3301

Prerequisite: Grade of "C" or better in ES 323. Corequisite: CE 3301.

**CE 3501 - Structural Analysis Laboratory (1)**

Classification of structures; Force and deflection analysis of statically determinate beams, frames, and trusses by classical

methods; Analysis of statically indeterminate beams and frames using the moment distribution method; Computer modeling and analysis of structures; Load effects, tributary loads, load paths, and ASCE load combinations; Construction of reaction force, shear and moment envelopes using influence diagrams. Prerequisite: Grade of "C" or better in ES 243; Corequisite: CE 3503

Prerequisite: Grade of "C" or better in ES 243. Corequisite: CE 3503.

### **CE 3503 - Structural Analysis I (3)**

Classification of structures; Force and deflection analysis of statically determinate beams, frames, and trusses by classical methods; Analysis of statically indeterminate beams and frames using the moment distribution method; Computer modeling and analysis of structures; Load effects, tributary loads, load paths, and ASCE load combinations; Construction of reaction force, shear and moment envelopes using influence diagrams. Prerequisite: Grade of "C" or better in ES 243; Corequisite: CE 3501

Prerequisite: Grade of "C" or better in ES 243. Corequisite: CE 3501.

### **CE 3521 - Structural Design Laboratory (1)**

Introduction analysis and design of reinforced concrete, structural steel, and timber members subjected to tension, compression, and flexural loads. Application codes and specifications. Prerequisite: CE 3503; Corequisite: CE 3523

Prerequisite: CE 3503. Corequisite: CE 3523.

### **CE 3523 - Structural Design I (3)**

Introduction analysis and design of reinforced concrete, structural steel, and timber members subjected to tension, compression, and flexural loads. Application codes and specifications. Prerequisite: CE 3503; Corequisite: CE 3521

Prerequisite: CE 3503. Corequisite: CE 3521.

### **CE 3603 - Transportation Engineering (3)**

An introduction to the basic design, operation, control, and planning of highway transportation. Topics include an overview of project phases and the history of transportation as well as the fundamentals of traffic operations, user characteristics, capacity, and level of service, geometrics, traffic signal timing, and transportation planning. An introduction to basic concepts and terminology for air, rail, and freight engineering will be covered.

### **CE 3701 - Soil Mechanics Laboratory (1)**

Students typically perform the following laboratory tests: Atterberg Limits, sieve and hydrometer analyses, Proctor compaction, hydraulic conductivity, 1-D consolidation, direct shear, and unconfined compression. In-situ sampling and visual classification of soils will also be performed. Corequisite: CE 3703

Corequisite: CE 3703.

### **CE 3703 - Soil Mechanics (3)**

The course serves as an introduction to geotechnical engineering and provides an overview of the fundamental properties and behavior of soils. Topics to be presented include index properties, soil classification, phase relationships, compaction, subsurface exploration, seepage, shear strength bearing capacity, and consolidation. Prerequisite: ES 243; Corequisite: CE 3701

Prerequisite: ES 243. Corequisite: CE 3701.

### **CE 3803 - Geology for Engineers (3)**

An introduction to the field of geology. Study of minerals and rocks and their formation, as well as geologic structure. Other topics will include soils, running water, and groundwater. Plate tectonics, glaciers, volcanoes, erosion, weathering, and geologic hazards are also covered. The impact of geology on engineering projects will also be discussed.

**CE 3903 - Introduction to Site Development (3)**

The purpose of this course is to provide students with an overview of the site development process, integrating multiple disciplines of civil engineering including water resources, transportation, environmental and construction. The course will also introduce students to the process of considering how regulatory, economical, and environmental factors effect site development. Corequisite: At least 4 of the 7 junior level CE courses: CE 3103, CE 3203, CE 3303, CE 3503, CE 3603, CE 3703 or CE 3523

Corequisite: At least 4 of the 7 junior level CE courses: CE 3103, CE 3203, CE 3303, CE 3503, CE 3603, CE 3703 or CE 3523.

**CE 4103 - Pollution Control Technologies (3)**

Pollution control technologies will be investigated assessed, and designed for a wide variety of environmental applications, including air pollution control, solid and hazardous waste, alternative water and wastewater treatment. Contaminant fate (where does the pollutant go?) and transport (how does the pollutant get there?) will also be evaluated from the smokestack for gaseous contaminants and from leaking facilities for solid and hazardous wastes. Prerequisite: CE 3103

Prerequisite: CE 3103.

**CE 4113 - Environmental Remediation (3)**

Contaminated soil, sediment, and groundwater may represent significant health risks to people and the natural environment. Risk assessment will be used to assess these scenarios, incorporating site characterization data, contaminant fate (where does the pollution go?), contaminant transport (how does the pollutant get there?) and local hydrological data. Environmental remediation technologies appropriate for organic and inorganic contaminants will then be investigated, assessed, and designed for a wide variety of site conditions. Prerequisite: CE 3103

Prerequisite: CE 3103.

**CE 4123 - Water & Wastewater Treatment (3)**

Water treatment protects human health, while wastewater treatment protects human and environmental health. Both conventional water and wastewater treatment plants utilize similar unit operations and processes, where water treatment focuses on applied physics and chemistry and wastewater treatment relies upon physics and microbiology. Process fundamentals and unit operation design are the focus of this upper level course. Prerequisite: CE 3103

Prerequisite: CE 3103.

**CE 4303 - Open Channel Hydraulics (3)**

Advanced topics in open-channel hydraulics, including design of hydraulic structures, uniform flow, rigid and loose boundary channel design, gradually varied flow, unsteady flow, and flood routing techniques. Prerequisite: CE 3303

Prerequisite: CE 3303.

**CE 4323 - Engineering Hydrology (3)**

Fundamental processes in the hydrologic cycle including precipitation, infiltration, evapotranspiration, and runoff. Quantitative approaches for engineering hydrology to estimate flows for a variety of design problems, including routing through detention basins and river reaches. Prerequisite: CE 3303

Prerequisite: CE 3303.

**CE 4333 - Design of Water Distribution Systems & Sewers (3)**

Theory of pipe networks with application to the analysis and design of municipal water distribution systems, infiltration and inflow. Wastewater flows and design of storm, sanitary and combined sewers. Prerequisite: CE 3303

Prerequisite: CE 3303.



**CE 4503 - Structural Analysis II (3)**

In this course, matrix based computer methods are employed to analyze both determinate and indeterminate structures, and an introduction to the finite element method is presented. Also, fundamental concepts in structural dynamics, including the free and forced response of single degree of freedom systems, are introduced. Prerequisite: Grade of "C" or better in CE 3503

Prerequisite: Grade of "C" or better in CE 3503.

**CE 4523 - Structural Design II (3)**

Analysis and design of structural steel and reinforced concrete connections. Design of reinforced concrete foundations. Introduction to pre-stressed concrete design. Application of codes and specifications. Prerequisite: Grade of "C" or better in CE 3523

Prerequisite: Grade of "C" or better in CE 3523.

**CE 4553 - Timber Design (3)**

Analysis, proportioning, and connection of structural members in timber. Lateral wind force resisting systems in timber structures. Specifications and codes. Prerequisite: CE 3503

Prerequisite: CE 3503.

**CE 4563 - Bridge Engineering (3)**

Application of CE 3513 and CE 3533 to the design of bridges. AASHTO load specifications. Design of single span bridges and continuous beam bridges. Prerequisites: CE 3523 or permission of the instructor

Prerequisite: CE 3523 or permission of the instructor.

**CE 4603 - Highway Geometric Design (3)**

Basic principles and techniques of geometric design of highways and streets. Safety and comfort for road users with due regard to social, economic and environmental constraints. Dimensions and layout of visible highway features such as alignment, sight distance and intersection. Applications of national design standards and controls criteria. Prerequisite: CE 3603

Prerequisite: CE 3603.

**CE 4613 - Construction Methods & Equipment (3)**

Fundamental operations in construction and equipment selection. Building construction methods will include concrete, wood, steel, and masonry. Planning, scheduling, construction economics, and safety topics will comprise the construction management topics. Prerequisite: CE 3203

Prerequisite: CE 3203.

**CE 4703 - Topics In Geotechnical Engineering (3)**

Special topics frequently encountered in geotechnical practice. Topics may include soil and site improvement using deep dynamic compaction, vibroflotation, wick drains and geosynthetics; slope stability analyses; retaining wall design and geo-environmental concerns, such as environmental site assessments and waste liner/cover systems. Other topics may include special concerns in engineering geology. Prerequisite: CE 3703

Prerequisite: CE 3703.

**CE 4713 - Foundation Engineering (3)**

Evaluation of subsurface conditions in order to select appropriate foundations for structures. Topics include evaluation of bearing capacity and settlement of soils due to foundations, the design of driven piles, auger-cast piles, drilled shafts, and the design of immediate foundations such as pin piles and geopiers. The design of cantilever and MSE retaining walls is also

included. Prerequisite: CE 3703

Prerequisite: CE 3703.

### **CE 4723 - Pavement Design (3)**

Design of flexible and rigid highway and airport pavements. Topics include traffic quantity estimates, subgrade testing and properties, pavement materials testing and properties, AASHTO, Asphalt Institute, and PCA design methods, reinforced sub-base design, permeable pavement design, and rigid and flexible overlays. Corequisite: CE 3203, CE 3703

Corequisite: CE 3203, CE 3703.

### **CE 4901 - Special Problems in Civil Engineering (1)**

To be offered to students who have demonstrated superior ability. Course content to be arranged for the individual student according to his/her interest and aptitudes. Library research or independent study may be included. Prerequisites: Senior standing and permission of Department Chair

Prerequisite: Senior standing and permission of Department Chair.

### **CE 4902 - Special Problems in Civil Engineering (2)**

To be offered to students who have demonstrated superior ability. Course content to be arranged for the individual student according to his/her interest and aptitudes. Library research or independent study may be included. Prerequisites: Senior standing and permission of Department Chair

Prerequisite: Senior standing and permission of Department Chair.

### **CE 4903 - Special Problems in Civil Engineering (3)**

To be offered to students who have demonstrated superior ability. Course content to be arranged for the individual student according to his/her interest and aptitudes. Library research or independent study may be included. Prerequisites: Senior standing and permission of Department Chair

Prerequisite: Senior standing and permission of Department Chair.

### **CE 4904 - Special Problems in Civil Engineering (4)**

To be offered to students who have demonstrated superior ability. Course content to be arranged for the individual student according to his/her interest and aptitudes. Library research or independent study may be included. Prerequisites: Senior standing and permission of Department Chair

Prerequisite: Senior standing and permission of Department Chair.

### **CE 4911 - Civil & Environmental Engineering Design Workshop (1)**

The culminating capstone design experience for Civil Engineering majors showcases program outcomes. Students work as a team utilizing project management strategies to investigate, examine, and formulate design solutions for a civil or environmental engineering problem. Designs incorporate acquired classroom knowledge, out-of-class learning, and sustainability concepts to simulate a "real world" design experience. The first semester of this two semester course focuses on project selection and planning, data acquisition, and out of class learning. Prerequisites: At least 4 of the 7 junior level CE courses, CE 3103, CE 3203, CE 3303, CE 3503, CE 3603, CE 3703, or CE 3523

Prerequisite: At least 4 of the 7 junior level CE courses, CE 3103, CE 3203, CE 3303, CE 3503, CE 3603, CE 3703, or CE 3523 .

### **CE 4912 - Civil & Environmental Engineering Design Seminar (2)**

Design and decision-making by practicing civil engineers must incorporate a wide variety of external constraints, including sustainability, engineering ethics, public policy, and impact on the global society. This course prepares students so they can

investigate, evaluate, and incorporate each of these types of external constraints for civil and environmental engineering projects. Prerequisite: At least 4 of the 7 junior level CE courses, CE 3103, CE 3203, CE 3303, CE 3503, CE 3603, CE 3703, or CE 3523

Prerequisite: At least 4 of the 7 junior level CE courses, CE 3103, CE 3203, CE 3303, CE 3503, CE 3603, CE 3703, or CE 3523 .

### **CE 4913 - Civil & Environmental Engineering Design (3)**

The culminating capstone design experience for Civil Engineering majors showcases program outcomes. Students work as a team utilizing project management strategies to investigate, examine, and formulate design solutions for a civil or environmental engineering problem. Designs incorporate acquired classroom knowledge, out-of-class learning, and sustainability concepts to simulate a "real world" design experience. A written report and a formal group presentation must effectively communicate design solutions to stakeholders and engineering professionals. Prerequisite: CE 4911 (Must be taken in the term immediately prior to taking 4913)

Prerequisite: CE 4911 (Must be taken in the term immediately prior to taking 4913).

## **CH-Chemistry**

### **CH 101 - General Chemistry I Laboratory (1)**

Fundamentals of chemistry with emphasis on atomic structure, stoichiometry, thermochemistry, properties of solution, properties of matter. The laboratory is quantitative in nature.

### **CH 103 - General Chemistry I (no lab) (3)**

Fundamentals of chemistry with emphasis on atomic structure, stoichiometry, thermochemistry, properties of solutions, properties of matter. Non-laboratory science. Prerequisite: MA 113

Prerequisite: MA 113.

### **CH 104 - General Chemistry I (4)**

Fundamentals of chemistry with emphasis on atomic structure, stoichiometry, thermochemistry, properties of solution, properties of matter. The laboratory is quantitative in nature. Prerequisite: MA 113

Prerequisite: MA 113. Corequisite: Lab Required.

### **CH 114 - General Chemistry II (4)**

A continuation of CH 104. Emphasis is on chemical equilibria, thermodynamics, kinetics, acid-base reactions, electrochemistry, and properties of solutions. Includes laboratory time. Prerequisite: A 'C' or better in CH 104

Prerequisite: A 'C' or better in CH 104. Corequisite: Lab Required.

### **CH 144 - Chemistry - Ideas & Applications (4)**

An integrated view of organic and biological chemistry for non-science majors, emphasizing the importance of chemistry to daily living and chemical principles related to everyday experiences. Simulated chemical problems in the laboratory. This course cannot be substituted for CH 104 or CH 114 for either science or engineering majors.

Prerequisite: None. Corequisite: Lab Required.

### **CH 155H - Advanced Honors General Chemistry (5)**

An accelerated class that will focus on topics traditionally taught in a two semester general chemistry sequence. Topics include, but are not limited to, atomic structure, stoichiometry, gas laws, solution chemistry, thermochemistry, kinetics, chemical equilibria, acid-base reactions, and electrochemistry. Prerequisite: MA 113, high school chemistry, SAT OF 1120/ACT 27,

high school GPA of 3.75

Prerequisite: MA 113, high school chemistry, SAT OF 1120/ACT 27, high school GPA of 3.75. Corequisite: Lab Required.

### **CH 202 - Introduction to Chemical Literature and Communication (2)**

A course focusing on the nature and use of biological literature and the communication of scientific knowledge. The student will gain experience in searching literature, properly citing and referencing sources, and writing a documented research paper. Oral Communication of their work will also be a component of this course. Prerequisite: CH 114 or CH 155H

Prerequisite: CH 114 or CH 155H.

### **CH 204 - Organic Chemistry I (4)**

A study of the methods of preparation, structure, and characteristic reactions of the more important type of aliphatic compounds, including industrial uses and methods of synthesis. This course also contains a laboratory portion where synthesis and experiments illustrative of the methods used in working with organic compounds are performed. Students must successfully complete both the lab and lecture portions to pass the course. Prerequisite: CH 114 or CH 155H

Prerequisite: CH 114 or CH 155H. Corequisite: Lab Required.

### **CH 214 - Organic Chemistry II (4)**

A continuation of CH 204 with a study in a similar manner of aromatic compounds. This course also contains a laboratory portion illustrating the synthesis and reaction of aromatic compounds. Students must successfully complete both the lab and lecture portions to pass the course. Prerequisite: 'C' or better in CH 204

Prerequisite: 'C' or better in CH 204. Corequisite: Lab Required.

### **CH 234 - Quantitative Chemical Analysis (4)**

A quantitative treatment of analytical chemistry with a focus on the approach to solving problems. Topics of discussion include: the recognition and evaluation of error, critical and statistical analysis of data, further studies of equilibrium (acid/base, buffers, solubility and electrochemistry), and the principles of chemical separation and spectroscopy. The laboratory portion reinforces material learned in the classroom by providing practical experience in the areas of volumetric, gravimetric, spectrophotometric, and chromatographic processes. Prerequisite: CH 114 or CH 155H

Prerequisite: CH 114 or CH 155H. Corequisite: Lab Required.

### **CH 302 - Professional Practice Science (2)**

This course will provide students with the professional tools necessary to be successful in the fields of biology, chemistry, biochemistry, and forensic science. The course will help students construct an application packet (curriculum vitae and statement of purpose), give them experience researching relevant literature and presenting information in a professional setting, and learn about different areas of specialization of the faculty within the Department of Science. Prerequisite: CH 202; Junior Standing or Permission of the Chair

Prerequisite: CH 202; Junior Standing or Permission of the Chair.

### **CH 324 - Chemical Instrumental Analysis (4)**

This course focuses on the principles and applications of modern instrumental methods of analysis. Topics include spectroscopy, chromatography, and mass spectrometric methods of analysis. Selected topics in the area of electrochemical, thermal and surface analytical techniques may also be explored. In the laboratory, students will gain practical hands-on instrumental experience reinforcing the concepts covered in the lecture. Prerequisite: CH 204, CH 234

Prerequisite: CH 204, CH 234. Corequisite: Lab Required.

### **CH 332 - Medicinal Chemistry (2)**

Fundamentals of medicinal chemistry with emphasis on types and classifications of drugs, drug discovery process, structure activity relationships (SAR) case studies, effects of acidic and basic media on drug structure, sites of drug administration and interactions, drug metabolism pathways and mechanisms, and the process in which a drug becomes FDA approved.

Prerequisite: CH 204

Prerequisite: CH 204.

### **CH 344 - Inorganic Chemistry (4)**

Structure and bonding in main group and transition metal coordination compounds with an accompanying discussion of the electronic structure of the d-orbitals, group theory, and descriptive chemistry of the elements. The laboratory portion includes experiments examining the nature of bonding in transition metal complexes, the spectrochemical series, spectroscopic properties of coordination compounds, ligating ability of ligands, acid/base models, and catalysis. Prerequisite: CH 204

Prerequisite: CH 204. Corequisite: Lab Required.

### **CH 354 - Physical Chemistry I (4)**

An in-depth study in real gases, thermodynamics, kinetics, chemical and physical equilibrium, and electrochemistry. Laboratory contains experiments in these areas. Prerequisites: CH 114 or CH 155H, MA 213, PH 224

Prerequisite: CH 114 or CH 155H, MA 213, PH 224. Corequisite: Lab Required.

### **CH 364 - Toxicology (4)**

The methods and design of both acute and chronic toxicity tests will be surveyed. Probits of percent mortality versus log dose and other appropriate statistical methods of toxin analysis are applied to laboratory data. Emphasis will be given to mechanisms of action and metabolic detoxification and elimination. Federal regulations involving manufacture use categories and proper disposal are reviewed. (SAME AS BIO 364) Prerequisites: BIO 114 or ES 141; CH 114 or CH 155H; CH 204 and BIO/CH 434 Recommended

Prerequisite: BIO 114 or ES 141; CH 114 or CH 155H; CH 204 and CH 434 Recommended. Corequisite: Lab Required.  
Crosslisted as: BIO 364.

### **CH 374 - Physical Chemistry II (4)**

Fundamentals of quantum theory of atoms and molecules, and spectroscopy. Laboratory contains experiments in these areas.

Prerequisite: CH 354

Prerequisite: CH 354. Corequisite: Lab Required.

### **CH 434 - Biochemistry I (4)**

The chemical and physical behavior of biologically important compounds such as carbohydrates, lipids, proteins, nucleic acids, and enzymes are discussed. The various metabolic pathways are discussed in light of their organic mechanisms. (Same as BIO 434) Prerequisites: BIO 114 or ES 141; CH 204

Prerequisite: BIO 114 or ES 141; CH 204. Corequisite: Lab Required. Crosslisted as: BIO 434.

### **CH 444 - Biochemistry II (4)**

A second semester in Biochemistry would include topics in biosynthesis of the following: amino acids; purines and pyrimidines; proteins; nucleic acids. Topics in nitrogen metabolism and control of protein synthesis would also be discussed. Laboratories would supplement the lecture material. Prerequisites: BIO 434 or CH 434 (Same as BIO 444)

Prerequisite: BIO 434 or CH 434. Corequisite: Lab Required. Crosslisted as: BIO 444.

**CH 474 - Forensic Chemistry (4)**

The course includes a discussion of the analytical, quantitative and qualitative chemical procedures required for preparation of circumstantial evidence from laboratory analysis for prosecution of court cases. Statistical methods, particularly proper sampling, data handling, and quality control procedures are discussed. Quality assurance (QA), quality control (QC), and total quality management (TQM) are explored in some detail. Laboratory procedures will include wet chemistry and spot testing as well as use of thin layer chromatography, gas chromatography with mass spectrometry and nitrogen/phosphorous detectors, FT-infrared (ATR) and Raman spectroscopy, polarizing microscopy, and other instrumental techniques. The instruments are used by the students to analyze materials typical of the case load of forensic laboratories: drug surrogates, accelerants, colorants and pigments, inks and paints, and polymers, fibers and plant materials. Prerequisite: CH 204 and CH 234

Prerequisite: CH 204 and CH 234. Corequisite: Lab Required.

**CH 4001 - Special Assignments in Chemistry (1)**

Directed readings, independent study, or research. Prerequisite: Permission of the Department Chair

Prerequisite: Permission of the Department Chair.

**CH 4002 - Special Assignments in Chemistry (2)**

Directed readings, independent study, or research. Prerequisite: Permission of the Department Chair

Prerequisite: Permission of the Department Chair.

**CH 4003 - Special Assignments in Chemistry (2)**

Directed readings, independent study, or research. Prerequisite: Permission of the Department Chair

Prerequisite: Permission of the Department Chair.

**CH 4004 - Special Assignments in Chemistry (4)**

Directed readings, independent study, or research. Prerequisite: Permission of the Department Chair

Prerequisite: Permission of the Department Chair.

**CH 4005 - Special Assignments in Chemistry (5)**

Directed readings, independent study, or research. Prerequisite: Permission of the Department Chair

Prerequisite: Permission of the Department Chair.

**CH 4006 - Special Assignments in Chemistry (4)**

Directed readings, independent study, or research. Prerequisite: Permission of the Department Chair

Prerequisite: Permission of the Department Chair.

**CH 1003 - Fundamentals of Chemistry (3)**

This is for students who intend to take CH 104, but have not met the math requirement (MA 113 or ACT/SAT scores high enough to place in a higher math course), had difficulties with high school chemistry, or have no high school chemistry background. Solving mathematical problems as well as developing learning and study habits is emphasized. The fundamentals of chemistry will be highlighted, including scientific measurements, atomic structure and properties, identifying and naming compounds (ionic vs covalent), and reaction stoichiometry.

## CHE-Chemical Engineering

### **CHE 122 - Introduction to Chemical & Biological Engineering (2)**

An introduction to the field of Chemical Engineering & Biological Engineering. The tools of Chemical Engineering are introduced including mobile computational devices and Computer applications. Chemical production facilities will be included. Basic Biological Principles are reviewed including - The monomers and polymers of biological substances as well as cell structure and function will be introduced. The Central Dogma of biology will be introduced and explained. Prerequisite: GE 101

Prerequisite: GE 101.

### **CHE 203 - Material Balances (3)**

This course is an introduction to the practice of chemical engineering. Fundamental principles are applied to chemical engineering problems involving conservation of mass. Stoichiometry is also reviewed. Process flow diagrams and piping and instrumentation diagrams will be presented. Prerequisite: C or better in both CH 104 and CH 114 or CH 155H; Corequisite: PH 224

Prerequisite: C or better in both CH 104 and CH 114 or CH 155H; Corequisite: PH 224. Corequisite: PH 224.

### **CHE 212 - Energy Balances (2)**

This course is a continuation of CHE 203 with an emphasis on problems involving the conservation of mass and energy. Prerequisite: C or better in CHE 203; Corequisite: CHE 222

Prerequisite: C or better in CHE 203; Corequisite: CHE 222. Corequisite: CHE 222.

### **CHE 222 - Sustainability & Process Measurement Laboratory (2)**

This laboratory introduces students to the process of writing laboratory reports. The laboratory includes the measurement of process variable and the reinforcement of fundamental concepts related to conservation principles. Statistical analysis of data is included. Safety and sustainability is also covered. Corequisite: CHE 212; Prerequisite: CHE 252

Prerequisite: CHE 252. Corequisite: CHE 212.

### **CHE 252 - Introduction to Statistical & Computational Methods in Chemical Engineering (2)**

Spreadsheets and mathematical worksheets, both computer and mobile application based, will be used extensively for the calculation and analysis of chemical processes. Statistics will be introduced in the context of chemical process and product analysis. Corequisite: CHE 203

Corequisite: CHE 203.

### **CHE 303 - Chemical Engineering Fluid Dynamics (3)**

Fluid mechanics applied to chemical processes will be introduced. Topics include fluid statics, rheological properties of fluids, laminar and turbulent flow in compressible and incompressible systems. Transfer equipment will also be introduced as well as the concept of net positive suction head. Fluid transport system design will be included. Prerequisite: C or better in both CHE 203 and CHE 212

Prerequisite: C or better in both CHE 203 and CHE 212.

### **CHE 313 - Chemical Engineering Thermodynamics I (3)**

This course will review the laws of thermodynamics and introduce students to thermodynamic cycles and systems. Equations of state for single component systems are introduced. Estimation of physical and thermodynamic properties will be covered.

Prerequisite: MA 213 and a C or better in CHE 212

Prerequisite: MA 213 and a C or better in CHE 212.

### **CHE 333 - Unit Operations Laboratory (3)**

A laboratory course to study both heat transfer and fluid flow. Identification prevention and mitigation of laboratory and industrial hazards will be covered. Statistics and technical writing are required. Prerequisite: ENG 133, CHE 222, CHE 303, and CHE 373

Prerequisite: ENG 133, CHE 222, CHE 303, and CHE 373.

### **CHE 372 - Chemical Engineering Thermodynamics II (2)**

Phase and Chemical Reaction equilibrium will be covered in this course. Emphasis is placed on multi-component non-ideal systems. Prerequisite: CHE 313

Prerequisite: CHE 313.

### **CHE 373 - Chemical Engineering Heat Transfer (3)**

Heat transfer will be studied and applied to chemical processes. Heat transfer coefficient prediction with and without phase change will be included. Commercially available heat transfer equipment will be studied. Radiation heat transfer, evaporation as well as unsteady state heat transfer will be studied. A design project involving heat transfer equipment will be included in this class. Prerequisite: C or better in both CHE 203 and CHE 212

Prerequisite: C or better in both CHE 203 and CHE 212.

### **CHE 383 - Mass Transfer (3)**

This course will study the phenomena of mass transfer as it relates to chemical separation processes. Diffusion coefficients and mass transfer coefficients will be introduced and estimated. Rate based separation calculations will be studied. Applications include absorption and cooling water towers. Prerequisite: CHE 373 and CHE 313

Prerequisite: CHE 373 and CHE 313.

### **CHE 393 - Stagewise Separations (3)**

The design and characterization of stage-wise and continuous separation processes are covered in this course. Both graphical and rigorous numerical techniques are used. Applications include distillation, absorption, stripping and liquid-liquid extraction. Corequisite: CHE 372

Corequisite: CHE 372.

### **CHE 412 - Applied Numerical Methods (2)**

Advanced engineering mathematics will be introduced. Numerical techniques will be discussed and applied to chemical engineering problems. Prerequisite: CHE 453

Prerequisite: CHE 453.

### **CHE 433 - Unit Operations Laboratory II (3)**

This is a laboratory course devoted to the study of mass transfer and chemical reaction kinetics. Statistical techniques will be integrating into these experiments along with statistical design of experiments. Prerequisite: CHE 333 and CHE 393

Prerequisite: CHE 333 and CHE 393.

### **CHE 453 - Chemical Engineering Kinetics (3)**

A study of chemical reaction processes with applications to equipment design. Prerequisites: CHE 383, CHE 393, MA 233

Prerequisite: CHE 383, CHE 393, MA 233.



### **CHE 463 - Chemical Process Dynamics & Control (3)**

An introduction to process dynamics and the application of control systems. Prerequisite: MA 233

Prerequisite: MA 233. Corequisite: Lab Required.

### **CHE 473 - Chemical Process Design I (3)**

Starting with the big picture students add greater detail in a top down, evolutionary and generally circular feedback design process. Design heuristics, cost estimation, simulation, safety, and economic analysis are covered as well as project optimization, documentation, reporting and presentation. Prerequisite: CHE 372, CHE 383 and CHE 393

Prerequisite: CHE 372, CHE 383 and CHE 393.

### **CHE 483 - Chemical Process Design II (3)**

Capstone design experience unifying the principles of previous coursework. Comprehensive projects that incorporate appropriate engineering standards and multiple realistic constraints. Prerequisites: CHE 453, CHE 473, and ES 382

Prerequisite: CHE 453, CHE 473, and ES 382.

### **CHE 4001 - Special Problems in Chemical Engineering (1)**

Course content arranged according to the student's abilities and with the permission of the Chair of the department. No student may pursue this course off campus during his or her last semester prior to graduation.

### **CHE 4002 - Special Problems in Chemical Engineering (2)**

Course content arranged according to the student's abilities and with the permission of the Chair of the department. No student may pursue this course off campus during his or her last semester prior to graduation.

### **CHE 4003 - Special Problems in Chemical Engineering (3)**

Course content arranged according to the student's abilities and with the permission of the Chair of the department. No student may pursue this course off campus during his or her last semester prior to graduation.

### **CHE 4004 - Special Problems in Chemical Engineering (4)**

Course content arranged according to the student's abilities and with the permission of the Chair of the Department. No student may pursue this course off campus during his or her last semester prior to graduation.

### **CHE 4073 - Biochemical Engineering (3)**

Microbiological and biochemical phenomena are treated from an engineering standpoint. Course topics include an overview of basic biological concepts along with the modern techniques of biotechnology. Mathematical models of enzyme and whole cell systems are derived and discussed. Commercial and laboratory reactors, as well as separation techniques, are studied.

Prerequisite: CHE 222 or BME 3202 (CHE 4073 same as BME 4303)

Prerequisite: CHE 222 or BME 3202. Crosslisted as: BME 4303.

### **CHE 4083 - Plant Management (3)**

A comprehensive overview of the factors and issues which must be considered for the successful management and operation of a chemical plant. Typical areas addressed include process evaluation and optimization, maintenance operations and planning, environmental pollution control and hazardous waste management, manufacturing economics, plant safety, labor relations, community relations, and regulatory compliance. Prerequisite: Junior standing

Prerequisite: Junior standing.

**CHE 4173 - Bio-Separation Processes (3)**

This course will examine the fundamentals of separation processes used to isolate and purify biochemical products such as whole cells, enzymes, food additives, and pharmaceuticals. Topics to be discussed include cell disruption, centrifugation, filtration, membrane separations, extraction, and chromatographic separation processes. The laboratory portion of the course will include experiments covering the above topics. Prerequisites: CHE 303 or BME 4603

Prerequisite: CHE 303 or BME 4603.

**CHE 4193 - High Polymer Processes (3)**

The chemical and engineering aspects of high-polymers, structure, property, and relationships. Physical methods of characterizing high polymers, basic chemistry and kinetics of polymerization reactions, industrial polymerization processes. Compounding and processing of plastics and elastomers, molding, extrusion, and other polymer-manipulation techniques. Prerequisites: CH 204

Prerequisite: CH 204.

**CHE 4273 - Pharmaceutical Processes (3)**

The objective of this course is to provide students with an overview of the pharmaceutical process industry from an engineering standpoint. Special emphasis will be given to biologically derived pharmaceuticals. Topics in the course include the drug discovery, drug development, and drug manufacturing processes, including cGMP. The course also covers fermentation selection, operation and control, and unit operations associated with recovery and purification. The course concludes with finished product preparation and packaging. The laboratory time will be used to tour pharmaceutical production facilities. Prerequisites: CHE 303 or BME 4603

Prerequisite: CHE 303 or BME 4603.

**CHN-Chinese****CHN 113 - Chinese I (no-native speakers) (3)**

An introduction to the Mandarin Chinese language and Chinese culture. Pronunciation, alphabet, and basic grammar skills are emphasized. No previous study of Chinese is required.

**CHN 123 - Chinese II (3)**

An advanced introduction to Mandarin Chinese language and Chinese culture. Pronunciation, alphabet, and basic grammar skills are emphasized. Prerequisite: CHN 113 or by placement

Prerequisite: CHN 113 or by placement.

**CO-Cooperative Education****CO 050 - Co-Op Employment (0)**

For cooperative education (Co-op) students only. Co-op employment in a professional environment with emphasis on training oriented to students who are majoring in an engineering, environmental science, or computer science program. Co-op students must pre-register for this course before each semester's work assignment. The final cooperative education (Co-op) work assignment must be within the calendar year prior to graduation. While enrolled in this course, a student is considered a full-time Trine University student. Prerequisite: Sophomore standing with a minimum GPA of 2.4

Prerequisite: Sophomore standing with a minimum GPA of 2.4.

**CO 451 - Co-Op Work Experience (1)**

To obtain cooperative education endorsement on the degree, the student must register for this course. While enrolled in this

course, the student must complete a formal report on his/her co-op work experience. The report must be completed by the eighth week of the semester. Prerequisites: Three semesters of CO 050

Prerequisite: Three semesters of CO 050 .

### **CO 452 - Co-Op Work Experience (2)**

To obtain cooperative education endorsement on the degree, the student must register for this course. While enrolled in this course, the student must complete a formal report on his/her co-op work experience. The report must be completed by the eighth week of the semester. Prerequisites: Three semesters of CO 050

Prerequisite: Three semesters of CO 050 .

### **CO 453 - Co-Op Work Experience (3)**

To obtain cooperative education endorsement on the degree, the student must register for this course. While enrolled in this course, the student must complete a formal report on his/her co-op work experience. The report must be completed by the eighth week of the semester. Prerequisites: Three semesters of CO 050

Prerequisite: Three semesters of CO 050.

## **COM-Communication**

### **COM 111 - Practices & Professions (1)**

This course introduces students to the Communication field with hands on experience in a variety of communicative modes (for example, video, broadcast, marketing, web content, etc.). The course often partners closely with Trine University Offices to provide students with real world, practical experience.

Prerequisite: None. Corequisite: None. Crosslisted as: none.

### **COM 123 - History of the Media (3)**

An examination of the history of the media stressing the nature, controls under which they operate, economic and political foundations, social implications, and its future roles.

### **COM 153 - Principles of Public Relations (3)**

Students will examine the history, nature, and types of public relations. Students will gain an understanding in the importance of research, planning, executing, and evaluating a multitude of PR affordances and constraints based on client needs and abilities. This course will also allow students to create, analyze, and evaluate different genres of PR writing across multiple media outlets.

Prerequisite: None. Corequisite: None.

### **COM 163 - Interpersonal Communication (3)**

Students in this course will apply communication concepts and principles to interpersonal communication. Students will use communication exercises, role playing, and case studies throughout this course. Students will analyze communication dynamics and improve communication skills through language, nonverbal communication, listening, perception of self and others, relationship development, and assertiveness.

### **COM 183 - Writing For The Media (3)**

Introduction to writing for the media (print, broadcast, online). Course examines Associated Press (AP) style, as well as techniques for newsgathering, writing headlines, the inverted pyramid structure, and other forms of media communication.

Prerequisite: ENG 143

Prerequisite: ENG 143.

**COM 203 - Media & Society (3)**

A systematic approach to mass media in terms of structure, functions and effects; includes such topics as meaning, perception, selectivity, ethics persuasion, subliminal seduction, violence and erotica, political socialization, learning, agenda-setting, and uses and gratifications. Prerequisite: ENG 143 or ENG 133

Prerequisite: ENG 143 or ENG 133.

**COM 213 - Business Communication (3)**

This course provides students with an introduction to effective research, writing, and document design in relation to business and professional communication. Students will be expected to develop a basic understanding of business communication norms and the different genres of composition found in a workplace setting. Students will employ multiple modes of communication to best fit their intended audience. Prerequisite: C or better in ENG 143.

Prerequisite: C or better in ENG 143. Corequisite: None. Crosslisted as: None.

**COM 233 - Intercultural Communication (3)**

Considers interrelationships between communication and culture, the diversity between and within cultures, and both the challenges and rewards of intercultural communication practice. Topics include cultural patterns, worldview and perception, cultural identity, verbal and nonverbal communication, listening, family and relationships, and business.

**COM 243 - Digital Media Creation (3)**

Students examine and practice how to create and craft stories and content using various forms of digital media. Students have the opportunity to capture photo, video, and audio content, and edit and produce using industry standard software from the Adobe Suite including Photoshop, Illustrator, and Premiere. Students will be introduced to principles of visual communication through lectures and class projects and will review and implement best practices and laws that impact media use and creation. Prerequisite: COM 303 or Permission from Instructor and/or Chair

Prerequisite: COM 303 or Permission from Instructor and/or Chair.

**COM 253 - Event Planning & Promotion (3)**

Considers event planning and promotion as typical duties for public relations, event coordinators, and development professionals. While considering event goals, budget, and audience, students will develop committees, event and production timelines, and consider PR, environment, volunteer management, risk assessments and more. Students will plan, develop, promote, and execute a substantial event. Prerequisite: COM 153 or sophomore standing

Prerequisite: COM 153 or sophomore standing. Corequisite: None. Crosslisted as: None.

**COM 263 - Communication Research (3)**

The goal of this course is to provide students with a foundational understanding of research methods in the field of Communication studies. By the end of this course, students will be able to depict what is good and bad scholarship, how to design their own research study, and how to approach ethical analysis for practical application.

Prerequisite: None. Corequisite: None. Crosslisted as: None.

**COM 293 - Argumentation & Debate (3)**

This course provides students with an introduction into the world of argumentation and debate. Students are expected to analyze, explain, and argue in a variety of debate styles (including but not limited to refutation and policy). Students will use reason, research, and logic to shape their respective arguments for appropriate audiences. Prerequisite: SP 203 or permission of Chair

Prerequisite: SP 203 or permission of Chair.

### **COM 301 - Media Practicum (1)**

Students will gain practical media experience through working for the HAC Media Team, the Trine University Marketing Department, The Trine Broadcasting Network, or another approved media-oriented work experience for a total of 30 hours. May be repeated, but only if duties and skills learned are different each time, up to a total of three credits. Prerequisite: Communication major or minor, or permission of Chair

Prerequisite: Communication major or minor, or permission of Chair.

### **COM 303 - Digital Photography (3)**

Designed as an introduction to photography, this course examines the relationship and role of the photograph, the photographer, and the viewer through active class discussions, photographic assignments, and critiques. This class will cover the fundamentals of digital imaging including: basic camera functions, file types, file management, and digital editing. Students will produce a body of work by the end of class. This is a more hands-on, laboratory class and, as such is not a humanities elective.

### **COM 343 - Web Content Management (3)**

Throughout this course, students will create a website using web content management software. Students will compare website content from personal and business websites. Students will also examine search engine optimization and create a brand message to improve website traffic and performance.

Prerequisite: Junior standing. Corequisite: None.

### **COM 353 - Public Relations Writing & Production (3)**

This course provides students with advanced knowledge concerning writing, designing, and production in various public relation genres of communication. Students will be able to evaluate, analyze, and produce effective persuasive materials using both written and multimodal forms of communication. By the end of this class, students will be able to effectively create workplace appropriate public relations documentation for a multitude of publics. Prerequisite: COM 153 or permission of Chair.

Prerequisite: COM 153 or permission of Chair. Corequisite: None. Crosslisted as: None.

### **COM 363 - Rhetoric and Persuasion (3)**

This course considers a variety of rhetorical theories (i.e. Marxism, Feminism, Psychoanalytic) and concepts that highlight functions of persuasion. Students will engage with how rhetoric affects and frames a person's construction of reality. This will be done through the lenses of multiple modes, such as print, video, sound, and image.

### **COM 373 - Topics In Communication (3)**

Detailed survey of one of the major areas within the discipline of communication. The course changes each time it is offered, with the specific topic announced in the class schedule. Prerequisite: ENG 143 or ENG 133

Prerequisite: ENG 143 or ENG 133.

### **COM 383 - Advanced Writing for the Media (3)**

An intermediate look at writing in the media. It examines feature style writing, in particular, such as features, reviews, interviews, profiles, and more across print, broadcast, and online media. Prerequisite: COM 183

Prerequisite: COM 183.

### **COM 393 - Design Thinking (3)**

This course explores theories and methods of design thinking with an emphasis on digital communication. Interdisciplinary and collaborative in nature, design thinking uses a human-centered, divergent thinking approach to creatively investigate, identify, and solve complex problems. Students will participate in a series of problem-solving exercises and project challenges that

require innovating existing products and materials by using a holistic design thinking process. Prerequisite: MK 373 or COM 243 or permission of Department Chair

Prerequisite: MK 373 or COM 243 or permission of Department Chair.

### **COM 413 - Corporate & Organizational Communication (3)**

Principles and skills for effective communication within task-oriented teams, nonprofit organizations, and corporations. Considers communication techniques to improve meetings, problem-solving, decision-making, and communication climate, while fostering cohesiveness and productivity. Also considers the role of communication consultants and trainers and of internal media such as newsletters, brochures, and electronic communication. Team projects apply techniques and refine communication skills essential for internal contexts. Teams conduct a client-based communication audit or ethnography of an organization or corporate office. Participation in development of content for the Triangle, the Modulus, and/or WEAX is also required. Prerequisite: COM 213 or ENG 133

Prerequisite: COM 213 or ENG 133.

### **COM 433 - Media Law & Ethics (3)**

The law as it affects journalism and broadcasting. History and background of the freedom of the press and broadcast industries with emphasis on First Amendment and FCC regulations, including such areas as seditious libel, libel, obscenity, privacy, copyright, advertising and the Fairness Doctrine. This course also examines the place of ethics in media production and distribution. Prerequisite: COM 123

Prerequisite: COM 123.

### **COM 453 - Public Relations Planning & Campaigns (3)**

Knowledge and skills needed in the public relations planning, decision-making, and problem-solving process of research, objectives, programming, and evaluation. Case studies and problems apply planning and execution of PR campaigns and relations with a variety of publics: media, employees, members, communities, government and the public, investors, consumers, international, and special groups. Includes crisis and emergency PR and PR aspects of integrated marketing communications. Individuals develop oral and written client-based campaign proposals to solve problems or to utilize opportunities, while teams develop and execute a short term PR campaign for a campus or community client. Prerequisites: COM 213 or ENG 133

Prerequisite: COM 213 or ENG 133.

### **COM 483 - Public Affairs Reporting (3)**

Advanced analysis of writing in the media. Examining public affairs style reporting, in particular, such as politics, government, social issues, public policy, and more across print, broadcast, and online media. Prerequisite: COM 183

Prerequisite: COM 183.

### **COM 4001 - Elective Internship in Communication (1)**

Elective internship with variable credit of from one to three hours, with a minimum of 40 hours of work per credit hour. May be repeated for credit with a different internship, with a maximum of six hours of elective internship credit. Prerequisites: Communication major, 2.5 G.P.A., Permission of Advisor

Prerequisite: Communication major, 2.5 G.P.A., Permission of Advisor.

### **COM 4002 - Elective Internship in Communication (2)**

Elective internship with variable credit of from one to three hours, with a minimum of 40 hours of work per credit hour. May be repeated for credit with a different internship, with a maximum of six hours of elective internship credit. Prerequisites: Communication major, 2.5 G.P.A., Permission of Advisor

Prerequisite: Communication major, 2.5 G.P.A., Permission of Advisor.

**COM 4003 - Elective Internship in Communication (3)**

Elective internship with variable credit of from one to three hours, with a minimum of 40 hours of work per credit hour. May be repeated for credit with a different internship, with a maximum of six hours of elective internship credit. Prerequisites: Communication major, 2.5 G.P.A., Permission of Advisor

Prerequisite: Communication major, 2.5 G.P.A., Permission of Advisor.

**COM 4013 - Senior Capstone Internship in Communication (3)**

An internship including capstone requirements, such as submission of a proposal and of written and oral final reports, requiring a minimum of 100 hours of work. Prerequisites: Senior Communication major, 2.5 G.P.A.

Prerequisite: Senior Communication major, 2.5 G.P.A. .

**COM 4101 - Independent Studies In Communication (1)**

An individualized reading and research project in the communication discipline. Prerequisite: Permission of the Department Chair

Prerequisite: Permission of the Department Chair.

**COM 4102 - Independent Studies In Communication (2)**

An individualized reading and research project in the communication discipline. Prerequisite: Permission of the Department Chair

Prerequisite: Permission of the Department Chair.

**COM 4103 - Independent Studies In Communication (3)**

An individualized reading and research project in the communication discipline. Prerequisite: Permission of the Department Chair

Prerequisite: Permission of the Department Chair.

**COM 4104 - Independent Studies In Communication (4)**

An individualized reading and research project in the communication discipline. Prerequisite: Permission of the Department Chair

Prerequisite: Permission of the Department Chair.

**COM 4281 - Senior Communication Project Proposal (1)**

Application of communication principles and skills by planning and developing a formal proposal for a capstone communication campaign or project. Prerequisite: Senior Communication major

Prerequisite: Senior Communication major.

**COM 4292 - Senior Communication Project (2)**

Application of communication principles and skills by implementing and evaluating a capstone communication campaign or project. Prerequisite: COM 4281

Prerequisite: COM 4281.

## COV-Community Volunteer

### **COV 101 - Community Volunteer (1)**

Students perform volunteer work assisting and advancing adult literacy in Steuben County under the direction of the Steuben County Literacy Coalition. The course is graded on a pass/fail basis and may be taken twice.

## CRJ-Criminal Justice

### **CRJ 103 - Introduction to Criminal Justice (3)**

This course is an introduction to the criminal justice system that covers the processes, institutions and administration of justice in the United States. The course will concentrate on the purposes and history of the three primary parts of the criminal justice system: law enforcement, courts, and corrections.

### **CRJ 133 - Criminal Justice Report Writing (3)**

This is an introductory course to research in the field of criminal justice. Learners will identify the required sections of case briefs, formal reports, memorandums, and other legal documents and how to develop them. APA formatting and research writing will also be covered. Prerequisite: ENG 143

Prerequisite: ENG 143.

### **CRJ 153 - Juvenile Justice (3)**

A comprehensive review of the nature and etiology of juvenile delinquency. The legal and philosophical basis of the juvenile justice process, procedures, and programs of prevention and rehabilitation.

### **CRJ 243 - Introduction to Criminology (3)**

This course will cover the scientific study of the criminal justice systems. Learners will assess crime from a social view to identify nature and extent of crime, causes of crime, impact of crime on society and prevention of crime. Prerequisite: CRJ 103

Prerequisite: CRJ 103.

### **CRJ 263 - Introduction to Criminal Law & Justice (3)**

A survey of the American criminal justice system, its legal bases, and the interrelationships between local, state and national agencies. Specific attention will be focused on criminal law, criminal liabilities and punishments.

### **CRJ 273 - Criminal Procedure & Evidence (3)**

An examination of the various aspects of criminal procedures and their bases in the Constitution and in law. Topics include arrest, search and seizure, interrogation, and the exclusionary rule.

### **CRJ 343 - Criminalistics & Crime Scene Investigations I (3)**

Introduction to criminalistics and crime scene investigation. Methods of processing a crime scene: documentation, location, and collection of evidence, proper collection and handling procedures, selection, and presentation for analytical examination, and presentation of the process and findings in court. (Same as FS 343)

Crosslisted as: FS 343.

### **CRJ 363 - Institutional Corrections & Law (3)**

A detailed review of penology and institutional corrections. A historical and contemporary perspective on jails and prisons. Rehabilitation and incarceration in both the adult and juvenile systems. A critical analysis of legislation and appellate decisions in correctional law for pretrial detainees and convicted and sentenced prisoners. Prerequisite: Junior standing or permission of instructor



Prerequisite: Junior standing or permission of instructor.

**CRJ 423 - Criminal Justice Agency Administration (3)**

A detailed examination of the unique blend of criminal justice and business/public administration required in the administration of law enforcement, judicial and corrections agencies. A pragmatic analysis of public funding and utilization of local, state, and federal grants. Prerequisite: Junior standing or permission of instructor

Prerequisite: Junior standing or permission of instructor.

**CRJ 433 - Criminal Justice Capstone Demonstration (3)**

This capstone course will provide students the opportunity to integrate and synthesize previous coursework in Criminal Justice. In addition, to the Capstone Demonstration Project, student will be required to take the exit criminal justice academic assessment for Criminal Justice Majors. Prerequisite: All required coursework following Concentration.

Prerequisite: All required coursework following Concentration.

**CRJ 453 - Topics in Criminal Justice (3)**

Selected topics in the area of criminal justice. May be taken multiple times. Prerequisite: Junior standing or permission of instructor

Prerequisite: Junior standing or permission of instructor.

**CRJ 473 - Law Enforcement Internship (3)**

Professional internship placement in a criminal justice agency in the students' areas of concentration. Students will participate in agency activity under the supervision of an agency professional. Prerequisite: Junior or senior standing and department approval

Prerequisite: Junior or senior standing and department approval.

**CRJ 4015 - Basic Police Training Course (15)**

Attendance and completion of the Basic Police Training Course at the Indiana Law Enforcement Academy. Prerequisite: Junior or senior standing and department approval

Prerequisite: Junior or senior standing and department approval.

**CRJ 502 - The American System of Justice (2)**

An examination of the core components of the criminal justice system: courts, law enforcement, and correctional agencies. Particular emphasis will be placed on the interrelationship between the various components as they attempt to meet their individual mandates. Prerequisite: Must be admitted to either the MSCJ or Certificate Program

Prerequisite: Must be admitted to either the MSCJ or Certificate Program.

**CRJ 503 - Seminar Law & Social Control (3)**

This course provides students with an introduction to legal theory and the moral, practical and legal implications of law as a means of maintaining social order. The course also examines the impact of economic and political forces on social control.

**CRJ 513 - Criminology (3)**

Throughout this course students will explore criminological theories and the study of nature, extent, cause, and control of criminal behavior. Students will also examine the ways in which crime is measured. Additionally, students will assess various crime typologies and analyze a wide range of crime causation theories

Prerequisite: None.

**CRJ 533 - Criminal Justice Policy Formation & Analysis (3)**

A study of the methodology behind law, statute, and policy creation in the public criminal justice arena. Includes a discussion of the American political system and an evaluation of key public policies that impact the justice system. Prerequisite: Must be admitted to either the MSCJ or Certificate Program

Prerequisite: Must be admitted to either the MSCJ or Certificate Program.

**CRJ 543 - Criminal Justice Research & Writing (3)**

This course prepares students for academic writing at the graduate level. Throughout this course, learners will use research and critical thinking skills to develop original thoughts. Exploration and research for the criminal justice capstone will also begin in this course.

**CRJ 553 - Applied Statistics for Criminal Justice (3)**

This course will examine the study of data analysis as it relates to the social sciences. Topics will include inductive and descriptive analysis, sampling, and methods of evaluation. The emphasis will be on practical application of statistics to criminal justice situations.

**CRJ 563 - Planning & Program Evaluation (3)**

An overview of program planning and intervention principles for the public administrator. Students will review methodologies for identifying public issues, planning for them, and assessing outcomes. Attention will also be given governmental policies as they impact program planning. Prerequisite: ENG 501 and must be admitted to either the MSCJ or Certificate Program

Prerequisite: ENG 501 and must be admitted to either the MSCJ or Certificate Program.

**CRJ 593 - Criminal Justice Capstone Preparation (3)**

An in-depth application of the concepts contained in the core courses. Under the direction of a criminal justice faculty member, the student will design, research, and evaluation of the criminal justice capstone program or policy. This will include identifying criminal justice issues, evaluating and planning for solutions. The students will then formally present to a committee of at least two full-time or adjunct professors.

**CRJ 643 - Law & Public Policy (3)**

This course provides an overview of several key legal issues faced by administrators within criminal justice public agencies. It focuses on statutory and Constitutional public employment rights and the Constitutional limitations on these administrators' interactions with prisoners, probationers and parolees. It also addresses core issues faced by public managers in the field of administrative law. Prerequisite: Must be admitted to either the MSCJ or Certificate Program

Prerequisite: Must be admitted to either the MSCJ or Certificate Program.

**CRJ 653 - Crisis Intervention for Law Enforcement (3)**

This course prepares students to identify, intervene and deescalate crisis situations in various criminal justice fields. Upon completion of this course, students should be able to recognize crisis situations and provide short-term assistance to emergency situations minimizing long-term distress. Students will also be able to identify mental illnesses and provide information on resources promoting mental health services.

**CRJ 663 - Child Welfare and The Family (3)**

This course will provide students with an overview of the child welfare system in relation to the field of criminal justice. Students will review and evaluate laws, policies, procedures and practices of child welfare and family. Upon completion of this course, students will be able to assess risk factors related to child welfare and identify preventative measures. Students will also be able to learn strategies to engage parents and families in child welfare services.

### **CRJ 683 - Criminal Justice Demonstration Capstone (3)**

An in-depth analysis and synthesis of the concepts contained within the program courses. Conducted under the direction of a criminal justice faculty member, the student will chose an area in the criminal justice system that needs change and research, design and implement a capstone project that is a comprehensive solution. The student will present the results to a committee of two full time or adjunct professors who specialize in criminal justice. Prerequisites: CRJ 593

Prerequisite: CRJ 593.

## **CS-Computer Science**

### **CS 1113 - Introduction to Object-Oriented Program (3)**

An introduction to object-oriented programming. Students will: use primitive data types and expressions; understand APIs; effectively use existing classes; use selection and iteration control structures; create classes; use data structures such as arrays; create applications; effectively use debugging techniques and IDE. Corequisite: MA 113 or higher

Corequisite: MA 113 or higher.

### **CS 1123 - C++ & Object Oriented Design (3)**

This course covers the C++ programming language with emphasis placed on object-oriented design. Students will: use pointers and arrays; use header files; overload operators; use functions of the standard library; determine a plan for testing a piece of software; organize a program to determine classes and objects; design a graphical user interface using Qt GUI Prerequisite: CS 1113 with a grade of "C" or above

Prerequisite: CS 1113 with a grade of "C" or above.

### **CS 1303 - Introduction to the World Wide Web (3)**

Introduction to computer science through the World Wide Web, focusing on the techniques of web-page creation.

### **CS 2103 - Algorithm Design & Analysis (3)**

The theory of programming, reinforced with practical activities. Students will: analyze algorithms for asymptotic required memory and time; implement stacks, queues, dictionaries, priority queues using arrays and linked lists; apply recursion, backtracking, and dynamic programming; use classic strategies like greedy search and branch-and-bound; use trees and graphs to solve problems; explain theory of computation (automata and Turing machines); explain complexity classes like P and NP. Prerequisite: CS 1123

Prerequisite: CS 1123.

### **CS 2213 - Operating Systems (3)**

Students learn the concepts and vocabulary of operating system software that manages processes, memory, device drivers, and a user interface, including secondary storage and network access. The successful students will be able to: identify and explain the software concepts that provide the standard abstractions upon which developers rely; design, implement, modify, and analyze the responsibilities of these complex software systems; explain the vulnerabilities produced by poorly designed security; compare analytically current operating systems, addressing the solutions chosen in different systems and explaining the tradeoffs made. Prerequisites: CS 1123 and SE 233

Prerequisite: CS 1123 and SE 233.

### **CS 2503 - Software Engineering (3)**

Is an introduction to software engineering form requirements definitions, through system modeling, specification and design, to verification and validation. Students will: explain project management issues including software cost estimation; determine applicable SDLC models; explain Agile methods (XP and Scrum); gather requirements; design architecture of a software system; create tests to assure quality of software; design and implement an effective graphical user interface. (Same as SE 353)

Prerequisite: CS 1123

Prerequisite: CS 1123. Crosslisted as: SE 353.

### **CS 2613 - Artificial Intelligence & Information (3)**

This course introduces the basic terms and issues of artificial intelligence. It describes knowledge representation and search methods, and learning systems like genetic algorithms and neural networks. The course describes information models and systems, database systems data modeling, and both relational databases and query languages. Prerequisites: CS 1123

Prerequisite: CS 1123.

### **CS 3223 - Network Architecture (3)**

Topics include distributed algorithms interfacing and communication; multiprocessing architectures; LAN, WAN and ISO/OSI; concurrency; scheduling; real-time issues; fault-tolerance; system performance measurement; scripting. Prerequisites: CS 2213

Prerequisite: CS 2213.

### **CS 3303 - Net-Centric Computing (3)**

The development of web-based applications using databases while gaining an understanding of the underlying network concepts. Students will: describe the functions of each layer in the layered network model; setup Ubuntu client/servers including virtual machines; use network management and network security tools; build web applications using Python and PHP; create and integrate MySQL database and SQL in application programs. Prerequisite: CS 1123 or ECE 401 Special Topics - Python

Prerequisite: CS 1123 or ECE 401 Special Topics - Python.

### **CS 3613 - Artificial Intelligence (3)**

Introduction to Software AI and machine learning. Students will analyze problems and develop programs showing mastery of knowledge representation, expert systems and formal reasoning; heuristic searches; adaption; pattern classification/recognition, and learning. They will be ready to explain genetic algorithm development, supervised and unsupervised learning, and Bayesian learning. Prerequisite: CS 1113 and MA 134

Prerequisite: CS 1113 and MA 134.

### **CS 4013 - Computer Graphics (3)**

This course includes both two and three dimensional computer graphics. Topics include windows and view-ports; geometric transformations, hidden surfaces and file formats. It introduces standard libraries such as VCL. Prerequisites: ECE 263

Prerequisite: CS 1123.

### **CS 4023 - Programming Language Design (3)**

An introduction to the diversity of programming paradigms, and a deeper look at the core concepts of compilers. Students will develop working code in several language paradigms, including a functional language; discuss symbols, types, lexical, dynamic, and static scopes, storage duration, and namespace; read syntax grammar; explain and exploit continuation and closure; critique the choice of a paradigm (Object-oriented, functional, procedural, data, logic) for an application. It's helpful to have project experience before this course. Prerequisites: CS 1123

Prerequisite: CS 1123.

### **CS 4033 - Special Topics (3)**

Addresses advanced topics that vary by year. Prerequisite: Consent of instructor

Prerequisite: Consent of instructor.

### **CS 4103 - Advanced Software Development (3)**

Tools and techniques required to develop complex applications using contemporary software development methods. Students will: develop apps for Android smartphones and tablets; develop software-as-a-service applications; use cloud computing technologies; integrate a database in applications; use Agile and test-driven development methods. Prerequisite: CS 1123 with a grade of "C" or above

Prerequisite: CS 1123 with a grade of "C" or above.

### **CS 4903 - Capstone Project (3)**

A team project that requires interactions with users and formal reporting. A student who intends to pursue graduate study and who can demonstrate team work from other experiences may be assigned a solo research project. Prerequisites: CS 2503

Prerequisite: CS 2503.

## **CSIT-Computer Sci Information Tech**

### **CSIT 101 - Introduction to Computer Science & Information Technology (1)**

This course offers resources for success in learning for students new to Trine University. This course will assist students in becoming more proficient learners, understanding self and others, and learning personal life skills. This course will present information about Trine University offices and services to familiarize students with resources and procedures.

### **CSIT 103 - Introduction to Information Systems (3)**

An introduction to the concepts of Information Systems including history, terminology, principles, and use of computers in solutions in business, scientific and educational decision-making problems. The emphasis of the course is topics in human-computer interaction and human factors, collaborative technologies, ethics, privacy, and ownership of information and information sources, information representation, the information life cycles, and the transformation of data to information. The relationships to the other main areas of computing such as Information Technology, Computer Engineering, Software Engineering, and Computer Science are explored. Hands on assignments in Word Processing, Spreadsheet Analysis, Database, Presentation Graphics, and collaboration software.

### **CSIT 123 - Computing Infrastructure Basics (3)**

Students will gain a complete, step-by-step approach for learning the fundamentals of supporting a computing infrastructure. This course maps fully of CompTIA's latest A+ 220-1101 (Core 1) Exam objectives. Specific topic coverage areas include: taking a computer apart and putting back together, learning all about motherboards, supporting processors and upgrading memory, supporting the power system and troubleshooting computers, supporting hard drives and other storage devices, supporting I/O devices, setting up a local network, network infrastructure and troubleshooting, supporting mobile devices and virtualization, cloud computing, and printers. An introductory look at programming with Python and Elecrow's CrowPi hardware and software environment will also be explored.

### **CSIT 153 - Introduction to Operating Systems (3)**

This course is an introduction to computer operating systems, including their organization and functions of hardware components. Emphasis on system commands, operating system interface, system utilities, shell programming, file systems, and security. Concepts, such as, the graphical user interface, device drivers, memory management, processes, concurrency, scheduling, multitasking and multiprocessing will be covered. Labs include the installation, management, troubleshooting, and administration of Microsoft Windows and Linux-based operating systems.

### **CSIT 163 - Using Programming to Solve Problems (3)**

This course is an introduction to the fundamental concepts and techniques of computer programming. Students will learn to translate a real problem into a program description, and write and test a program to implement their description. The emphasis will be on developing a professional style using correct syntax; modular design; definition of data types; sequence, selection, and repetition control structures; arrays; classes; and simple file input/output (I/O).

**CSIT 1013 - Esports Administration (3)**

Students will explore the world of esports through an administration perspective. Focus will be placed on the formation, structure, maintenance, and coaching of esports organizations at the amateur, collegiate and professional levels. Entrepreneurship in the gaming industry will be studied.

**CSIT 1023 - The History of Gaming (3)**

This course is designed to educate students about the history of video games, gaming and esports. This will focus specifically on the development of what video games started as, and what they have evolved into. This will include not only the history of the games, themselves, but the companies, creators, and culture that helped to create the industry as it currently exists. This course will cover the history of the video game from the 1950s to the modern day industry.

**CSIT 203 - Web Site Design (3)**

This course focuses on web technologies, web-based systems, and web page design. Topics covered include Internet applications, web site development, multimedia technologies, vulnerabilities, web site publishing, and web site maintenance.

**CSIT 223 - Network Management (3)**

This course is an introduction to technologies, terminology, and skills used in the world of data networking. Emphasis is on practical applications of networking and computer technology to real-world problems. Prepares students for entry-level job as a networking technician and prepares them for learning more advanced topics in networking. Students will be introduced to topics covering the CompTIA Network+ and Cisco CCNA Professional certification exams. Prerequisites: CSIT 123

Prerequisite: CSIT 123.

**CSIT 233 - Designing Data Links to Web Applications (3)**

This course focuses on web page construction, client and server-side scripting, database interaction, file systems, performance issues, and security concerns of web applications. Prerequisites: CSIT 203 and INF 403

Prerequisite: CSIT 203 and INF 403.

**CSIT 243 - Mobile Application Development (3)**

This course covers mobile application development frameworks; architecture, design and engineering issues, techniques, methodologies for mobile application development. Students will be required to implement a mobile application on two separate platforms. Prerequisites: CSIT 163 and CS 1113

Prerequisite: CSIT 163 and CS 1113.

**CSIT 253 - Artificial Intelligence & Information (3)**

An introduction to the field of artificial intelligence: LISP language, search techniques, games, vision, representation of knowledge, inference and process of proving theorems, and natural language understanding. Prerequisite: CSIT 163

Prerequisite: CSIT 163.

**CSIT 273 - Enterprise Architecture (3)**

This course covers foundational aspects of both enterprise and architectural thinking, including the software to technology to solution architecture continuum, role of EA in business and IT alignment, architectural styles, and techniques for capturing and documenting architecture. Techniques for analyzing and reasoning about architecture are practiced in assignment in class.

Prerequisite: CSIT 123

Prerequisite: CSIT 123.

### **CSIT 2013 - Esports Analytics (3)**

This course focuses on the evaluation and interpretation of games and game footage to analyze matches, teams, players and the meta game of esports. It will focus on how to interpret data between games, how to build teams for competitive leagues, and how to break down matches of current professional games. It will explore the different games, and different types of statistics between games analysts should focus upon.

### **CSIT 2023 - Linux & PowerShell**

### **CSIT 333 - Introduction to E-Commerce Site Development (3)**

This course introduces the concepts and technologies used in electronic commerce. The course content includes the need for e-commerce, the technological challenges, the legal and regulatory framework, technological challenges, organization and business barriers, and strategies for creating a successful e-commerce site. Prerequisite: CSIT 233

Prerequisite: CSIT 233.

### **CSIT 363 - Certified Ethical Hacking I (3)**

Using methodologies and frameworks from the field, students will be introduced to ethical hacking throughout this course. Students will review the basics of information security including international and national laws. Additionally, concepts of reconnaissance, footprinting, enumeration of information systems, and vulnerability analysis will be covered. Prerequisite: CSIT 223 and INF 343

Prerequisite: CSIT 223 and INF 343.

### **CSIT 373 - Certified Ethical Hacking II (3)**

This class is designed to provide students an insight of current security scenarios and increasing hacking attempts on various information systems. The goal of the ethical hacking and countermeasures is to help an organization take preemptive measures against malicious attacks by attacking systems themselves while staying within legal limits. This class is part 2 of 4 that qualifies the student to attempt the EC-Council Certified Ethical Hacker (CEH) exam. Prerequisite: CSIT 223 and INF 343; Corequisite: CSIT 363

Prerequisite: CSIT 223 and INF 343. Corequisite: CSIT 363.

### **CSIT 383 - Certified Ethical Hacking III (3)**

This class is designed to provide students an insight of current security scenarios and increasing hacking attempts on various information systems. The goal of the ethical hacking and countermeasures is to help an organization take preemptive measures against malicious attacks by attacking systems themselves while staying within legal limits. This class is part 3 of 4 that qualifies the student to attempt the EC-Council Certified Ethical Hacker (CEH) exam. Prerequisite: CSIT 223, INF 263, INF 343 and INF 403; Corequisite: CSIT 393

Prerequisite: CSIT 223, INF 263, INF 343 and INF 403. Corequisite: CSIT 393.

### **CSIT 393 - Certified Ethical Hacking IV (3)**

This class is designed to provide students an insight of current security scenarios and increasing hacking attempts on various information systems. The goal of the ethical hacking and countermeasures is to help an organization take preemptive measures against malicious attacks by attacking systems themselves while staying within legal limits. This class is part 4 of 4 that qualifies the student to attempt the EC-Council Certified Ethical Hacker (CEH) exam. Prerequisite: CSIT 223, CSIT 273, and INF 343; Corequisite: CSIT 383

Prerequisite: CSIT 223, CSIT 273, and INF 343. Corequisite: CSIT 383.

### **CSIT 3111 - Internship (1)**

This course involves meaningful work experience related to the student's field of study or other functional areas of Information Technology at an approved company. The assignment must be approved by both the student's advisor and the Department

Chair. A maximum of 3 credit hours may be granted for any one work session. Prerequisite: CSIT major, and permission of the Department Chair

Prerequisite: CSIT major, and permission of the Department Chair.

### **CSIT 3112 - Internship (2)**

This course involves meaningful work experience related to the student's field of study or other functional areas of Information Technology at an approved company. The assignment must be approved by both the student's advisor and the Department Chair. A maximum of 3 credit hours may be granted for any one work session. Prerequisite: CSIT major, and permission of the Department Chair

Prerequisite: CSIT major, and permission of the Department Chair.

### **CSIT 3113 - Internship (3)**

This course involves meaningful work experience related to the student's field of study or other functional areas of Information Technology at an approved company. The assignment must be approved by both the student's advisor and the Department Chair. A maximum of 3 credit hours may be granted for any one work session. Prerequisite: CSIT major, and permission of the Department Chair

Prerequisite: CSIT major, and permission of the Department Chair.

### **CSIT 403 - Applications of Cybersecurity (3)**

This course provides a monitored structure for application of the skills and knowledge acquired throughout the Cybersecurity program. Emphasis is placed on the use of real-world security problems, issues, and situations. Course assignments will require the use of protection, detection, deterrence, and response techniques in addressing threats, vulnerabilities, and risks found in businesses today. Prerequisite: CSIT 153 and INF 343

Prerequisite: CSIT 153 and INF 343.

### **CSIT 443 - Advanced Cybersecurity Concepts (3)**

This course examines the analysis, design, implementation, and management issues surrounding effective concepts of cybersecurity. Virus protection and conceptual and technological aspects of data security for computer and networks will be examined including firewalls, authentication, encryption, wireless security, security protocols, security policy development, digital forensics, and fraud protection. Prerequisites: CSIT 403

Prerequisite: CSIT 403.

### **CSIT 483 - Senior Capstone I (3)**

Capstone design projects selected from a wide variety of areas related to Computer Science and Information Technology. Develops system approach to design: preparation of specifications, scheduling, modeling, simulations, and technological, financial and environmental aspects. Multi-disciplinary teamwork is emphasized. Prototyping, testing and completion of the project are required. Presentation of results required. Prerequisite: Senior Standing

Prerequisite: Senior Standing.

### **CSIT 493 - Senior Capstone II (3)**

Multi-disciplinary team experience in engineering design, emphasizing realistic constraints such as safety, economic factors, reliability, aesthetics, ethics and societal impact. Projects will be supervised by Computer Science and Information Technology faculty. Prerequisite: CSIT 483

Prerequisite: CSIT 483.



### **CSIT 4013 - Game Design and Development (3)**

This course is designed to teach students to become skilled in coding, game design, and 3D modeling using game design software. This course ends with the learners creating a completely original game of their own design from the initial concept up to the first playable prototype.

Prerequisite: CSIT 163.

## **DEI-Diversity, Equity, and Inclusion**

### **DEI 243 - Org Emotional Intelligence (3)**

Throughout this course, students will use the four quadrants of emotional intelligence to recognize and positively manage emotions of self and others. Students will learn how to use open communication and authentic collaboration to build trust within organizations. Additionally, students will learn the importance of ethics and accountability as it relates to organizational emotional intelligence.

Prerequisite: None. Corequisite: None.

### **DEI 333 - Recog/Mitigate Unconscious Bias (3)**

This course prepares students to recognize and mitigate unconscious biases within the organizations they serve. Students will acknowledge their unconscious beliefs, judgements, and false perceptions of others. Students will also examine the stereotypes and prejudices that exist within organizational cultures and how to overcome these assumptions when making decisions. Additionally, students will identify how to foster impartiality and objectivity in organizations. Prerequisite: DEI 243

Prerequisite: DEI 243. Corequisite: None.

### **DEI 413 - Diverse/Inclusive Org Culture (3)**

Students in this course will learn organizational best practices to implement diversity, equity, inclusion, and belonging in the workplace. Students will evaluate laws and policies that apply to diversity and inclusion. Students will also build cultural competencies to foster employee recruitment, motivation, satisfaction, and retention. Additionally, students will analyze the leadership skills and processes needed to develop an organizational culture that is diverse and inclusive. Prerequisite: DEI 333

Prerequisite: DEI 333. Corequisite: None.

## **DPT-Doctor of Physical Therapy**

### **DPT 5001 - Graduate Independent Study (1)**

This course is to be used when approved by Program Director, in rare circumstances for a student to earn either 1, 2 or 3 credits for an independent study of the subject matter in the program.

### **DPT 5002 - Graduate Independent Study (2)**

This course is to be used when approved by Program Director, in rare circumstances for a student to earn either 1, 2 or 3 credits for an independent study of the subject matter in the program.

### **DPT 5003 - Graduate Independent Study (3)**

This course is to be used when approved by Program Director, in rare circumstances for a student to earn either 1, 2 or 3 credits for an independent study of the subject matter in the program.

### **DPT 5024 - Foundations of Medical Anatomy (4)**

Students will increase their knowledge of the primary developmental patterns and structural composition of the human form. In

addition to an increase in their anatomical knowledge, students will learn to correlate anatomical form with clinical manifestations of dysfunction of the primary body systems such as, but not limited to, the musculoskeletal, cardiovascular, respiratory, and nervous systems. Genetic, molecular, histological, and embryological disorders which manifest themselves as anatomical dysfunction will also be discussed within the context of the course. While the course is designed to be an EXTENSION of material from an undergraduate anatomy course, this course would satisfy the pre-requisite anatomy requirement for the DPT program. Prerequisite: Accepted into the Doctorate of Physical Therapy program.

Prerequisite: Accepted into the Doctorate of Physical Therapy program.

#### **DPT 5034 - Foundations of Medical Physiology (4)**

This course will include detailed study of the physiology of the neuromuscular, cardiovascular, respiratory, renal, endocrine, and gastrointestinal systems. Emphasis is placed on medical aspects of human physiology and how these conditions manifest themselves within the patient presentation of human disease. Students will use interactive computer modeling to simulate clinical scenarios and analyze normal and pathophysiological responses. The course, while designed to be an extension of knowledge from an undergraduate human physiology course for preparation for graduate level study, would meet pre-requisite requirements for physiology for graduate school application criteria. Prerequisite: Accepted into the Doctorate of Physical Therapy program.

Prerequisite: Accepted into the Doctorate of Physical Therapy program.

#### **DPT 5111 - CARE I (1)**

Clinical Application and Reflection Experience (CARE) I is the first in a series of five courses that are integrated with didactic instruction in the first five semesters of the DPT curriculum. Students work in teams with a physical therapist clinical instructor to practice and refine skills, employ clinical problem-solving, participate in reflective group discussions and assume professional roles in various clinical patient care settings. Students are expected to demonstrate skills and apply knowledge obtained from concurrent coursework. Prerequisite: Accepted into the Doctorate of Physical Therapy program.

Prerequisite: Accepted into the Doctorate of Physical Therapy program.

#### **DPT 5124 - Anatomy of Movement I (4)**

Systems and regional approaches to gross human anatomy are combined with principles of kinesiology to enable an in-depth study of the anatomical components and principles of function. The material covered in this course includes anatomy and kinesiology of the upper extremities, head, and neck. Classroom and online lectures are complemented by laboratory experiences that include study of prosected human cadavers, and instructional palpation of live humans. Prerequisite: Accepted into the Doctorate of Physical Therapy program.

Prerequisite: Accepted into the Doctorate of Physical Therapy program.

#### **DPT 5134 - Applied Physiology I (4)**

This is the first of a two course series in which students study applied physiological concepts. This course focuses on the physiological and functional responses and adaptations of the human body to exercise, and the influences of structural and physiological changes with growth, aging, nutrition, drugs, and disease. The primary focus will be on the musculoskeletal and cardiopulmonary systems, and systems of energy production, delivery and balance. Learning occurs through lecture, discussion, and laboratory experiences. Prerequisite: Enrolled in the Doctor of Physical Therapy program

Prerequisite: Enrolled in the Doctor of Physical Therapy program.

#### **DPT 5143 - Clinical Practice I (3)**

Students learn through lecture, discussion, and guided practice important skills for patient management in clinical practice. Examples of these skills include: Effective patient interviewing and documentation; assessment of impairments including vital signs, sensation, reflexes, and pain; safe and effective positioning and draping; managing wheelchairs and other equipment; safe assistance with gait and transfers; and the therapeutic application of superficial heat and cold. Students are also introduced to theoretical models that guide clinical decision making, including patient management, clinical reasoning, disablement, and

evidence-based practice models. Prerequisite: Enrolled in the Doctor of Physical Therapy program

Prerequisite: Enrolled in the Doctor of Physical Therapy program.

**DPT 5152 - Health Behavior Science (2)**

Students will explore and analyze how human actions, cognitions, communications, and environment affect health, chronic disease, and quality of life across the lifespan. Students will explore evidence and strategies for health promotion through education, policy change, development and implementation of programs, and evaluation of impact and outcomes.

Prerequisite: Enrolled in the Doctor of Physical Therapy program.

Prerequisite: Enrolled in the Doctor of Physical Therapy program.

**DPT 5162 - Professional Development I (2)**

This is the first of a series of three professional development courses which focus on the professional socialization process. Students will learn about the profession of physical therapy, including its history, and future directions. Topics of emphasis include professional codes of ethics and conduct, laws relative to PT practice, therapeutic communication, cultural competency, stress management and conflict resolution. Prerequisite: Enrolled in the Doctor of Physical Therapy program

Prerequisite: Enrolled in the Doctor of Physical Therapy program.

**DPT 5211 - CARE II (1)**

Clinical Application and Reflection Experience (CARE) II is the second in a series of five courses that are integrated with didactic instruction in the first five semesters of the DPT curriculum. Students work in teams with a physical therapist clinical instructor to practice and refine skills, employ clinical problem-solving, participate in reflective group discussions and assume professional roles in various clinical patient care settings. Students are expected to demonstrate skills and apply knowledge obtained from concurrent and previous coursework. Prerequisites: Successful completion of all coursework in previous semesters

Prerequisite: Successful completion of all coursework in previous semesters.

**DPT 5224 - Anatomy of Movement II (4)**

Systems and regional approaches to gross human anatomy are combined with principles of kinesiology to enable an in-depth study of the anatomical components and principles of function. The material covered in this course includes anatomy of the internal thorax and abdomen as well anatomy and kinesiology of the pelvis and lower extremities. A study of the anatomy of the heart and lungs is also included. Classroom and online lectures are complemented by laboratory experiences that include study of prosected human cadavers, and instructional palpation of live humans. Prerequisites: Successful completion of all coursework in previous semesters

Prerequisite: Successful completion of all coursework in previous semesters.

**DPT 5234 - Applied Physiology II (4)**

This is the second of a two course series in which students study applied physiological concepts. This course focuses on the normal physiology of the cardiovascular, pulmonary, endocrine, GI, renal, and reproductive organ systems, as well the influences of physiological changes with growth, aging, nutrition, drugs, and disease. The course will also highlight the basic processes of disease, identification of tissues displaying signs of disease, and basic diagnostic test and tools. Learning occurs through lecture, discussion, and problem solving laboratory experiences. Prerequisites: Successful completion of all coursework in previous semesters

Prerequisite: Successful completion of all coursework in previous semesters.

**DPT 5243 - Clinical Practice II (3)**

Students learn through lecture, guided practice, literature reviews, case-based discussion, and documentation assignments, important skills for patient management in clinical practice. Examples of these skills include: assessment of range of motion,

muscle performance, and posture: the therapeutic use of passive, active-assisted, and manually resisted motion; and the design and implementation of therapeutic exercise programs. An emphasis is placed on the integration of examination findings, current scientific evidence, and sound clinical reasoning to guide the use of therapeutic exercise for prevention and rehabilitation of movement dysfunction and disability. Prerequisites: Successful completion of all coursework in previous semesters

Prerequisite: Successful completion of all coursework in previous semesters.

#### **DPT 5254 - Applied Neuroscience (4)**

Students are introduced to the structure and function of the nervous system. An emphasis is placed on the sensory and motor systems involved in motor control and key concepts required for clinical practice. Through lecture and laboratory instruction, the gross and cellular organization of the nervous system are presented, along with its relationship to the somatic and visceral systems, and the reception, transmission, and integration of information at multiple levels. Clinical manifestations of dysfunction of major neural elements are discussed. Prerequisites: Successful completion of all coursework in previous semesters

Prerequisite: Successful completion of all coursework in previous semesters.

#### **DPT 5311 - CARE III (1)**

Clinical Application and Reflection Experience (CARE) III is the third in a series of five courses that are integrated with didactic instruction in the first five semesters of the DPT curriculum. Students work with a physical therapist clinical instructor to practice and refine skills, employ clinical problem-solving, participate in reflective group discussions and assume professional roles in various clinical patient care settings. Students are expected to demonstrate skills and apply knowledge obtained from concurrent and previous coursework. Prerequisites: Successful completion of all coursework in previous semesters

Prerequisite: Successful completion of all coursework in previous semesters.

#### **DPT 5343 - Clinical Practice III (3)**

Students learn through lecture, guided practice, literature reviews, case-based discussion and treatment plan development, important skills for patient management in clinical practice. Examples of these skills include: the selection and use of deep thermal, electrodiagnostic, electrotherapeutic, and mechanical/manual techniques including massage and peripheral joint mobilization for various impairments and functional limitations. An emphasis is placed on the integration of examination findings, current scientific evidence, and sound clinical reasoning to guide the use of therapeutic interventions for prevention and rehabilitation of movement dysfunction and disability. Prerequisites: Successful completion of all coursework in previous semesters

Prerequisite: Successful completion of all coursework in previous semesters.

#### **DPT 5352 - Pharmacology (2)**

An integrated study of pharmacology presenting the pharmacodynamics and pharmacotherapeutics of common classes of drugs which include anti-inflammatory, analgesic, muscle relaxant, psychotropic, anti-microbial, and diabetic medications. Factors emphasized include indications, contraindications, adverse reactions, and the implications for physical therapy care.

Prerequisites: Successful completion of all coursework in previous semesters

Prerequisite: Successful completion of all coursework in previous semesters.

#### **DPT 5361 - Outcome Assessment (1)**

This course explores approaches to the appraisal of health, functional outcomes, and the effectiveness of physical therapy interventions. Students study specific metrics utilized for outcomes assessment, and analyze common health and rehabilitation outcomes measures in terms of reliability, validity, clinical utility, and cost effectiveness. A working knowledge of these topics is developed through lecture, discussion and case-based examples. Prerequisites: Successful completion of all coursework in previous semesters

Prerequisite: Successful completion of all coursework in previous semesters.

**DPT 5372 - Evidence Based Practice I (2)**

Students will study the theoretical foundations of evidence-based practice and develop a framework to support sound clinical reasoning. They will learn how to search, retrieve and organize scientific evidence from sources of knowledge such as library and internet-based sources. Following an introduction to psychometrics and principles of measurement in healthcare, students will learn to critically evaluate current literature to inform clinical decisions. Prerequisites: Successful completion of all coursework in previous semesters

Prerequisite: Successful completion of all coursework in previous semesters.

**DPT 5381 - Integumentary System (1)**

This course introduces the physical therapy management of patients with integumentary system pathology or impairments. Study of anatomy, physiology, and pathologies of the integumentary system provide a foundation for theoretical and practical applications of care. Students learn to examine and evaluate individuals with integumentary lesions of various etiologies and to use appropriate clinical decision-making and problem-solving strategies to determine and implement safe and effective plans of care. Prerequisites: Successful completion of all coursework in previous semesters

Prerequisite: Successful completion of all coursework in previous semesters.

**DPT 6111 - CARE IV (1)**

Clinical Application and Reflection Experience (CARE) IV is the fourth in a series of five courses that are integrated with didactic instruction in the first five semesters of the DPT curriculum. Students work in teams with a physical therapist clinical instructor to practice and refine skills, employ clinical problem-solving, participate in reflective group discussions and assume professional roles in various clinical patient care settings. Students are expected to demonstrate skills and apply knowledge obtained from concurrent and previous coursework. Prerequisites: Successful completion of all coursework in previous semesters

Prerequisite: Successful completion of all coursework in previous semesters. Corequisite: None.

**DPT 6124 - Musculoskeletal PT I (4)**

This course is the first part of a two part series dedicated to study of the musculoskeletal system as it relates to the clinical practice of physical therapy. This course introduces students to musculoskeletal examination, evaluation, diagnosis, prognosis, intervention, standardized assessment, and outcome measurement for impairments, functional limitations, and disability in clients with pathologies of the cervical spine and upper extremities. Prerequisites: Successful completion of all coursework in previous semesters

Prerequisite: Successful completion of all coursework in previous semesters.

**DPT 6134 - Neuromuscular PT I (4)**

In this first of a two course series focusing on the neuromuscular system, students will be introduced to the management of adults with complex CNS and multisystem disorders and co-morbidities. Instruction occurs via lecture, discussion of case scenarios, and guided laboratory practice. The neuropathology of conditions frequently managed by physical therapists is studied with an emphasis on examination, evaluation, diagnosis, clinical decision-making, prognosis, intervention, standardized assessments and relevant outcome measures. The appropriate use of assistive technologies is also explored. Prerequisites: Successful completion of all coursework in previous semesters

Prerequisite: Successful completion of all coursework in previous semesters.

**DPT 6142 - Imaging & Laboratory Testing (2)**

Students study the fundamentals of diagnostic testing procedures used in the evaluation of patients with various disorders and disease processes. Scientific principles underlying clinical laboratory testing and imaging technologies will be explained. Emphasis will be placed on the information obtained through specific testing and medical imaging procedures, its sensitivity

and specificity, and its potential to influence the physical therapy examination, interventions, and plan of care. Prerequisites: Successful completion of all coursework in previous semesters

Prerequisite: Successful completion of all coursework in previous semesters.

#### **DPT 6152 - Lifespan I: Growth & Development (2)**

Students learn through lecture, discussion, and guided practice, the major components of development from birth through adolescence. Theories that support our understanding of developmental delays and disabilities, and guide clinical decisions are explored. Also considered are pediatric public laws, child abuse, and therapeutic interactions with families. Prerequisites: Successful completion of all coursework in previous semesters

Prerequisite: Successful completion of all coursework in previous semesters.

#### **DPT 6172 - Evidence Based Practice II (2)**

Students study principles of experimental, qualitative, and survey research methods and the application of these methods to the field of physical therapy. Emphasis is placed on the function of the research question, hypotheses, study design, sampling, study variables, measurement, reliability, validity, and statistics in the analysis and evaluation of research literature. In addition to descriptive statistics, students are introduced to, linear regression, comparison of means, and categorical data analysis (chi-square and logistic regression). Statistics for comparison of results across studies will also be discussed (e.g., effect size, odds ratio). Prerequisites: Successful completion of all coursework in previous semesters

Prerequisite: Successful completion of all coursework in previous semesters.

#### **DPT 6191 - Anatomy Seminar I (1)**

The goal of this course is to enable an in-depth study of human anatomy. Students will perform an independent human cadaver dissection project under the supervision of the course instructor. Learning is enhanced as students share their results through formal presentations to their peers and clinical experts. Prerequisites: Successful completion of all coursework in previous semesters.

Prerequisite: Successful completion of all coursework in previous semesters.

#### **DPT 6211 - CARE V (1)**

Clinical Application and Reflection Experience (CARE) V is the last and final course in a series of five that are integrated with didactic instruction in the first five semesters of the DPT curriculum. Students work in teams with a physical therapist clinical instructor to practice and refine skills, employ clinical problem-solving, participate in reflective group discussions and assume professional roles in various clinical patient care settings. Students are expected to demonstrate skills and apply knowledge obtained from concurrent and previous coursework. Prerequisites: Successful completion of all coursework in previous semesters

Prerequisite: Successful completion of all coursework in previous semesters.

#### **DPT 6224 - Musculoskeletal PT II (4)**

This course is the second part of a two part series dedicated to study of the musculoskeletal system as it relates to the clinical practice of physical therapy. This course introduces students to musculoskeletal examination, evaluation, diagnosis, prognosis, intervention, standardized assessment, and outcome measurement for impairments, functional limitations, and disability in clients with pathologies of the thoracic spine and lower quarter. Prerequisites: Successful completion of all coursework in previous semesters

Prerequisite: Successful completion of all coursework in previous semesters.

#### **DPT 6233 - Neuromuscular PT II (3)**

In this second of a two course series focusing on the neuromuscular system, students will be introduced to the management of pediatric patients with neurological and neuromuscular conditions and co-morbidities. Instruction occurs via lecture, discussion

of case scenarios, and guided laboratory practice. Relevant neuropathology is studied with an emphasis on examination, evaluation, diagnosis, clinical decision-making, prognosis, intervention, standardized assessments and relevant outcome measures. The appropriate use of assistive technologies is also explored. Prerequisites: Successful completion of all coursework in previous semesters

Prerequisite: Successful completion of all coursework in previous semesters.

#### **DPT 6242 - Cardiopulmonary PT (2)**

The focus of this course is the physical therapy management of individuals with adults with movement-related cardiovascular and pulmonary conditions including those with significant co-morbidities. Instruction occurs via lecture, discussion of case scenarios, and guided laboratory practice. The pathology of conditions frequently managed by physical therapists is introduced with an emphasis on examination, evaluation, diagnosis, clinical decision-making, prognosis, intervention, standardized assessments and relevant outcome measures. Prerequisites: Successful completion of all coursework in previous semesters

Prerequisite: Successful completion of all coursework in previous semesters.

#### **DPT 6252 - Lifespan II: Geriatrics (2)**

Students study the physiologic and pathologic changes in musculoskeletal, neurological, integumentary, cardiopulmonary and metabolic systems that occur from middle to old age and the consequent effects on physical performance, cognition, behavior, and social and emotional wellbeing. Emphasis will be placed on utilizing a clear understanding of the consequences of aging to plan effective, evidence-based physical therapy intervention for older adults. Prerequisites: Successful completion of all coursework in previous semesters

Prerequisite: Successful completion of all coursework in previous semesters.

#### **DPT 6272 - Evidence-Based Practice III (2)**

In this course students apply the concepts of evidence-based practice to answer a question relevant to clinical practice. Students work in groups with faculty mentors to identify a question, review the relevant literature, and collect and analyze evidence to determine best practices and/or policies. The course will meet its outcomes through one of three mechanisms: (1) student research with faculty mentor; (2) evidence based project; or (3) case study. 8-12 projects are anticipated to be supported by the combined DPT faculty to enable each cohort to complete this course through one of these three mechanisms. Each faculty member will annually mentor 1-4 groups through this capstone project. Weekly sessions will be led by the instructor(s) of record and the recitations will be mentored by a DPT faculty member assigned to each group. The weekly sessions will focus on application of concepts from prior evidence-based practice courses and critical evaluation of the literature.

Prerequisites: Successful completion of all coursework in previous semesters

Prerequisite: Successful completion of all coursework in previous semesters.

#### **DPT 6282 - Healthcare Delivery I (2)**

This course provides an overview of the American health care system. It will review the system's origins and its various components and how these factors translate into current health care services. Forces influencing health care access, cost, and quality will be explored as well as the effects of the current environment on physical therapy practice, research and education.

Prerequisites: Successful completion of all coursework in previous semesters

Prerequisite: Successful completion of all coursework in previous semesters.

#### **DPT 6291 - Anatomy Seminar II (1)**

The goal of this course is to enable an in-depth study of human anatomy. Students will perform an independent human cadaver dissection project under the supervision of the course instructor. Learning is enhanced as students share their results through formal presentations to their peers and clinical experts. Prerequisite: Successful completion of all coursework in previous semesters.

Prerequisite: Successful completion of all coursework in previous semesters.

**DPT 6314 - First Full-Time Clinical Education Experience (4)**

This is first of four full-time clinical education experiences during which students are engaged in clinical observation and supervised application of basic examination, evaluation, and intervention skills and procedures. An emphasis is placed on professional behaviors, safe patient handling techniques, analysis of examination findings, individualized treatment planning and progression, and appropriate communication. Prerequisites: Successful completion of all coursework in previous semesters.

Prerequisite: Successful completion of all coursework in previous semesters.

**DPT 6342 - Orthotics & Prosthetics (2)**

This course introduces students to the management of patients with amputations, prosthetics, and orthotics. Instruction occurs via lecture, discussion of case scenarios, and guided laboratory practice. Relevant pathology and kinesiology are reviewed with an emphasis on examination, evaluation, diagnosis, clinical decision-making, prognosis, intervention, standardized assessments and relevant outcome measures. The appropriate use of orthotic and prosthetic technologies is also explored. Prerequisites: Successful completion of all coursework in previous semesters

Prerequisite: Successful completion of all coursework in previous semesters.

**DPT 6352 - Primary Care Practice (2)**

This course explores current issues in primary care practice and focuses specifically on aspects of primary care that are crucial to safe and effective practice. Students learn to perform higher level diagnostic screening procedures to identify selected medical diagnoses, and they practice clinical decision making to guide patient management and referral decisions. Students also learn to assess the health needs of individuals, groups and communities in order to develop programs for health, wellness, and injury prevention across the lifespan. Prerequisites: Successful completion of all coursework in previous semesters

Prerequisite: Successful completion of all coursework in previous semesters.

**DPT 6362 - Professional Development II (2)**

This course emphasizes a professional approach to clinically relevant topics such as cultural diversity; child, elder, and domestic abuse; workplace violence and harassment; end of life issues; and mental health concerns. Professional communications and the role of the professional as an educator and lifelong learner are also explored. Students present the results of their Evidence-based practice project in poster or platform format at the Rinker-Ross School of Health Sciences research forum. Prerequisites: Successful completion of all coursework in previous semesters

Prerequisite: Successful completion of all coursework in previous semesters.

**DPT 6382 - Healthcare Delivery II (2)**

This course focuses on contemporary managerial and leadership issues important to the provision high quality, fiscally sound healthcare. Topics include organizational structures, management principles, leadership and decision-making, quality assurance and accountability, financial and reimbursement concerns, marketing and customer relations, and the regulatory and external environment. Prerequisites: Successful completion of all coursework in previous semesters

Prerequisite: Successful completion of all coursework in previous semesters.

**DPT 7118 - Terminal Full-Time Clinical Education Experience I (8)**

During this full-time clinical education experience, students are engaged in clinical observation and supervised application of basic and comprehensive examination, evaluation, and intervention skills and procedures. An emphasis is placed on integration of professional behaviors, evaluation, physical therapy diagnosis, individualized treatment planning and progression, clinical reasoning, and documentation. Prerequisites: Successful completion of all coursework in previous semesters

Prerequisite: Successful completion of all coursework in previous semesters.



### **DPT 7128 - Terminal Full-Time Clinical Education Experience II (Other)**

During this full-time clinical education experience, students participate, with supervision, in the provision of major components of physical therapy care including screening, examination, integrative evaluation, differential diagnosis, prognosis, and procedural interventions. Students also design, prepare and provide an educational intervention. An emphasis is placed on the development of entry-level PT competencies and behaviors as students are given opportunities to practice components of the professional physical therapist's role. Prerequisites: Successful completion of all coursework in previous semesters

Prerequisite: Successful completion of all coursework in previous semesters.

### **DPT 7214 - Terminal Full-Time Clinical Education Experience III (14)**

In this final full-time clinical education experience, students engage in continued supervised application of comprehensive patient management skills including advanced examination, evaluation, diagnosis, prognosis and interventions. Students also provide an educational intervention, and participate in practice management and proper utilization of support personnel. At the completion of this experience students are expected to have demonstrated entry-level physical therapist competency and behaviors. Prerequisites: Successful completion of all coursework in previous semesters

Prerequisite: Successful completion of all coursework in previous semesters.

### **DPT 7262 - Professional Development III (2)**

Students participate in asynchronous learning sessions while on their final clinical internship. The emphasis is on sharing and reflecting on aspects of their experience pertinent to their development as professionals. Topics emphasized include leadership, interdisciplinary collaboration, quality and safety standards, billing, rules, regulations, laws. Following the experience students will come together on campus to participate in seminars on topics such as for effective resume writing and interviewing, exam preparation, and professional career planning. Prerequisites: Successful completion of all coursework in previous semesters

Prerequisite: Successful completion of all coursework in previous semesters.

## **EAS-Earth Science**

### **EAS 213 - Physical Geography (3)**

An analysis of the spatial and functional relationships among landforms, climates, soils, water, and the living world. This course also addresses the connections between environmental processes and human activity, such as human impact on the environment. (Same as GEO 213)

Crosslisted as: GEO 213.

### **EAS 253 - Weather & Climate (3)**

Elementary description of the atmosphere: its motion systems, thermal characteristics, clouds and precipitation, weather map interpretation and analysis; climates of the United States. The course conveys meteorological concepts in a visual, practical, and non-mathematical manner.

### **EAS 271 - Geology Laboratory (1)**

An introductory laboratory study of basic physical geology. The laboratory emphasizes skills needed for the identification of minerals and rocks, for the interpretation of land surface features based on topographic maps and for the understanding of folding, faulting, and rock relationships through the interpretation of geologic maps. Corequisite or Prerequisite: EAS/GLY 273 (same as GLY 271)

Prerequisite: EAS 273. Crosslisted as: GLY 271.

### **EAS 273 - Geology (3)**

An introduction to the field of geology. Study of minerals and rocks and their formation, within the context of the earth's geologic history. Emphasis on soils, running water, and groundwater. Plate tectonics, glaciers, volcanoes, erosion, and

weathering are also covered. Non-lab science only. (Same as GLY 273)

Crosslisted as: GLY 273.

## ECE-Electrical/Computer Engineering

### **ECE 112 - Prototyping & Projects (2)**

Is an introduction to electrical and computer engineering which includes a strong experimental and project component. Students will: learn the principles of electrical phenomena, the mathematics used to describe power and signals, Boolean logic and its implementation including Programmable Logic Controllers.

### **ECE 211 - Circuits Laboratory (1)**

The laboratory supports the Circuits class through the experimental characterization of passive circuits and their response prediction using component models. Students will: use typical electronics-laboratory test equipment for circuit characterization, write an experimental logbook, model electrical components to better predict a circuit's actual response, measure time response and frequency response. Corequisite: ECE 213

Corequisite: ECE 213.

### **ECE 213 - Circuit Analysis (3)**

This course prepares students for all subsequent circuits-based courses. Linear circuit analysis is studied by placing emphasis on the modified nodal admittance matrix method and circuit transformations. Students will: formulate a solution for any circuit containing terminally-defined resistors, capacitors, inductors, coupled inductors, ideal transformers, dependent and independent sources; use professional software to simulate circuits and to facilitate computations and mathematical operations. Corequisite: MA 164

Corequisite: MA 164.

### **ECE 231 - Discrete Electronics Laboratory (1)**

This laboratory provides a comprehensive hands-on opportunity to implement electronic design concepts. The pn junction diode, and MOS transistors and their biasing techniques are extensively introduced to teach operational perspectives and circuit design. Students will: work in a team environment to perform and solve technical problems; understand load lines and design transistors to operate in different regions; design rectifiers, filters, multipliers, and clippers using pn junction diodes; design circuits using TINA simulation software; implement the design in proto board. Corequisite: ECE 233

Corequisite: ECE 233.

### **ECE 233 - Discrete Electronics (3)**

This is a first course in semiconductor electronics with emphasis on electronic circuits and devices for low-voltage control, signal conditioning, and switching. Students will: explain the basic operation of junction diodes, BJT's, and FET's, including major limitations; analyze the operation of circuits using practical device models; use SPICE-based software as both an analysis and design tool for electronic circuits; design practical circuits using these devices Corequisite: ECE 231; Prerequisite: ECE 213

Prerequisite: ECE 213. Corequisite: ECE 231.

### **ECE 243 - Analog Signals (3)**

This course bridges the gap between the device-based topics of circuits and the signals-and-systems topics of DSP, controls, and communications. Mathematical concepts relating to complex numbers and matrices are developed and frequency domain analysis is discussed in depth. Students will: calculate with complex numbers; analyze continuous-time circuits in the time domain, phasor domain, and frequency domain, and decide the appropriate domain to use for analysis. Prerequisites: MA 164, ECE 213 with a grade of "C" or above, ECE 263 with a grade of "C" or above

Prerequisite: MA 164, ECE 213 with a grade of "C" or above, ECE 263 with a grade of "C" or above.

### **ECE 261 - Digital Systems Laboratory (1)**

The lab provides a comprehensive hands-on opportunity to implement digital design concepts. Logic gates, logic tools, Hardware Description Language (HDL) and Field Programmable Gate Array (FPGA) design boards are used extensively to provide different variations of digital design. Students will: Work in a team environment to solve technical problems; understand switch-bounce problems and design a de-bounced switch; design adders, comparators, multiplexers, tri-state buffers and decoders using AND/OR/NOT/NAND/NOR logic gates; design memory cells, BCD-7-segment decoders, flip-flops and counters using logic gates and HDL; implement the design in an FPGA board. Corequisite: ECE 263

Corequisite: ECE 263.

### **ECE 263 - Digital Systems (3)**

This course explores the introductory concepts of digital systems using combinational and sequential logic circuits. Digital design automation tools and Hardware Description Language (HDL) are also introduced. Students will: demonstrate that they understand number systems and Boolean algebra; understand and design combinational logic circuits including multiplexers, comparators, decoders, and adders; understand and design sequential logic circuits including latches, flip-flops and counters; design combinational and sequential circuits using HDL and perform timing analysis; understand the memory hierarchy, ROMs, RAMs and FLASH memories; understand Programmable Logic Devices (PLDs), CPLDs and FPGAs. Corequisite: ECE 261

Corequisite: ECE 261.

### **ECE 271 - Microcontrollers Laboratory (1)**

This course teaches students to implement and test inexpensive hardware-software systems that offer a user interface, a digital signal generator, a sampled feedback controller, and subsystem interfacing. Students will: test a feedback system using experiments they design, and determine if project goals are met; design and implement a working feedback controller for a real physical system; team-up on most labs and on one formal report; solve the problem posed in the feedback project; report findings in formal written documents; use lab bench tools to develop and debug code. Prerequisite: ECE 261; Corequisite: ECE 273

Prerequisite: ECE 261. Corequisite: ECE 273.

### **ECE 273 - Microcontrollers (3)**

This course teaches students to design inexpensive hardware-software systems that offer a user interface, a digital signal generator, a sampled feedback controller, and subsystem interfacing. Students will: analyze a microcontroller system for timing; solve problems written in prose by showing a hardware/software system that addresses the problem; empathize with stakeholders of a medical device; teach themselves to use an unfamiliar on-chip peripheral from the manufacturer's data sheet; address power consumption/battery life; use a compiler/assembler/ simulator to develop correctly working code; use the UML to aid design work; respect the IEEE code of ethics. Prerequisites: ECE 263 and CS 1113 or ECE 401 Special Topics - Python; Corequisite: ECE 271

Prerequisite: ECE 263 and CS 1113 or ECE 401 Special Topics - Python. Corequisite: ECE 271.

### **ECE 301 - Electrical Machines Laboratory (1)**

This laboratory supports the machines class through experimental work with dissectible and purpose-built machines. Students will: assemble and test commutator machines, synchronous machines, and induction machines; characterize machine performance in terms of regulation, efficiency and power; carry out tests to determine a synchronous generator's synchronous reactance Corequisite: ECE 303

Corequisite: ECE 303.

**ECE 303 - Electrical Machines (3)**

Rotating electrical machinery are studied from the magnetic-field interaction viewpoint. Machine operating principles are studied in detail and electrical circuit models are used to quantify machine/power system interactions. Students will: calculate the power-torque-speed performance of various DC and AC machines; model and calculate synchronous and induction machine performance in the steady state; calculate and present machine capability limits. Prerequisite: ECE 313; Corequisite: ECE 301

Prerequisite: ECE 313. Corequisite: ECE 301.

**ECE 313 - Electrical Power (3)**

An introduction to three-phase power generation, transmission, distribution, and utilization. Steady-state power system performance measures: efficiency, ratings, voltage regulation, static stability, and reactive power control are used as unifying concepts across a study of the main power system components. Students will: calculate transmission line capacity, generator capability limits, transformer regulation, and load power consumption in balanced and unbalanced three-phase systems.

Prerequisite: ECE 213

Prerequisite: ECE 213.

**ECE 323 - Dynamic Electromagnetic Fields (3)**

This class discusses electromagnetic fields and calculations involving Maxwell's equations. Students will: apply Maxwell's equations in integral and differential form to calculate electromagnetic fields; calculate transmission line fields; calculate potentials; and describe how plane waves propagate in free space and in other uniform materials. The course may also cover antennas. Prerequisite: MA 233, PH 234

Prerequisite: MA 233, PH 234.

**ECE 333 - Analog IC's (3)**

The design and test of circuits that include analog integrated circuits such as operational amplifiers, ADCs and DACs, and modulation or demodulation devices. Students will: explain the basic operation of op-amps, including major limitations; analyze the operation of circuits using practical device models; use SPICE-based software as both an analysis and design tool; analyze frequency-domain and time-domain characteristics of analog systems that include filtering, feedback, modulation, rectification, and sampling. Prerequisite: ECE 213

Prerequisite: ECE 213.

**ECE 351 - CMOS VLSI Laboratory (1)**

This lab provides an extensive opportunity to implement CMOS VLSI design concepts. Students will: use VLSI design tools for design projects on inverters, multiplexers, comparators, oscillators, and flip flops. Corequisite: ECE 353

Corequisite: ECE 353.

**ECE 353 - CMOS VLSI Design (3)**

The design of special purpose digital systems using VLSI technology is investigated using CMOS technology. MOSFET modeling, dynamic power dissipation, clocking strategies and transistor delays are considered. Students will: understand MOS device modeling and DC transfer characteristics; understand parasitic R,L,C and delay estimation and transistor sizing; understand sequential circuits and clocking strategies; design static and dynamic CMOS VLSI circuits; understand dynamic power dissipation and low power VLSI design techniques; use VLSI tools to simulate and produce technical reports.

Prerequisites: ECE 233; Corequisite: ECE 351

Prerequisite: ECE 233. Corequisite: ECE 351.

**ECE 361 - Logic & Computer Design Laboratory (1)**

The lab provides an opportunity to implement digital design concepts in Altera Field Programmable Gate Arrays (FPGAs) and

Complex Programmable Logic Devices (CPLDs). Students will: complete assigned design projects using HDL and schematic tools, and implement completed design projects using Altera FPGAs and CPLDs; work in a group setting to implement a challenging design project on the design board and make a group presentation of this design. Corequisite: ECE 363

Corequisite: ECE 363.

### **ECE 363 - Logic & Computer Design (3)**

The course builds on the Digital Systems class and provides an in-depth analysis of digital design and computer architecture. Core topics include Finite State Machine (FSM) controllers and pipeline design using Hardware Description Language (HDL). Students will: understand and design sequential circuits and perform timing analysis; understand and design FSM controllers and next state decoders; understand and design pipelined processors and cache memories; design of an onboard 32x32 register file; work in a group setting to come up with innovative ideas to design and implement an FSM, a controller and a cache memory. Prerequisite: ECE 263; Corequisite: ECE 361

Prerequisite: ECE 263. Corequisite: ECE 361.

### **ECE 371 - Embedded Systems Laboratory (1)**

In support of ECE 373, this lab puts students in small teams to explore isolated subsystems from the course project in the usual lab format, and then provides structured time to achieve and demonstrate progress in the project. Students will: work in small teams; show that they can use the tools and techniques of modern embedded systems to implement their designs; assume responsibility for designing the tests or experiments needed to verify their work; demonstrate communication skills in formal reports and demonstrations. Corequisite: ECE 373

Corequisite: ECE 373.

### **ECE 373 - Embedded Systems (3)**

Building on ECE 273 (Microcontrollers), this course focuses on real-time multitasking and RTOS and includes a design project to explore these ideas, and the course also looks at enabling techniques such as mixed C and assembly, control of linking, external memory, self-programming, and fail-safety. Students will: explain and apply real-time multitasking concepts; design and implement an embedded system; design recovery from exceptional conditions; incorporate into their work complex peripherals like PWM-capable timers. Prerequisite: ECE 273; Corequisite: ECE 371

Prerequisite: ECE 273. Corequisite: ECE 371.

### **ECE 393 - Software Analysis & Design (3)**

Teaches the code development process to students who can use an object-oriented computer language. Students will: identify activities of software project engineering; write a formal requirements document; perform object-oriented analysis of client requirements; use UML class and sequence diagrams to support object-oriented design; apply some software design patterns; implement your designed software in a team supported by a version-control tool; use a professional caliber GUI library to advantage; and follow coding standard. Prerequisite: CS 1123

Prerequisite: CS 1123.

### **ECE 3051 - Junior-Year Laboratory (1)**

This course is intended to secure and to extend student knowledge of sophomore fundamentals by posing multi-week laboratory exercises in the Junior year that move beyond the lab exercises required of Sophomores. The course is divided into halves, one for a project that extends circuit analysis and/or discrete electronics, and the other for a project that extends digital and/or microcontroller systems. Prerequisites: ECE 211 and ECE 231

Prerequisite: ECE 211 and ECE 231.

### **ECE 401 - Special Topics in Electrical & Computer Engineering (1)**

Special Topics in ECE is a non-recurring advanced course in a specialist area of electrical and computer engineering. The

course is intended to impart a depth of knowledge in a currently important technical area. The course may be used to satisfy the requirements for an electrical engineering or computer engineering concentration elective. Prerequisite: Varies according to the Special Topic

Prerequisite: Varies according to the Special Topic.

### **ECE 402 - Special Topics in Electrical & Computer Engineering (2)**

Special Topics in ECE is a non-recurring advanced course in a specialist area of electrical and computer engineering. The course is intended to impart a depth of knowledge in a currently important technical area. The course may be used to satisfy the requirements for an electrical engineering or computer engineering concentration elective. Prerequisite: Varies according to the Special Topic

Prerequisite: Varies according to the Special Topic.

### **ECE 403 - Direct Generation Techniques (3)**

The direct electrical energy conversion and storage methods are studied in depth. Direct conversion involves the conversion of energy directly to electrical form with no electromechanical interface. Students will: study conversion technologies including heat transfer, chemical cells, solar arrays, and fuel cells. The course also investigates the current and future trends in energy storage techniques. Prerequisite: ECE 213

Prerequisite: ECE 213.

### **ECE 433 - Power Electronics (3)**

Building on Discrete Electronics, this course addresses the concerns that arise in the design of semiconductor circuits and devices due to larger voltages and currents. Students can explain and quantify the performance of three-phase AC to DC and DC to AC converters, the performance of four-quadrant DC to DC converters, and quantify the effect of harmonic-producing electronics loads on a radial power system. Prerequisite: ECE 233

Prerequisite: ECE 233.

### **ECE 441 - Communication Systems Laboratory (1)**

A lab to investigate means of and results of moderate-frequency signal processing in the service of communications, using both integrated circuits and simulated components. Students will: determine bandwidth and bands of interest; identify distortion and aliasing; and apply lab tools to moderate-frequency designs. Corequisite: ECE 443

Corequisite: ECE 443.

### **ECE 443 - Communication Systems (3)**

The course investigates ways of processing a signal both to prepare it for effective transmission through some medium or media that may be carrying other signals, and to reconstruct the original signal at the receiving end. Students will: analyze and design basic communication systems using block-diagram models of filters, samplers, and modulators; compare and contrast multiple-access communication techniques including AM, FM, coding and keying; calculate the basic quantities such as channel capacity, probability of error, and bandwidth needed to transmit analog or digital signals in base-band or in pass-band.

Prerequisite: ECE 243; Corequisite: ECE 441

Prerequisite: ECE 243. Corequisite: ECE 441.

### **ECE 453 - Random Processes in Electrical & Computer Engineering (3)**

Concepts of random processes are applied to electrical and computer engineering applications. In addition to the mathematical topics described below, each student will present on a particular application which may include: oversampling A/D, queuing inside a computer processor, quality control, voice recognition, and interferometric measurements. Students will: describe a random process by a probability density and probability distribution; identify whether a process is stationary and ergodic; compute the auto-correlation, cross-correlation, spectral density and cross-spectral density of a random process. Prerequisite:

MA 393

Prerequisite: MA 393.

**ECE 461 - Digital Signal Processing Laboratory (1)**

MATLAB is used to demonstrate concepts from digital signal processing. Students should be able to: Sample and filter audio signals; filter images; demonstrate effects of insufficient sampling, aliasing, rounding, or instability; design digital filters.

Corequisite: ECE 463

Corequisite: ECE 463.

**ECE 463 - Digital Signal Processing (3)**

This course emphasizes analysis and design of systems for processing digital signals using frequency domain techniques.

Students will: analyze signals in the frequency domain; describe digital systems in the frequency domain; sample, quantize, and reconstruct signals; design digital filters. Prerequisite: ECE 243

Prerequisite: ECE 243.

**ECE 481 - Instrument Systems Laboratory (1)**

This course discusses data acquisition of both analog and digital signals. Students will: design a low-cost hand-held sensor system; select components for a hand-held sensor system within cost and size constraints; solve problems related to calculating noise in measurement systems; propose possible sensor circuits and select the best solution; construct, test, and debug a hand-held sensor system. Corequisite: ECE 483

Corequisite: ECE 483.

**ECE 483 - Instrument Systems (3)**

This course discusses theoretical and practical ideas related to data acquisition of both analog and digital signals. Students will: analyze input data from sensors; characterize signal noise; compare GPIB, USB, and other data buses for instrumentation systems; use Labview or Matlab for data acquisition and analysis. Corequisite: ECE 481; Prerequisite: ECE 213

Prerequisite: ECE 213. Corequisite: ECE 481.

**ECE 4001 - Contemporary Issues for Engineers (1)**

This is a seminar-based weekly course covering global perspectives on business and engineering, and the effects and responsibilities of engineers in society. Students will: understand sustainability and diversity and develop a broader perspective necessary to understand the impact of engineering solutions in an environmental and societal context; understand the complex global economy. (Same as SE 4001) Prerequisite: Senior standing

Prerequisite: Senior standing. Crosslisted as: SE 4001.

**ECE 4002 - Project Management (2)**

Students will: work with a team to identify or elicit details of end-user needs; produce and present a project proposal; identify and assign responsibilities to team members based on an accepted proposal; work across disciplines to deliver a product or service to a client; explain both highly-structured and more agile engineering design processes. (Same as SE 4002) Prerequisite: Advisor's consent

Prerequisite: Advisor's consent. Crosslisted as: SE 4002.

**ECE 4003 - Design Project (3)**

Students will: design and prototype a product; work with team members from other disciplines to collectively solve engineering problems; obtain and utilize information sources to solve engineering problems; consider the perspective of stakeholders as an integral part of the design process; incorporate appropriate engineering standards; identify economic, environmental, social,

ethical, and safety implications of the design; demonstrate communication skills necessary for successful teamwork; write a formal report that documents the entire design-cycle, from the initial concept to a functioning prototype; and give an oral report presenting the final product. (Same as SE 4003) Prerequisite: EE Majors: ECE 4002, ECE 243, ECE 483; CPE Majors: ECE 4002, ECE 243, ECE 373; SE Majors: ECE 4002, CS 2103, CS 2503 or SE 353

Prerequisite: EE Majors: ECE 4002, ECE 243, ECE 483; CPE Majors: ECE 4002, ECE 243, ECE 373; SE Majors: ECE 4002, CS 2103, CS 2503 or SE 353. Crosslisted as: SE 4003.

### **ECE 4113 - Special Topics in Electrical & Computer Engineering (3)**

Special Topics in ECE is a non-recurring advanced course in a specialist area of electrical and computer engineering. The course is intended to impart a depth of knowledge in a currently important technical area. The course may be used to satisfy the requirements for an electrical engineering or computer engineering concentration elective. Prerequisite: Varies according to the Special Topic

Prerequisite: Varies according to the Special Topic.

## **ECO-Economics**

### **ECO 203 - Survey of Economics (3)**

This course aims to provide an overview of the relevant areas of economics. After developing basic economic principles, such as the rationality assumption, the marginal benefit and marginal cost framework, and demand and supply analysis, equal attention is devoted to the principles of microeconomics and macroeconomics. Areas of study include firm decisions under various market structures, the role of money, central bank, and interest rates in the economy, as well as differing views on how an economy grows. Prerequisite: MA 113

Prerequisite: MA 113.

### **ECO 213 - Microeconomics (3)**

Introduction to the theory of demand and supply and price determination in market economies. The study of individual consumers and producers, different market structures and the distribution of income. Prerequisite: MA 113

Prerequisite: MA 113.

### **ECO 223 - Macroeconomics (3)**

Introduction to the theory of national income determination for the United States and other global economic systems. The study of fiscal and monetary policy tools and the government's role in promoting stability and growth, and the causes of unemployment, inflation, and trade deficits. Prerequisite: MA 113

Prerequisite: MA 113.

### **ECO 323 - Money & Banking (3)**

This course is a study of the principles of monetary economics. An analysis of the structure and operation of financial institutions and the Federal Reserve System is included. The function of monetary policy within the framework of macroeconomic theory is examined. (Same as FIN 323) Prerequisite: ECO 223 or ECO 203

Prerequisite: ECO 223 or ECO 203. Crosslisted as: FIN 323.

### **ECO 353 - Healthcare Regulations (3)**

This course will prepare learners to define healthcare regulations and accreditation standards. Additionally, learners will determine how to comply with regulations, avoiding costly violations. This course will also address the economic impact of regulations on the healthcare industry.



### **ECO 373 - Introduction to Econometrics (3)**

This course is designed for the finance and economics students as a continuation of MA 253 (Statistics). Students will first revisit the topics of probability, distributions, and hypothesis testing, exploring these topics more thoroughly. Most of the semester will be devoted to building solid theoretical and practical foundation of econometrics. Students will proceed from the simple regression model onto multiple regression analysis in the context of cross-sectional data, time series data, and finally panel data. Violations and fixes to serial correlation and heteroskedasticity problems will be studied. Students will be asked to demonstrate and apply the concepts studied while carrying out an empirical research project. (Same as FIN 373) Prerequisite: ECO 223 or ECO 203, MA 253

Prerequisite: ECO 223 or ECO 203, MA 253 . Crosslisted as: FIN 373.

### **ECO 383 - International Economics (3)**

Introduction to the fundamental theories of international specialization and exchange, and international payments; the analysis of processes and organizations for maintaining equilibrium of international economic relationships. Prerequisite: ECO 223 or ECO 203

Prerequisite: ECO 223 or ECO 203.

### **ECO 453 - Business & Public Policy (3)**

This course includes an analysis of the legal, political and economic framework that has shaped public policy toward business in the United States. It will include the methods as to how public policy is created and its implications for management decision making. The issues that this course will be concerned with are: how public policy is related to societal, community, employee, consumer, and environmental concerns and their implication for business. (Same as BA 403) Corequisite: MGT 363

Corequisite: MGT 363. Crosslisted as: BA 403.

### **ECO 4001 - Independent Studies in Economics (1)**

Credit earned through directed reading, independent study, and research or supervised field work. Maximum 4 hours credit.

### **ECO 4002 - Independent Studies in Economics (2)**

Credit earned through directed reading, independent study, research or supervised field work. Maximum 4 hours credit.

### **ECO 4003 - Independent Studies in Economics (3)**

Credit earned through directed reading, independent study, research or supervised field work. Maximum 4 hours credit.

### **ECO 5033 - Micro & Macro Economic Decision Making (3)**

This course in Micro and Macroeconomics is designed to provide students with a unified framework that can be used to analyze micro and macroeconomic issues such as growth, productivity, labor markets, wages, business cycles, inflation, money, interest rates, monetary policy, fiscal policy, and financial crises. The course is a mixture of macro theory and real-world applications. Analytical models will be developed that stress the microeconomics foundations of aggregate outcomes which will then be applied to the recent experience of the United States and global countries.

Prerequisite: None.

## **EDU-Education**

### **EDU 111 - Education Exploration (1)**

A study of teaching as a career. The candidate examines conditions and responsibilities at lower elementary, upper elementary, middle school, high school, and alternative school levels. Clinical experience. Prerequisite: strong interest in a teacher education major

Prerequisite: Strong interest in a teacher education major.

**EDU 181 - Introduction to Teaching Students with Mild Exceptional Needs (1)**

A study of the historical, philosophical, ethical, and legal foundations of American special education. Content includes current issues, state and federal policies, and the rights, roles, and responsibilities of all stakeholders regarding the education of students with mild exceptional needs. Clinical experience. Prerequisites: EDU 111

Prerequisite: EDU 111.

**EDU 1001 - Montessori Exploration (EL 1) (1)**

This course provides an overview of Montessori philosophy and methodology for the Elementary I (students ages 6-9) classroom. Clinical experience.

**EDU 1100 - Montessori E-I EC Overview (0)**

This course is a comprehensive introduction to child development and the Montessori philosophy/theory, methodology, and materials usage in the Montessori Early Childhood environments, that is intended to provide background and preparation for lower elementary teacher candidates pursuing Montessori qualifications to teach in Montessori lower elementary classrooms. The course is specifically focused on coverage of Montessori theories of child development, preparation of the environment and adult, classic materials and methodologies, and significant presentations that are precursors to the Elementary I curriculum.

Crosslisted as: EDU 1103.

**EDU 1103 - Montessori E-I EC Overview (3)**

This course is a comprehensive introduction to child development and the Montessori philosophy/theory, methodology, and materials usage in the Montessori Early Childhood environments, that is intended to provide background and preparation for lower elementary teacher candidates pursuing Montessori qualifications to teach in Montessori lower elementary classrooms. The course is specifically focused on coverage of Montessori theories of child development, preparation of the environment and adult, classic materials and methodologies, and significant presentations that are precursors to the Elementary I curriculum.

Crosslisted as: EDU 1100.

**EDU 1110 - Montessori E-I Philosophy/Child Development (3)**

This course addresses the characteristics and physical, cognitive, and social-emotional development of children ages 6-12 years old as well as introducing the philosophical underpinnings of the Montessori lower elementary educational methodology and philosophy as it applies to children of this age range. The course includes topics such as preparation of the teacher and environment for learning, integrated curriculum, Montessori's vision of "cosmic education," peace education, classroom/student observation strategies and practices, and methods for encouraging student autonomy and independence. This course is a blended online and in-person course.

Crosslisted as: EDU 1113.

**EDU 1113 - Montessori E-I Philosophy/Child Development (3)**

This course addresses the characteristics and physical, cognitive, and social-emotional development of children ages 6-12 years old as well as introducing the philosophical underpinnings of the Montessori lower elementary educational methodology and philosophy as it applies to children of this age range. The course includes topics such as preparation of the teacher and environment for learning, integrated curriculum, Montessori's vision of "cosmic education," peace education, classroom/student observation strategies and practices, and methods for encouraging student autonomy and independence. This course is a blended online and in-person course.

Crosslisted as: EDU 1110.

**EDU 211 - Education Immersion (1)**

A study of the responsibilities of teaching in a specific setting. The candidate is assigned to an area school according to subject matter and grade level of planned certification. Clinical experience. Prerequisite: EDU 111; education major

Prerequisite: EDU 111; education major.

**EDU 212 - Music for the Elementary Teacher (2)**

A study of general music fundamentals and methods. There is an emphasis on integrated instruction and the appropriate use of music to enhance the cognitive and psychomotor domains. Open to elementary and HPE majors.

Prerequisite: Open to elementary and HPE majors.

**EDU 222 - Educational Psychology for the Elementary Teacher (2)**

A study of the application of basic psychological principles to classroom instruction and the school environment at the K-6 level. Current research about motivation, theories and philosophies of how children learn, and major theories of child growth and development are explored. All developmental domains of children from birth through early adolescence are examined.

Prerequisite: EDU 111

Prerequisite: EDU 111.

**EDU 232 - Educational Psychology for the Middle & Secondary School Teacher (2)**

A study of the application of basic psychological principles to classroom instruction and the school environment at the middle and high school levels. Motivation, principles of learning, crucial issues and alternative learning environments are explored. All developmental domains of the early adolescent through young adult are examined. Clinical experience. Prerequisite: EDU 111

Prerequisite: EDU 111.

**EDU 242 - Physical Education for the Elementary School Teacher (2)**

Methods of elementary school physical education which meet the developmental needs of children. Focus on curriculum and skill attainment. Clinical experience in area schools.

**EDU 252 - School & Community Health (2)**

Knowledge of observing and understanding the health needs of school-aged children. The role of the school health program, students' habits, attitudes and understanding of good health practices are explored. Focus on health programs amenable to community action.

**EDU 273 - Issues in American Education (3)**

A study of the historical, philosophical, and social aspects of American public education. The legal and financial basis of public education and the rights and responsibilities of teachers and students are reviewed. Significant professional issues are identified and explored.

**EDU 282 - The Development of Students with Mild Except Needs (2)**

A study of the characteristics and needs of students with disabilities. Factors that affect the learning and development of students with mild exceptional needs are examined. Clinical experience. Prerequisites: EDU 181, Admission to Professional Education Sequence

Prerequisite: EDU 181, Admission to Professional Education Sequence.

**EDU 2100 - Montessori E-I Mathematics Curriculum (0)**

This course is an introduction to the Montessori methodology for elementary classrooms, specifically focused on mathematics—arithmetic. The course introduces concrete materials and methods for assisting lower elementary children in

arithmetic, from developing a grasp of basic numeration through advanced levels of the four operations, memorization of mathematic facts, and beginning fractions—all using Montessori hands-on materials. Philosophical underpinnings will illuminate how elementary children develop their mathematical minds—the ability to measure and abstract, to reason, to make comparisons and draw conclusions, to think logically and be exact. This course takes place in a clinical lab and hands-on practice with materials is required. Prerequisites: EDU 1100/1103 and EDU 1110/1113

Prerequisite: EDU 1100/1103 and EDU 1110/1113. Crosslisted as: EDU 2103.

### **EDU 2103 - Montessori E-I Mathematics Curriculum (3)**

This course is an introduction to the Montessori methodology for elementary classrooms, specifically focused on mathematics—arithmetic. The course introduces concrete materials and methods for assisting lower elementary children in arithmetic, from developing a grasp of basic numeration through advanced levels of the four operations, memorization of mathematic facts, and beginning fractions—all using Montessori hands-on materials. Philosophical underpinnings will illuminate how elementary children develop their mathematical minds—the ability to measure and abstract, to reason, to make comparisons and draw conclusions, to think logically and be exact. This course takes place in a clinical lab and hands-on practice with materials is required. Pre-requisites: EDU 1100/1103 and EDU 1110/1113

Prerequisite: EDU 1100/1103 & EDU 1110/1113. Crosslisted as: EDU 2100.

### **EDU 2110 - Montessori E-I Cultural Geography Curriculum (0)**

This course is an introduction to the hands-on materials and methodology for lower elementary traditional and Montessori classrooms, specifically focused on coverage of integrated cultural curriculum, including introductory work in history; human, physical, and political geography; biology; and physical science. The course addresses content topics of human geography and world cultures, human habitation, migration, and the interface between humans, their environments, and the idea of dwelling. Emphasis is on the methods, materials, and philosophical underpinnings of the cultural subjects through a holistic and integrated approach. This course takes place in a clinical lab and hands-on practice with materials is required. Prerequisites: EDU 1100/1103 & EDU 1110/1113

Prerequisite: EDU 1100/1103 & EDU 1110/1113. Crosslisted as: EDU 2113.

### **EDU 2113 - Montessori E-I Cultural Geography Curriculum (3)**

This course is an introduction to the hands-on materials and methodology for lower elementary traditional and Montessori classrooms, specifically focused on coverage of integrated cultural curriculum, including introductory work in history; human, physical, and political geography; biology; and physical science. The course addresses content topics of human geography and world cultures, human habitation, migration, and the interface between humans, their environments, and the idea of dwelling. Emphasis is on the methods, materials, and philosophical underpinnings of the cultural subjects through a holistic and integrated approach. This course takes place in a clinical lab and hands-on practice with materials is required. Prerequisites: EDU 1100/1103 & EDU 1110/1113

Prerequisite: EDU 1100/1103 & EDU 1110/1113. Crosslisted as: EDU 2110.

### **EDU 301 - Instructional Design Practicum (1)**

An in-depth study of the responsibilities of teaching in a specific setting. The candidate is assigned to an area school according to subject matter and grade level of planned certification. Clinical experience. Corequisite: EDU 303

Corequisite: EDU 303.

### **EDU 303 - Instructional Design (3)**

A study of the problems, purposes, and responsibilities of teaching, including educational standards, deductive and inductive instructional strategies, assessment, needs of diverse learners, daily and long-range planning, classroom management, and parental involvement in the schools. Corequisite: EDU 301, Admission to Professional Education Sequence

Corequisite: EDU 301, Admission to Professional Education Sequence.

**EDU 312 - Exceptional Learners (2)**

A study of exceptional children and programs in K-12 educational settings. Areas of study are program design, identification processes, curriculum development, inclusion, mainstreaming and program evaluation. Special education areas of concentration include learning disabilities, visual/hearing impaired, physically handicapped, emotionally handicapped, and mentally handicapped. (Gifted area of concentration includes academic.) Clinical experience.

**EDU 322 - Culturally Responsive Teaching (2)**

A study of educational programs and practices in schools with multicultural populations and a focus on becoming a culturally responsive teacher. Clinical experience.

**EDU 331 - Literacy in the Content Area Practicum (1)**

A supervised field-based experience at the secondary 5-12 level with an emphasis on applying literacy strategies appropriate for the various subject matter disciplines. Open to secondary education and all-grade education majors only. Co-requisite: EDU 332

Corequisite: EDU 332.

**EDU 332 - Literacy in the Content Area (2)**

A study of content area reading at the middle and high school levels. An emphasis on comprehension, study skills, and reading strategies appropriate for the various subject matter disciplines. Open to secondary and all-grade majors only. Prerequisite: EDU 301, EDU 303; Corequisite: EDU 331

Prerequisite: EDU 301, EDU 303 . Corequisite: EDU 331.

**EDU 342 - The Kindergarten Experience (2)**

A study of developmentally appropriate learning environments and practices for kindergarten teachers and their students. Integrated methods of teaching early and emergent literacy skills, math, social studies, science, art, health, technology, and music are explored in light of the cognitive, emotional, social, and physical development of children between the ages of 4-6 years old. In addition to raising awareness for identifying special needs, multicultural issues within the socio-cultural environment are addressed. Prerequisite: EDU 222

Prerequisite: EDU 222.

**EDU 353 - Children's Literature (3)**

Major emphasis is placed on selection and reading of quality children's literature associated with early childhood, middle childhood, and early adolescent stages of development. Literary genres are studied in relation to their value to children. Ways to best present literature in the classroom are explored, including children's responses to literature. Open to elementary education majors only. Prerequisites: EDU 111

Prerequisite: EDU 111.

**EDU 362 - Classroom Behavior & Environment (2)**

A study of how educators can manage the behavior of learners and organize classrooms to achieve positive outcomes. Clinical experience.

**EDU 372 - Teaching of Literacy (3-6) (2)**

A study of scientifically based reading instruction used to positively impact growth of learners in grades 3-6. Areas of study include essential components of literacy assessment, instruction, intervention, extension, and ongoing progress monitoring that is developmentally appropriate for learners in grades 3-6. No clinical placement. Prerequisite: EDU 303; Corequisite: EDU 445

Prerequisite: EDU 303. Corequisite: EDU 445.

**EDU 382 - Behavioral Analysis of Students with Mild Exceptional Needs (2)**

A study of positive behavioral interventions and supports for students with mild exceptional needs. Clinical experience.  
Prerequisites: EDU 282

Prerequisite: EDU 282.

**EDU 391 - Independent Study for Franks School of Education (1)**

This 1-3 credit course analyzes selected topics in education. A summative project that synthesizes explored content and includes real life application will be developed and presented by the student. This independent study must be arranged by the FSOE advisor or faculty and approved by the Franks School of Education Dean. Prerequisite: Permission from the FSOE Dean

Prerequisite: Permission from the FSOE Dean.

**EDU 392 - Independent Study for Franks School of Education (2)**

This 1-3 credit course analyzes selected topics in education. A summative project that synthesizes explored content and includes real life application will be developed and presented by the student. This independent study must be arranged by the FSOE advisor or faculty and approved by the Franks School of Education Dean. Prerequisite: Permission from the FSOE Dean

Prerequisite: Permission from the FSOE Dean.

**EDU 393 - Independent Study for Franks School of Education (3)**

This 1-3 credit course analyzes selected topics in education. A summative project that synthesizes explored content and includes real life application will be developed and presented by the student. This independent study must be arranged by the FSOE advisor or faculty and approved by the Franks School of Education Dean. Prerequisite: Permission from the FSOE Dean

Prerequisite: Permission from the FSOE Dean.

**EDU 3100 - Montessori E-I Geometry Curriculum I (0)**

This course is Part I of an introduction to the Montessori methodology for elementary classrooms, specifically focused on mathematics—geometry. This course addresses basic foundations of geometry including the fundamental concepts. Philosophical underpinnings will illuminate how elementary children develop their mathematical minds—the ability to measure and abstract, to reason, to make comparisons and draw conclusions, to think logically and be exact. This course takes place in a clinical lab and hands-on practice with materials is required. Prerequisites: EDU 1100/ EDU 1103 and EDU 1110/ EDU 1113 or permission of the program director

Prerequisite: EDU 1100/EDU 1103 and EDU 1110/EDU 1113 or permission of the program director. Crosslisted as: EDU 3101.

**EDU 3101 - Montessori E-I Geometry Curriculum I (1)**

This course is Part I of an introduction to the Montessori methodology for elementary classrooms, specifically focused on mathematics—geometry. This course addresses basic foundations of geometry including the fundamental concepts. Philosophical underpinnings will illuminate how elementary children develop their mathematical minds—the ability to measure and abstract, to reason, to make comparisons and draw conclusions, to think logically and be exact. This course takes place in a clinical lab and hands-on practice with materials is required. Prerequisites: EDU 1100/EDU 1103 and EDU 1110/EDU 1113 or permission of the program director

Prerequisite: EDU 1100/EDU 1103 and EDU 1110/EDU 1113 or permission of the program director. Crosslisted as: EDU 3100.

**EDU 3110 - Montessori E-I Language Curriculum (3)**

This course is an introduction to the Montessori methodology for elementary classrooms, specifically focused on language—reading, writing, grammar, sentence analysis, word study, spelling, and literature. The course introduces concrete materials and

methods for assisting lower elementary children in spoken and written communication, from a developmental approach—all using Montessori hands-on materials. This course takes place in a clinical lab and hands-on practice with materials is required. Prerequisites: EDU 1100/1103 & EDU 1110/1113

Prerequisite: EDU 1100/1103 & EDU 1110/1113. Crosslisted as: EDU 3113.

**EDU 3113 - Montessori E-I Language Curriculum (3)**

This course is an introduction to the Montessori methodology for elementary classrooms, specifically focused on language—reading, writing, grammar, sentence analysis, word study, spelling, and literature. The course introduces concrete materials and methods for assisting lower elementary children in spoken and written communication, from a developmental approach—all using Montessori hands-on materials. This course takes place in a clinical lab and hands-on practice with materials is required. Prerequisites: EDU 1100/1103 & EDU 1110/1113

Prerequisite: EDU 1100/1103 & EDU 1110/1113. Crosslisted as: EDU 3110.

**EDU 3120 - Montessori E-I Movement, Art and Music Curriculum I (0)**

This course introduces the basics of movement / physical education for the Montessori elementary class. The course offers theory and hands-on instruction and proposes strategies and methods for integrating movement into the experience of Montessori lower elementary children. This course is followed by EDU 3140/EDU 3141. Prerequisites: EDU 1100/EDU 1103 and EDU 1110/EDU 1113 or permission of the program director

Prerequisite: EDU 1100/EDU 1103 and EDU 1110/EDU 1113 or permission of the program director. Crosslisted as: EDU 3121.

**EDU 3121 - Montessori E-I Movement, Art and Music Curriculum I (1)**

This course introduces the basics of movement / physical education for the Montessori elementary class. The course offers theory and hands-on instruction and proposes strategies and methods for integrating movement into the experience of Montessori lower elementary children. This course is followed by EDU 3140/EDU 3141. Prerequisites: EDU 1100/EDU 1103 and EDU 1110/EDU 1113 or permission of the program director

Prerequisite: EDU 1100/EDU 1103 and EDU 1110/EDU 1113 or permission of the program director. Crosslisted as: EDU 3120.

**EDU 3130 - Montessori E-I Geometry Curriculum II (0)**

This course is Part II of an introduction to the Montessori methodology for elementary classrooms, specifically focused on mathematics—geometry. This course addresses basic foundations of geometry including lines, angles, triangles, quadrilaterals, polygons, circles, and an introduction to area—also using Montessori hands-on materials for learning. This course takes place in a clinical lab and hands-on practice with materials is required. Prerequisites: EDU 1100/EDU 1103, EDU 1110/EDU 1113, and EDU 3100/EDU 3101 or permission of the program director

Prerequisite: EDU 1100/1103, EDU 1110/EDU 1113, and EDU 3100/EDU 3101 or permission of the program director. Crosslisted as: EDU 3131.

**EDU 3131 - Montessori E-I Geometry Curriculum II (1)**

This course is Part II of an introduction to the Montessori methodology for elementary classrooms, specifically focused on mathematics—geometry. This course addresses basic foundations of geometry including lines, angles, triangles, quadrilaterals, polygons, circles, and an introduction to area—also using Montessori hands-on materials for learning. This course takes place in a clinical lab and hands-on practice with materials is required. Prerequisites: EDU 1100/EDU 1103, EDU 1110/EDU 1113, and EDU 3100/EDU 3101 or permission of the program director

Prerequisite: EDU 1100/EDU 1103, EDU 1110/EDU 1113, and EDU 3100/EDU 3101 or permission of the program director. Crosslisted as: EDU 3130.

**EDU 3140 - Montessori E-I Movement, Art and Music Curriculum II (0)**

This course continues with the basics of integrated arts including visual art, music, drama, and dance. The course offers theory and hands-on instruction and proposes strategies and method for integrating the arts and movement into the experience of Montessori lower elementary children. Prerequisite: EDU 1100/EDU 1103, EDU 1110/EDU 1113 and EDU 3120/EDU 3121 or permission of the program director

Prerequisite: Prerequisite: EDU 1100/EDU 1103, EDU 1110/EDU 1113 and EDU 3120/EDU 3121 or permission of the program director. Crosslisted as: EDU 3141.

**EDU 3141 - Montessori E-I Movement, Art and Music Curriculum II (1)**

This course continues with the basics of integrated arts including visual art, music, drama, and dance. The course offers theory and hands-on instruction and proposes strategies and methods for integrating the arts and movement into the experience of Montessori lower elementary children. Prerequisites: EDU 1100/EDU 1103, EDU 1110/EDU 1113 and EDU 3120/EDU 3121 or permission of the program director

Prerequisite: EDU 1100/EDU 1103, EDU 1110/EDU 1113 and EDU 3120/EDU 3121 or permission of the program director. Crosslisted as: EDU 3140.

**EDU 411 - Practicum in Teaching - Middle School (1)**

A supervised field-based experience at the middle school (5-8) level, with an emphasis on effective teaching methods and the philosophy of education. Prerequisites: EDU 422, Admission to Professional Education Sequence

Prerequisite: EDU 422, Admission to Professional Education Sequence.

**EDU 412 - The Middle School (2)**

A study of the historical and philosophical origins of the middle school. The changing cognitive, physical, social and emotional needs of the middle level learner are examined; team teaching, exploratory, advisor-advisee, intramural activities; scheduling; teacher qualities; parent expectations are examined. Prerequisites: EDU 301, EDU 303

Prerequisite: EDU 301, EDU 303.

**EDU 422 - Middle School Methods (2)**

A study of instruction and techniques for successful teaching of middle-level students. Emphasis on planning, application, team teaching, interdisciplinary teaching, interrelationship of subject matter. Clinical experience. Prerequisite: EDU 412

Prerequisite: EDU 412.

**EDU 431 - Secondary Methods Practicum (1)**

A supervised field-based experience at the secondary (9-12) level, with an emphasis on effective teaching methods and the philosophy of education. Open to secondary and all-grade majors only. Prerequisite: EDU 301, EDU 303, and content area approval

Prerequisite: EDU 301, EDU 303, and content area approval .

**EDU 441 - Teaching of Literacy Practicum (1)**

An in-depth study of the responsibilities of teaching reading in an elementary setting. Clinical experience. Open to elementary majors only. Corequisite: EDU 445

Corequisite: EDU 445.

**EDU 442 - Secondary Methods (2)**

A study of teaching methods designed to facilitate competency in specific subject areas; methods, daily and long-range



planning, classroom management, instructional technology, curriculum development, secondary school organization, individualized instruction, motivation, concept development, and interdisciplinary teaching. Open to secondary and all-grade majors only. Clinical experience. Corequisite: EDU 431

Corequisite: EDU 431.

**EDU 445 - Teaching of Literacy (K-2) (5)**

A study of multiple approaches used in the teaching of reading including balanced reading programs, phonics, and literature-based programs. A study of reading methods, strategies, and techniques designed to help children who are experiencing difficulties learning to read. Open to elementary majors only. Prerequisite: EDU 301, EDU 303; Corequisite: EDU 441

Prerequisite: EDU 301, EDU 303; Corequisite: EDU 441. Corequisite: EDU 441.

**EDU 452 - Art for the Elementary Teacher (2)**

A study of discipline-based art education as it applies to the elementary classroom. Emphasis on the preparation of art projects and the use of art as a tool of learning using a variety of mediums and materials. Open to elementary majors only. Clinical experience. Prerequisite: EDU 301, EDU 303

Prerequisite: EDU 301, EDU 303 .

**EDU 454 - Methods of Teaching Mathematics & Science (4)**

A study of methodologies, techniques, and materials used in the teaching of mathematics and science at the K-6 level. Emphasis is on hands-on science and the use of math manipulatives. National and state curriculum standards specific to teaching mathematics and science are examined and included as critical components of effective lesson/unit planning. Open to elementary majors only. Clinical experience. Prerequisite: EDU 301, EDU 303

Prerequisite: EDU 301, EDU 303.

**EDU 462 - Educational Measurement (2)**

A study of methods of assessment and evaluation that include standardized tests, teacher-made tests, authentic assessment, rubrics, portfolios, performance assessment, informal assessment. Prerequisite: EDU 301, EDU 303

Prerequisite: EDU 301, EDU 303.

**EDU 463 - Educational Media And Technology (3)**

A study of instructional media and technology used in K-12 settings. Prerequisite: EDU 301, EDU 303

Prerequisite: EDU 301, EDU 303.

**EDU 464 - Methods of Teaching Language Arts & Social Studies (4)**

A study of methodologies, techniques, technology, and curricular resources used in the teaching of language arts and social studies at the K-6 level. National and state curriculum standards specific to teaching social studies and oral/written expression in language arts are examined and included as critical components of effective lesson/unit planning. Clinical experience. Open to elementary majors only. Prerequisite: EDU 301, EDU 303

Prerequisite: EDU 301, EDU 303.

**EDU 470 - Supervised Student Teaching (10)**

Observation, participation, and teaching in a school under the direction of a master cooperating teacher and university supervisor. Candidate is assigned to an area school for 16 full weeks according to subject matter and grade level of planned certification. Prerequisites: senior status; 3.0 GPA in major, overall; Corequisite: EDU 482

Prerequisite: Senior status; 3.0 GPA in major, overall. Corequisite: EDU 482.

**EDU 473 - Issues in American Public Education (3)**

A study of the historical, philosophical, and social aspects of American public education. The legal and financial basis of public education and the rights and responsibilities of teachers and students are reviewed. Significant professional issues are identified and explored.

Prerequisite: EDU 301 and EDU 303.

**EDU 482 - Student Teaching Seminar (2)**

Analysis, synthesis, and reflection based on the student teaching experience. Prerequisites: senior standing; 3.0 GPA in major, overall; Corequisite: EDU 470

Prerequisite: Senior standing; 3.0 GPA in major, overall. Corequisite: EDU 470.

**EDU 483 - Individualized Planning & Assessment of Students with Mild Exceptional Needs (3)**

A study of formal and informal assessments used in the field of special education. Examination includes the development, implementation, monitoring, and amending of individualized programs for students with mild exceptional needs. Clinical experience. Prerequisites: EDU 382

Prerequisite: EDU 382.

**EDU 484 - Methods of Teaching Students with Mild Exceptional Needs (4)**

A study of methodologies, techniques, technology, materials, and curricular resources used in teaching students with mild exceptional needs. Experiences will include planning, managing, and modifying learning environments and applying strategies that develop students' curriculum, communication, and social skills. Clinical experience. Prerequisites: EDU 483

Prerequisite: EDU 483.

**EDU 4001 - Directed Studies In Education (1)**

Individual projects, research, and/or directed studies of contemporary issues in the field of professional education. Credit arranged on an individual basis. Prerequisite: Approval of the Dean of the Franks School of Education

Prerequisite: Approval of the Dean of the Franks School of Education.

**EDU 4002 - Directed Studies In Education (2)**

Individual projects, research, and/or directed studies of contemporary issues in the field of professional education. Credit arranged on an individual basis. Prerequisite: Approval of the Dean of the Franks School of Education

Prerequisite: Approval of the Dean of the Franks School of Education.

**EDU 4003 - Directed Studies In Education (3)**

Individual projects, research, and/or directed studies of contemporary issues in the field of professional education. Credit arranged on an individual basis. Prerequisite: Approval of the Dean of the Franks School of Education

Prerequisite: Approval of the Dean of the Franks School of Education.

**EDU 4004 - Directed Studies In Education (4)**

Individual projects, research, and/or directed studies of contemporary issues in the field of professional education. Credit arranged on an individual basis. Prerequisite: Approval of the Dean of the Franks School of Education

Prerequisite: Approval of the Dean of the Franks School of Education.

**EDU 4005 - Directed Studies In Education (5)**

Individual projects, research, and/or directed studies of contemporary issues in the field of professional education. Credit arranged on an individual basis. Prerequisite: Approval of the Dean of the Franks School of Education

Prerequisite: Approval of the Dean of the Franks School of Education.

**EDU 4100 - Montessori E-I Curriculum Design/Classroom Leadership I (0)**

This course introduces the basics of Montessori program, curriculum and environmental design for the lower elementary (6-9) classroom and the requirements of the teacher/guide for leading effective learning and engagement among students, scheduling, planning, record keeping, assessment, community building and family involvement, conflict resolution, cultural awareness and inclusion, and peaceful interactions. This course is followed by EDU 4160/EDU 4161. Prerequisites: EDU 1100/EDU 1103 and EDU 1110/EDU 1113 or permission of the program director

Prerequisite: EDU 1100/EDU 1103 and EDU 1110/EDU 1113 or permission of the program director. Crosslisted as: EDU 4101.

**EDU 4101 - Montessori E-I Curriculum Design/Classroom Leadership I (1)**

This course introduces the basics of Montessori program, curriculum and environmental design for the lower elementary (6-9) classroom and the requirements of the teacher/guide for leading effective learning and engagement among students, scheduling, planning, record keeping, assessment, community building and family involvement, conflict resolution, cultural awareness and inclusion, and peaceful interactions. This course is followed by EDU 4160/EDU 4161. Prerequisites: EDU 1100/EDU 1103 and EDU 1110/EDU 1113 or permission of the program director

Prerequisite: EDU 1100/EDU 1103 and EDU 1110/EDU 1113 or permission of the program director. Crosslisted as: EDU 4100.

**EDU 4103 - Education Studies Internship (3)**

This course provides senior-level education students with immersive capstone experience in a setting aligned to their career path. An application of theory and implementation of educational strategies are required. This internship must be arranged by the FSOE advisor or faculty and approved by the Franks School of Education Dean. Prerequisite: Senior-level Education Studies majors

Prerequisite: Senior-level Education Studies majors.

**EDU 4110 - Montessori E-I Practical Life Curriculum (0)**

This course addresses the basics of activities for practical living within a Montessori lower elementary classroom. Topics include self-care, hygiene, health, safety, care of the environment, gardening, food preparation, information technology and media, maker activities and spaces, handwork—particularly as it applies to cultural studies, and care of classroom/school pets. Prerequisite: EDU 1100/1103 and EDU 1110/1113

Prerequisite: EDU 1100/1103 & EDU 1110/1113. Crosslisted as: EDU 4112.

**EDU 4112 - Montessori E-I Practical Life Curriculum (2)**

This course addresses the basics of activities for practical living within a Montessori lower elementary classroom. Topics include self-care, hygiene, health, safety, care of the environment, gardening, food preparation, information technology and media, maker activities and spaces, handwork—particularly as it applies to cultural studies, and care of classroom/school pets. Prerequisite: EDU 1100/1103 and EDU 1110/1113

Prerequisite: EDU 1100/1103 & EDU 1110/1113. Crosslisted as: EDU 4110.

**EDU 4120 - Montessori E-I Practicum Teaching I (0)**

This represents the first practicum (student teaching) component of the Montessori Elementary I Education Program. Practicum

students will observe, participate, and teach in a Montessori setting under the guidance of a university supervisor. Complete details of this component are found in the Practicum Handbook. Prerequisite: Summer academic phase of coursework in Montessori E-I education or permission of the program director.

Prerequisite: Summer academic phase of coursework in Montessori E-I education or permission of the program director.  
Crosslisted as: EDU 4123.

### **EDU 4123 - Montessori E-I Practicum Teaching I (3)**

This represents the first practicum (student teaching) component of the Montessori Elementary I Education Program. Practicum students will observe, participate, and teach in a Montessori setting under the guidance of a university supervisor. Complete details of this component are found in the Practicum Handbook. Prerequisite: Summer academic phase of coursework in Montessori E-I education or permission of the program director

Prerequisite: Summer academic phase of coursework in Montessori E-I education or permission of the program director.  
Crosslisted as: EDU 4120.

### **EDU 4130 - Montessori E-I Practicum Seminar I (0)**

This online semester course provides guided support, additional content, and systematic practice with the Montessori materials. Students begin a year-long project and have a mechanism to complete and submit independent work based on the previous summer academic phase, during the Practicum year. Students will register for this course in fall. Class will meet synchronously once per week in an online format. Prerequisites: EDU 1100/1103, EDU 1110/1113 or permission of the program director

Prerequisite: EDU 1100/1103, EDU 1110/1113 or permission of the program director. Crosslisted as: EDU 4132.

### **EDU 4132 - Montessori E-I Practicum Seminar I (2)**

This online semester course provides guided support, additional content, and systematic practice with the Montessori materials. Students begin a year-long project and have a mechanism to complete and submit independent work based on the previous summer academic phase, during the Practicum year. Students will register for this course in fall. Class will meet synchronously once per week in an online format. Prerequisites: EDU 1100/1103, EDU 1110/1113 or permission of the program director

Prerequisite: EDU 1100/1103, EDU 1110/1113 or permission of the program director. Crosslisted as: EDU 4130.

### **EDU 4140 - Montessori E-I Practicum Teaching II (0)**

This represents the second practicum (student teaching) component of the Montessori Elementary I Education Program. Practicum students will observe, participate, and teach in a Montessori setting under the guidance of a university supervisor. Complete details of this component are found in the Practicum Handbook. Prerequisite: EDU 4120/4123 or permission of the program director

Prerequisite: EDU 4120/4123 or permission of the program director. Crosslisted as: EDU 4143.

### **EDU 4143 - Montessori E-I Practicum Teaching II (3)**

This represents the second practicum (student teaching) component of the Montessori Elementary I Education Program. Practicum students will observe, participate, and teach in a Montessori setting under the guidance of a university supervisor. Complete details of this component are found in the Practicum Handbook. Prerequisite: EDU 4120/4123 or permission of the program director

Prerequisite: EDU 4120/4123 or permission of the program director. Crosslisted as: EDU 4140.

### **EDU 4150 - Montessori E-I Practicum Seminar II (0)**

This online semester course provides guided support, additional content, and systematic practice with the Montessori materials. Students complete a year-long project, and have a mechanism to complete and submit independent work based on the previous

summer academic phase, during the practicum year. Students will register for this course in the spring semester. Class will meet synchronously once per week in an online format. Prerequisites: EDU 1100/1103, EDU 1110/1113 or permission of the program director

Prerequisite: EDU 1100/1103, EDU 1110/1113 or permission of the program director. Crosslisted as: EDU 4152.

**EDU 4152 - Montessori E-I Practicum Seminar II (2)**

This online semester course provides guided support, additional content, and systematic practice with the Montessori materials. Students complete a year-long project, and have a mechanism to complete and submit independent work based on the previous summer academic phase, during the practicum year. Students will register for this course in the spring semester. Class will meet synchronously once per week in an online format. Prerequisite: EDU 1100/1103, EDU 1110/1113 or permission of the program director

Prerequisite: EDU 1100/1103, EDU 1110/1113 or permission of the program director. Crosslisted as: EDU 4150.

**EDU 4160 - Montessori E-I Curriculum Design/Classroom Leadership II (0)**

This course continues with the basics of Montessori program, curriculum and environmental design for the lower elementary (6-9) classroom and the requirements of the teacher/guide for leading effective learning and engagement among students, scheduling, planning, record keeping, assessment, community building and family involvement, conflict resolution, cultural awareness and inclusion, and peaceful interactions. Prerequisite: EDU 1100/EDU 1103, EDU 1110/EDU 1113, and EDU 4100/EDU 4101 or permission of the program director

Prerequisite: EDU 1100/EDU 1103, EDU 1110/EDU 1113, and EDU 4100/EDU 4101 or permission of the program director. Crosslisted as: EDU 4161.

**EDU 4161 - Montessori E-I Curriculum Design/Classroom Leadership II (1)**

This course continues with the basics of Montessori program, curriculum and environmental design for the lower elementary (6-9) classroom and the requirements of the teacher/guide for leading effective learning and engagement among students, scheduling, planning, record keeping, assessment, community building and family involvement, conflict resolution, cultural awareness and inclusion, and peaceful interactions. Prerequisites: EDU 1100/EDU 1103, EDU 1110/EDU 1113 and EDU 4100/EDU 4101 or permission of the program director

Prerequisite: EDU 1100/1103, EDU 1110/1113 and EDU 4100/4101 or permission of the program director. Crosslisted as: EDU 4160.

**EDU 5012 - Montessori Philosophy/Theory/Peace Education (2)**

**EDU 5013 - Montessori Cultural Studies Curriculum (Physical/Life Science and Social Studies Curriculum) (3)**

**EDU 5022 - Montessori Practical Life/Everyday Living Curriculum (2)**

**EDU 5023 - Montessori Art, Music & Movement Curriculum (3)**

**EDU 5032 - Montessori Sensorial Curriculum (2)**

**EDU 5033 - Montessori Classroom Leadership (3)**

**EDU 5042 - Montessori Language Curriculum (2)**

**EDU 5043 - Montessori Early Childhood Practicum Teaching I (3)**

**EDU 5052 - Montessori Math Curriculum (2)**

**EDU 5053 - Montessori Early Childhood Practicum Teaching II (3)**

**EDU 5062 - Montessori Child Development/Psychology (2)**

**EDU 5072 - Montessori Early Childhood Practicum Seminar I (2)**

**EDU 5082 - Montessori Early Childhood Practicum Seminar II (2)**

**EDU 5102 - The Beginning Teacher (2)**

A study of the foundations for creating an inclusive and effective learning environment that ensures academic and social success for all learners. Clinical placement required.

**EDU 5122 - Partnering with Families (2)**

A study of the importance of welcoming, positive, and supportive partnerships with learners' families and the development of the tools to facilitate those partnerships. Clinical placement required.

**EDU 5132 - Expanding the Classroom with Technology (2)**

A study of the effective use of technology to support an inclusive classroom. Clinical placement required.

**EDU 5333 - Research Methods (3)****EDU 5601 - Montessori E-I Movement, Art and Music Curriculum I (1)**

This course introduces the basics of movement / physical education for the Montessori elementary class. The course offers theory and hands-on instruction and proposes strategies and methods for integrating movement into the experience of Montessori lower elementary children. This course is followed by EDU 5611. Prerequisites: EDU 5603 and EDU 5613 or permission of the program director

Prerequisite: EDU 5603 and EDU 5613 or permission of the program director.

**EDU 5603 - Montessori E-I EC Overview (3)**

This course is a comprehensive introduction to child development and the Montessori philosophy/theory, methodology, and materials usage in the Montessori Early Childhood environments, that is intended to provide background and preparation for lower elementary teacher candidates pursuing Montessori qualifications to teach in Montessori lower elementary classrooms. The course is specifically focused on coverage of Montessori theories of child development, preparation of the environment and adult, classic materials and methodologies, and significant presentations that are precursors to the Elementary I curriculum.

**EDU 5611 - Montessori E-I Movement, Art and Music Curriculum II (1)**

This course continues with the basics of integrated arts including visual art, music, drama, and dance. The course offers theory and hands-on instruction and proposes strategies and methods for integrating the arts and movement into the experience of Montessori lower elementary children. Prerequisites: EDU 5601, EDU 5603, and EDU 5613 or permission of the program director.

Prerequisite: EDU 5601, EDU 5603, and EDU 5613 or permission of the program director.

**EDU 5613 - Montessori E-I Philosophy/Child Development (3)**

This course addresses the characteristics and physical, cognitive, and social-emotional development of children ages 6-12 years old as well as introducing the philosophical underpinnings of the Montessori lower elementary educational methodology and philosophy as it applies to children of this age range. The course includes topics such as preparation of the teacher and environment for learning, integrated curriculum, Montessori's vision of "cosmic education," peace education, classroom/student observation strategies and practices, and methods for encouraging student autonomy and independence. This course is a blended online and in-person course.

**EDU 5621 - Montessori E-I Curriculum Design/Classroom Leadership I (1)**

This course introduces the basics of Montessori program, curriculum and environmental design for the lower elementary (6-9) classroom and the requirements of the teacher/guide for leading effective learning and engagement among students, scheduling, planning, record keeping, assessment, community building and family involvement, conflict resolution, cultural awareness and inclusion, and peaceful interactions. This course is followed by EDU 5631. Prerequisites: EDU 5603 and EDU 5613 or permission of the program director

Prerequisite: EDU 5603 and EDU 5613 or permission of the program director.

**EDU 5622 - Montessori E-I Practical Life Curriculum (2)**

This course addresses the basics of activities for practical living within a Montessori lower elementary classroom. Topics include self-care, hygiene, health, safety, care of the environment, gardening, food preparation, information technology and

media, maker activities and spaces, handwork—particularly as it applies to cultural studies, and care of classroom/school pets. Prerequisites: EDU 5603, EDU 5613 or permission of the program director

Prerequisite: EDU 5603, EDU 5613 or permission of the program director.

### **EDU 5623 - Montessori E-I Cultural Geography Curriculum (3)**

This course is an introduction to the hands-on materials and methodology for lower elementary traditional and Montessori classrooms, specifically focused on coverage of integrated cultural curriculum, including introductory work in history; human, physical, and political geography; biology; and physical science. The course addresses content topics of human geography and world cultures, human habitation, migration, and the interface between humans, their environments, and the idea of dwelling. Emphasis is on the methods, materials, and philosophical underpinnings of the cultural subjects through a holistic and integrated approach. This course takes place in a clinical lab and hands-on practice with materials is required. Prerequisites: EDU 5603, EDU 5613 or permission of the program director

Prerequisite: EDU 5603, EDU 5613 or permission of the program director.

### **EDU 5631 - Montessori E-I Curriculum Design/Classroom Leadership II (1)**

This course continues with the basics of Montessori program, curriculum and environmental design for the lower elementary (6-9) classroom and the requirements of the teacher/guide for leading effective learning and engagement among students, scheduling, planning, record keeping, assessment, community building and family involvement, conflict resolution, cultural awareness and inclusion, and peaceful interactions. Prerequisites: EDU 5621, EDU 5603, and EDU 5613 or permission of the program director

Prerequisite: EDU 5621, EDU 5603, and EDU 5613 or permission of the program director.

### **EDU 5632 - Montessori E-I Practicum Seminar I (2)**

This online semester course provides guided support, additional content, and systematic practice with the Montessori materials. Students begin a year-long project and have a mechanism to complete and submit independent work based on the previous summer academic phase, during the Practicum year. Students will register for this course in fall. Class will meet synchronously once per week in an online format. Prerequisites: EDU 5603, EDU 5613 or permission of the program director

Prerequisite: EDU 5603, EDU 5613 or permission of the program director.

### **EDU 5633 - Montessori E-I Mathematics Curriculum (3)**

This course is an introduction to the Montessori methodology for elementary classrooms, specifically focused on mathematics—arithmetic. The course introduces concrete materials and methods for assisting lower elementary children in arithmetic, from developing a grasp of basic numeration through advanced levels of the four operations, memorization of mathematic facts, and beginning fractions—all using Montessori hands-on materials. Philosophical underpinnings will illuminate how elementary children develop their mathematical minds—the ability to measure and abstract, to reason, to make comparisons and draw conclusions, to think logically and be exact. This course takes place in a clinical lab and hands-on practice with materials is required. Prerequisites: EDU 5603, EDU 5613 or permission of the program director.

Prerequisite: EDU 5603, EDU 5613 or permission of the program director.

### **EDU 5641 - Montessori E-I Geometry Curriculum I (1)**

This course is Part I of an introduction to the Montessori methodology for elementary classrooms, specifically focused on mathematics—geometry. This course addresses basic foundations of geometry including the fundamental concepts. Philosophical underpinnings will illuminate how elementary children develop their mathematical minds—the ability to measure and abstract, to reason, to make comparisons and draw conclusions, to think logically and be exact. This course takes place in a clinical lab and hands-on practice with materials is required. Prerequisites: EDU 5603 and EDU 5613 or permission of the program director

Prerequisite: EDU 5603 and EDU 5613 or permission of the program director.

**EDU 5642 - Montessori E-I Practicum Seminar II (2)**

This online semester course provides guided support, additional content, and systematic practice with the Montessori materials. Students complete a year-long project, and have a mechanism to complete and submit independent work based on the previous summer academic phase, during the practicum year. Students will register for this course in the spring semester. Class will meet synchronously once per week in an online format. Prerequisite: EDU 5603, EDU 5613 or permission of the program director

Prerequisite: EDU 5603, EDU 5613 or permission of the program director.

**EDU 5651 - Montessori E-I Geometry Curriculum II (1)**

This course is Part II of an introduction to the Montessori methodology for elementary classrooms, specifically focused on mathematics—geometry. This course addresses basic foundations of geometry including lines, angles, triangles, quadrilaterals, polygons, circles, and an introduction to area—also using Montessori hands-on materials for learning. This course takes place in a clinical lab and hands-on practice with materials is required. Prerequisites: EDU 5603, EDU 5613, and EDU 5641 or permission of the program director

Prerequisite: EDU 5603, EDU 5613, and EDU 5641 or permission of the program director.

**EDU 5653 - Montessori E-I Language Curriculum (3)**

This course is an introduction to the Montessori methodology for elementary classrooms, specifically focused on language—reading, writing, grammar, sentence analysis, word study, spelling, and literature. The course introduces concrete materials and methods for assisting lower elementary children in spoken and written communication, from a developmental approach—all using Montessori hands-on materials. This course takes place in a clinical lab and hands-on practice with materials is required. Prerequisites: EDU 5603, EDU 5613 or permission of the program director.

Prerequisite: EDU 5603, EDU 5613 or permission of the program director.

**EDU 5663 - Montessori E-I Practicum Teaching I (3)**

This represents the first practicum (student teaching) component of the Montessori Elementary I Education Program. Practicum students will observe, participate, and teach in a Montessori setting under the guidance of a university supervisor. Complete details of this component are found in the Practicum Handbook. Prerequisite: Summer academic phase of coursework in Montessori E-I education or permission of the program director.

Prerequisite: Summer academic phase of coursework in Montessori E-I education or permission of the program director.

**EDU 5673 - Montessori E-I Practicum Teaching II (3)**

This represents the second practicum (student teaching) component of the Montessori Elementary I Education Program. Practicum students will observe, participate, and teach in a Montessori setting under the guidance of a university supervisor. Complete details of this component are found in the Practicum Handbook. Prerequisite: EDU 5663 or permission of the program director

Prerequisite: EDU 5663 or permission of the program director.

## EDUV-Education Graduate Certificate

**EDUV 5002 - Advanced Classroom Management: Children as Change Agents (K-12) (2)**

Virtual Education Software (VESi)

Geared primarily for professionals (e.g., regular or special educators, instructional assistants, school psychologist, counselors) serving children and youths presenting behavior problems in the school or community. This course focuses on cognitive and cognitive-behavioral interventions (often lumped together under the rubric "social skills") with an emphasis on teaching students how to change and manage their own behavior. Since previous knowledge and understanding of traditional behavioral



(operant) concepts and strategies is required, it is strongly recommended that you take an introductory behavior management course to learn the basic terms and concepts of behavior management prior to taking this advanced course.

**EDUV 5003 - Behavior is Language: Strategies for Managing Disruptive Behavior (5-12) (3)**

Virtual Education Software (VESi)

Welcome to *Behavior is Language*, an interactive distance learning course, designed to give you a new perspective on student behavior and effective tools for facilitating positive student change. *Behavior is Language* provides a developmental framework for understanding what students are trying to tell you through the “language” of their behavior. The course teaches behavioral techniques and intervention strategies that remediate disruptive behaviors, reduce power struggles while increasing classroom control and reduce your workloads and burnout. This program helps you, as well as students, find creative, effective solutions to behavioral problems.

After you have completed your studies in the chapters on behavioral theory and interventions, you will be presented with various classroom scenarios in which you will be able to practice and hone your skills for interpreting behavior, determining appropriate interventions and effectively debriefing your students.

Although all of the course content presented in this course can be applied to any person of any age or ability level, some of the intervention strategies require that a certain level of intellectual and verbal skill be possessed by the students if they are to complete verbal and written debriefs. Debriefs will need to be adjusted for younger or less skilled individuals.

**EDUV 5012 - Attention Deficit/Hyperactivity Disorder: Information & Interventions for Effective Teaching (K-6) (2)**

Virtual Education Software (VESi)

Welcome to *Attention Deficit/Hyperactivity Disorder (ADHD)*, an interactive distance learning course designed to help you achieve a better understanding of ADHD and provide intervention strategies to facilitate positive student change. *Attention Deficit/Hyperactivity Disorder* provides information on the history of the disorder, accepted methods to assess and identify students with the disorder, and various treatment methods that are currently being used to treat the disorder. The course helps you through the referral process when you feel a student needs services beyond what you are capable of or comfortable providing in your classroom environment. This course also lists resources for both teachers and parents who would like more help or information about ADHD.

**EDUV 5013 - Early Childhood: Observation & Assessment (EC) (3)**

Virtual Education Software (VESi)

Welcome to *Early Childhood: Observation & Assessment*, an interactive distance learning course which explores observation and assessment instruments, as well as recommended practices and available resources for infants, toddlers, and preschoolers. Content includes an emphasis on observing young children and assessing their early childhood learning environments.

**EDUV 5022 - Autism & Asperger’s Disorder: Information & Effective Intervention Strategies (K-12) (2)**

Virtual Education Software (VESi)

Welcome to *Autism & Asperger’s Disorder*, an interactive computer-based instruction course designed to help you achieve a better understanding of Autism and Asperger’s Disorder, of intervention strategies to enhance communication and learning, and of methods for teaching more conventional behaviors. *Autism & Asperger’s Disorder* provides information on the characteristics of the disorder, learning styles associated with the disorder, communication weaknesses, and various intervention strategies that have proven to be successful when working with students with Autism Spectrum Disorder. The course helps you comprehend why individuals with Autism Spectrum Disorder act the way they do, and what you can do to enhance more appropriate behavior. This course also lists resources for educators, related service personnel, and parents who would like more help or information on autism and Asperger’s Disorder.

**EDUV 5023 - Early Childhood: Program Planning (EC) (3)**

Virtual Education Software (VESi)

Welcome to *Early Childhood: Program Planning*, an interactive distance learning course designed to give you a new perspective on planning and implementing developmentally appropriate practices for young children from birth through age eight. In this course you will learn what is meant by curriculum, assessment, evaluation, and program planning as these terms apply to early childhood education. We will discuss several historical perspectives and theories on child development and examine best practice for early childhood education. We will also examine key concepts and specific activities for teaching various curricular content areas, including language and literacy, mathematics and science, and the expressive arts.

**EDUV 5032 - Build School Communities: Brain Smart Classroom Management (K-12) (2)**

Virtual Education Software (VESi)

This course helps teachers build genuine bonds between themselves and their students and between students and their classmates, to create “kindred classhomes” with a foundation of acceptance, respect, and shared purpose. For many of our students, our classrooms may be a safe, nurturing refuge...the eye of the hurricane they experience as life. This course will help you develop strategies, rituals, and environmental design skills to create these safe havens of learning: kindred classhomes where students and teachers work together in synergistic ways that benefit all members of the school family. Students will learn how to differentiate for classroom management and discipline similarly to differentiating for students’ diverse academic needs. One size does not fit all, but all sizes can fit together.

**EDUV 5033 - Early Childhood: Typical & Atypical Development (EC) (3)**

Virtual Education Software (VESi)

Welcome to *Early Childhood: Typical & Atypical Development*, an interactive distance learning course that covers development during the first six years of life and research-based best practices in early learning. Included will be typical development from the prenatal stage to middle childhood with an emphasis is on individual differences, cultural influences, and the impact of developmental delay and disability. Discussion will also include instructional technology (IT) and assistive technology (AT) applications for this population.

**EDUV 5042 - Child Abuse: Working with Abused & Neglected Children (P-12) (2)**

Virtual Education Software (VESi)

Welcome to *Child Abuse: Working with Abused & Neglected Children*, an interactive computer-based instruction course, designed to help you identify and effectively teach students affected by child abuse and/or neglect. This course discusses the identification of physical, emotional, and sexual abuse; the impact of abuse on the behavior and learning abilities of students; the responsibilities of a teacher to report abuse or provide assistance to students who are the victims of abuse; and methods for teaching students about abuse of all types and its prevention. It also discusses the specific factors that exist in families who abuse or neglect their children. A major emphasis in this course is on helping the participant understand the special learning needs of the abused or neglected child, and how to meet those needs in the regular classroom. Working with parents and community agencies is also emphasized.

This course meets the child abuse and neglect educational requirement in most states. It is the responsibility of the student to verify the course content with your specific state professional licensing agency to ensure proper credit.

**EDUV 5043 - English Language Learner: Language Acquisition (K-12) (3)**

Virtual Education Software (VESi)

*English Language Learner: Language Acquisition* was written to help teachers understand concepts and terms related to educating students whose first language is not English. This course discusses developmental theories and how they apply to English language learners. The focus of this course is on the process of second language acquisition and the role of the

classroom teacher. Included in this course is information about literacy development, integrating language, co-teaching, ELL instructional needs and the legal obligations of schools and teachers to provide services and about the types of programs schools might provide. Also included is information on communicating with parents/guardians.

### **EDUV 5052 - Drugs & Alcohol in Schools: Understanding Substance Use & Abuse (5-12) (2)**

Virtual Education Software (VESi)

Welcome to *Drugs & Alcohol in Schools*, an interactive computer-based instruction course, designed to give you a more comprehensive understanding of alcohol, drugs, and their influences in your classroom. *Drugs & Alcohol in Schools* provides a contextual framework for understanding what students may be experiencing through their own substance use or the impact of substance use around them. The course provides a basic historical perspective of substance use along with descriptions of biological, psychological, and social factors that comprise the disease of addiction. This program will help you better understand a multitude of complex dynamics that contribute to this biological and social phenomenon.

### **EDUV 5053 - English Language Learner: Methods & Materials (K-12) (3)**

Virtual Education Software (VESi)

*English Language Learner: Methods & Materials* was written to help teachers understand concepts and terms related to educating students whose first language is not English. This course discusses how to apply instructional methods in creating lessons; how to create a motivating and caring learning environment; how to integrate teaching reading, writing, speaking, and listening skills; how to differentiate instruction for English language learners; and how to identify culturally appropriate curriculum and instructional resources.

### **EDUV 5062 - Early Childhood: Family-Centered Services (EC) (2)**

Virtual Education Software (VESi)

Welcome to *Early Childhood: Family-Centered Services*, a course that seeks to promote the development of thoughtful, knowledgeable, effective educators for a diverse society. The course provides conceptual frameworks for working with families of children from a variety of backgrounds. Course content places an emphasis on family-centered practices designed to help early childhood professionals involve and support families in the care and education of children.

### **EDUV 5063 - Learning Disabilities: Practical Information for the Classroom Teacher (K-12) (3)**

Virtual Education Software (VESi)

*Learning Disabilities: Practical Information for the Classroom Teacher*, is an interactive computer-based instruction course, that provides an introduction to the field of Learning Disabilities for special education teachers, general classroom teachers, integration teachers and related professionals, especially those working in the areas of language, psychology and counseling.

### **EDUV 5072 - Educational Assessment: Assessing Student Learning in the Classroom (K-12) (2)**

Virtual Education Software (VESi)

Welcome to *Educational Assessment: Assessing Student Learning in the Classroom!* Curriculum, instruction, and assessment work together to support student learning. Students are provided with opportunities to learn the skills, concepts, and work-study practices necessary to be successful in classrooms. Assessments measure student progress toward the standards, help teachers identify each student's instructional needs, and inform parents about what and how their child is learning. The assessments also help to gauge how well schools are supporting the achievement of all students.

However, no matter how many assessments there are, without educators able to use assessments, those assessments are worthless. As educators, we must know how to conduct the assessment, interpret the data, and develop priorities for action. We also must take into account data from other sources, notably the parents and psychologists. We then have to put all this information into some organized format and make the information clear to colleagues and parents.

In order to do this, we have to bring our skills and knowledge about the subject matter into play while answering these questions:

- What is the prerequisite knowledge for this area of the curriculum?
- How important is the particular area?
- Would having a "less than very high" level of competence in one area predispose the child to failure in other areas?
- How much time should be spent on a particular topic?
- Should we consider an alternative area?

### **EDUV 5073 - Reading Fundamentals #3: The Elements of Effective Reading Instruction & Assessment (K-12) (3)**

Virtual Education Software (VESi)

This course will focus on learning to read, reading to learn, and an introduction to reading assessment. As part of these two key areas of reading instruction, the five elements of effective reading instruction will be highlighted, including definitions, implications for instruction, and future directions. These five elements include instruction in: phonemic awareness, phonics, fluency, vocabulary, and text comprehension. Further, we discuss information on teacher preparation in learning about comprehension strategy instruction and reading instruction, as well as how to integrate computer technology into the classroom. Additionally, the course will provide information on important assessment terms and definitions and will explore how reading assessment fits within federal mandated programs, including the Common Core State Standards in English Language Arts. This analysis includes specific recommendations for understanding student reading needs using screening, diagnostic, and progress-monitoring assessments. Finally, the course describes how teachers can conduct and use pivotal curriculum-based measurement procedures in their classrooms.

### **EDUV 5082 - Harassment, Bullying & Cyber-Intimidation in Schools (K-12) (2)**

Virtual Education Software (VESi)

*Harassment, Bullying & Cyber-Intimidation in Schools* will discuss definitions and the personal, social, and legal ramifications associated with sexual harassment, bullying, and cyber-intimidation. The course will address what we know about these troubling areas. We will then explore preventative strategies as well as how school staff can address these issues when they occur. A clear understanding of what constitutes harassment and the harmful effects of harassment on people and institutions is essential to providing a safe and inclusive school environment for all.

### **EDUV 5083 - Response to Intervention: Practical Information for the Classroom Teacher (K-12) (3)**

Virtual Education Software (VESi)

Welcome to *Response to Intervention: Practical Information for the Classroom Teacher*, a course providing an introduction to the Response to Intervention process for special education teachers, general classroom teachers, parents, and related professionals.

### **EDUV 5092 - Working with Students with Special Needs in General Education Classrooms (K-12) (2)**

Virtual Education Software (VESi)

*Inclusion: Working with Students with Special Needs in General Education Classrooms* was written to help teachers understand concepts and terms related to educating students in inclusive classrooms. The course also helps teachers learn about the continuum of placements school systems can use in providing special education and related services to students with disabilities. Information discussed is also designed to help you understand the federal definition of students entitled to special education services, as well as procedures you can use in determining whether these students can be educated in the regular classroom. The course also identifies and describes the roles and responsibilities of special and general educators in providing

special education services to students educated in inclusive classrooms and instructional and classroom management strategies teachers can use to work with these students in the least restrictive environment.

### **EDUV 5093 - Teaching Secondary Math Conceptually: Meeting Mathematics Standards (5-12) (3)**

Virtual Education Software (VESi)

Welcome to *Teaching Secondary Math Conceptually: Meeting Mathematics Standards*, an interactive computer-based instruction course designed to expand your methodology for teaching Mathematics. The course will explore an instructional methodology that incorporates strategies for teaching concepts, constructively, and contextually. The goal is for you to gain a deeper understanding of the underlying concepts of various math topics and explore the principles of teaching those concepts to learners. The course will also explore teaching methodologies that support many federal and state standards. This course will focus on the topics of integers, fractions, factoring, and functions.

### **EDUV 5102 - Infant & Toddler Mental Health: Issues & Information for Educators (EC) (2)**

Virtual Education Software (VESi)

Welcome to *Infant & Toddler Mental Health: Issues & Information for Educators*, an interactive computer-based instruction course designed to help you achieve a better understanding of infant and toddler mental health, child development, and strategies you can use to promote positive relationships with children and their families. This course provides information that will help you to understand and identify your role as a child care provider, educator, and early childhood professional. *Infant & Toddler Mental Health* will provide you with research-based information on child development, attachment, temperament, and curriculum. This course also lists resources for both teachers and parents who would like more help or information about infant and toddler mental health.

### **EDUV 5103 - Try DI!: Planning & Preparing a Differentiated Instruction Program (K-12) (3)**

Virtual Education Software (VESi)

Welcome to *Try DI!: Planning & Preparing a Differentiated Instruction Program*, an interactive computer-based instruction course. This course is designed to provide you an opportunity to learn about an instructional framework, Differentiated Instruction (DI), aimed at creating supportive learning environments for diverse learning populations. Students will be presented a method for self-assessment of the extent to which their current instructional approach reflects the perspective, principles, and practices of the DI approach. The course reflects an approach that aligns the principles of DI with the practices of DI. The concept of a “theory of action” will also be provided within a DI context. The course has also been designed to introduce students to a range of strategies associated with a DI approach. Strategies included in this course have been selected on the basis that they are effective in the widest possible range of educational K-12 settings. This course follows *Why DI?: An Introduction to Differentiated Instruction*, which addressed the **What, Why, and Who** of a classroom that reflects a DI approach. The focus of *Try DI!: Planning & Preparing a Differentiated Instruction Program* is on the **When, Where, and How** of the DI approach.

*Try DI!: Planning & Preparing a Differentiated Instruction Program* is an invitation to reflect, explore, and anchor professional practices in the current literature and growing research base in support of DI. This course is designed for anyone working with a diverse learning population across the K-12 spectrum and will have the most direct application to professionals serving students within a mixed-ability classroom setting.

### **EDUV 5112 - Understanding & Implementing Common Core Standards (K-12) (2)**

Virtual Education Software (VESi)

Welcome to *Understanding & Implementing Common Core Standards*, an interactive computer-based instruction course designed to give you a deeper understanding of the rationale for and structure of this particular standards-based framework. In this course you will learn a number of factors that contributed to the overall design of the Common Core Standards as well as practical pedagogical approaches that will support practitioners working toward deeper implementation. We will reflect on the instructional “shifts” emphasized throughout the Common Core Standards and contextualize the shifts based on the diverse population of students course participants serve. *Understanding & Implementing Common Core Standards* will also provide

connections to a variety of instructional considerations that will support implementation regardless of educational context. Practitioners will be provided opportunities to reflect on current practice and the degree to which they align with the Common Core Standards as well as with colleagues across a wide range of settings implementing these standards.

### **EDUV 5202 - Reading & Writing in Content Area (5-12) (2)**

Virtual Education Software (VESi)

This course offers instruction in teaching reading and writing in various subject matter fields at the secondary level. The material stresses the skills of vocabulary building, comprehension, and writing, as well as methods for motivating adolescents to read and write.

### **EDUV 5203 - Understanding Aggression: Coping with Aggressive Behavior in the Classroom (P-12) (3)**

Virtual Education Software (VESi)

This course is about violence in America, about the aggression in our schools, classrooms, streets, homes and elsewhere. The course speaks to the hate, the fights, the anger, the crimes committed and the victims in our schools and society. It is a course about students, children, teenagers, adults and neighbors, all of us.

The course will consider the many forms of aggression, both criminal and otherwise; its costs and motivation; its perpetrators and targets; its likely and unlikely locations; its impact on our schools, the children; and, most especially, its several causes and promising solutions.

Topics of interest will include violence and the challenge of raising and working with children; aggression in our classrooms; American youth gangs and their influence; past and future sports violence; “hot spot” locations of frequent violence; and the aggression-promoting role of alcohol, temperature, driving, television and other features of modern life. The course also will answer questions such as: Is aggression always bad? How do aggressive thoughts lead to aggressive actions? Is aggression, at least for some people, an addiction? Does the victim contribute to being attacked? Is dating a dangerous proposition? How are the acts of aggression dealt with in other countries, and are there any lessons for America?

The goal of this course is to help educators and adults in general better understand how aggression affects our lives and the lives of children. Hopefully such greater understanding and more skilled efforts at prevention will substantially reduce the aggression and violence that has become all too common in America’s schools.

### **EDUV 5302 - Reading Fundamentals #1: An Introduction to Scientifically-based Research (K-6) (2)**

Virtual Education Software (VESi)

Reading Fundamentals supports the concept of scientifically-based reading research to develop a phonetically-based approach to reading assessment, instruction, evaluation, and remediation.

*An Introduction to Scientifically-based Research*, the first in the three-course Reading Fundamentals series on effective reading instruction, was designed to give background on scientifically-based instruction as it applies to the federal legislation of 2001. The course discusses the research that supports scientifically-based research as it applies to phonetically-based instruction, assessment, and evaluation. The course explores myths and misconceptions concerning reading instruction and remediation. It also presents an evaluation checklist designed to assess the effectiveness of your current reading program. The goal of the course is to present you with research, trustworthy evidence, and background information that support the need for a reading program that is based on scientific research and proven methods.

### **EDUV 5303 - Violence in Schools: Identification, Prevention & Intervention Strategies (P-12) (3)**

Virtual Education Software (VESi)

Welcome to *Violence in Schools*, an interactive computer-based instruction course, designed to give you a better understanding of school violence and increase your interventions strategies. *Violence in Schools* provides a foundational understanding of

violence and the motivational purposes behind aggression. The correlation with and impact of the media, community and family upon violence will be investigated. The course teaches identification and intervention approaches for working with out-of-control behaviors. In addition, each student will receive information on available national resources for both parents and teachers. This course will help each person to increase his or her understanding of violence, the motivations behind the use of violence and specific strategies to minimize the occurrence of violence in a school and community.

**EDUV 5402 - Reading Fundamentals #2: Laying the Foundation for Effective Reading Instruction (K-6) (2)**

Virtual Education Software (VESi)

The federal legislation enacted in 2001 mandates the use of scientifically-based research in programs receiving federal funding that deal with remedial readers. The concept of scientifically-validated methods is so prevalent in the legislation that it appears 110 times in these documents. This three-course Reading Fundamentals series will help improve your knowledge of science and the scientific process suggested for development of remedial reading programs. This knowledge will make you a more informed consumer and an even better advocate for students.

The purpose of this second course in this three-course series is to lay the foundation for effective reading instruction. As part of this course, you will learn about the elements of effective instruction. It is important that all teachers have a firm understanding of effective instructional procedures. Teachers benefit, and more importantly, students benefit, both in terms of their behavior and their academic performance, from effective instruction. Further, you will learn about the importance of reading instruction and read some sobering statistics on reading performance in this country and what happens when individuals are not proficient in reading.

**EDUV 5403 - Why DI?: An Introduction to Differentiated Instruction (K-8) (3)**

Virtual Education Software (VESi)

Welcome to *Why DI?: An Introduction to Differentiated Instruction*, an interactive computer-based instruction course, designed to give you an understanding of the framework of and need for creating supportive learning environments for diverse learning populations. In this course you will learn what is meant by Differentiated Instruction (DI) and the common myths associated with creating the differentiated classroom. We will discuss the legal, theoretical, and pedagogical foundations in the field of education that support the utilization of differentiated instructional practices and principles. We will reflect on best practices and national trends in the design of the educational setting to meet the needs of a diverse learning population. *Why DI?: An Introduction to Differentiated Instruction* will also provide connections to a variety of concepts, variables, and resources that will assist practitioners in aligning their own professional practices with those found in the differentiated classroom.

**EDUV 5502 - Six Traits of Writing Model: Teaching & Assessing (P-12) (2)**

Virtual Education Software (VESi)

Welcome to *Six Traits of Writing Model: Teaching & Assessing*, a course geared primarily for professionals (e.g., regular or special educators, instructional assistants, school psychologists, counselors) working with children and youth in any academic area. This course focuses on why teaching writing is an essential skill for life, and gives theory and practical steps to implement the six traits of writing in any classroom.

**EDUV 5503 - English Language Learner: Evaluation & Assessment (K-12) (3)**

Virtual Education Software (VESi)

This course was written to help teachers understand concepts and terms related to evaluating and assessing students whose first language is not English. This course discusses high-quality assessment and the scope of assessments, including initial placement, annual assessments, and exit assessments. This course ends with a discussion of classroom assessments, including accommodations for those who need language assistance.

**EDUV 5602 - Talented & Gifted: Working with High Achievers (K-6) (2)**

Virtual Education Software (VESi)

Welcome to Talented & Gifted, an interactive computer-based instruction course designed to help you achieve a better understanding of the talented and gifted student, methods used in identification, and strategies for instruction of these students in an inclusive classroom. Talented & Gifted provides information on the history of the exceptional in relation to education, current law, and accepted methods for referral, assessment, and identification of these students. The course also covers methods of differentiating instruction to meet the rate and level of learning of those students identified. The course gives you an understanding of ways to meet the affective needs of the gifted and talented student in the regular classroom.

### **EDUV 5603 - English Language Learner: Linguistics (K-12) (3)**

Virtual Education Software (VESi)

The course was written to help teachers understand concepts and terms related to educating student whose first language is not English. This course discusses how to understand theoretical foundations of linguistics and how to apply the knowledge and skills in linguistics in ELL classrooms and content classroom.

### **EDUV 5702 - Teaching Diversity: Influences & Issues in the Classroom (K-12) (2)**

Virtual Education Software (VESi)

Welcome to *Teaching Diversity: Influences & Issues in the Classroom*, an interactive computer-based instruction course, designed to give you the knowledge and tools to facilitate a diverse classroom effectively. This course will help you understand and identify differences in approaches to learning and performance, including different learning styles and ways in which students demonstrate learning. This course will emphasize understanding how students' learning is influenced by individual experiences, talents, disabilities, gender, language, culture, family, and community values. You will be challenged to apply knowledge of the richness of contributions from our diverse society to your teaching field.

### **EDUV 5802 - Teaching Elementary Math Conceptually: A New Paradigm (K-6) (2)**

Virtual Education Software (VESi)

Welcome to *Teaching Elementary Math Conceptually*, an interactive computer-based instruction course designed to expand your methodology for teaching Mathematics. The course will explore an innovative teaching model that incorporates strategies for teaching concepts constructively and contextually. The goal is for you to gain a deeper understanding of the underlying concepts of various math topics and to explore the principles of teaching those concepts to learners. This course will focus on the topics of number sense, basic operations, and fractions.

### **EDUV 5902 - Traumatized Child: The Effects of Stress, Trauma & Violence on Student Learning (P-12) (2)**

Virtual Education Software (VESi)

Welcome to *Traumatized Child: The Effects of Stress, Trauma & Violence on Student Learning*, an interactive computer-based instruction course designed to help you identify and effectively teach students affected by stress, trauma, and/or violence. This course teaches you to recognize the signs of stress, trauma or violence in students. It also discusses the specific factors that exist in families and communities where stress and violence are common. A major emphasis in this course is on helping the participant understand the special learning needs of the student who is experiencing stress, trauma or violence in his/her life and how to meet his/her needs in the regular classroom. Working with parents and community agencies is also emphasized.

## **EGR-Engineering Graphics**

### **EGR 141 - Introduction Spatial Visualization (1)**

Through instruction and exercises spatial visualization skills will be developed in preparation for engineering coursework and/or advanced coursework. Students will learn how to visualize objects in 3D and communicate that same object on 2D medium by developing their spatial thinking.

### **EGR 143 - Engineering Graphics (3)**

Graphical communication for engineers using sketching and computer-aided drafting. The fundamentals of orthographic



projection, isometric projection and descriptive geometry are taught. An introduction to three dimensional models using solid modeling computer software is also covered. Emphasis is placed on developing the skills needed for mechanical engineering design.

### **EGR 152 - Engineering Graphics for Civil Engineering (2)**

Graphical communication by means of sketching and computer-aided drafting. Fundamentals of orthographic projection and descriptive geometry. This course stresses applications of graphic communications, both manually and through the use of CAD systems.

### **EGR 453 - Advanced Parametric Design (3)**

An introduction to Unigraphics NX design software which includes modeling basics as well and an in depth look at the advanced capabilities of the software as it applies to engineering design. Prerequisite: EGR 143 or ETD 263

Prerequisite: EGR 143 or ETD 263.

## **EM-Emergency Management**

### **EM 253 - Disaster Relief & Recovery (3)**

The purpose of this course is to address relief and recovery from disasters that occur. The majority of effort will focus on natural disasters, but planned (e.g., terrorism) and unplanned (e.g., oil tanker spills) will be covered as well. Policies, programs and procedures for managing the relief effort and methods of providing the best return to normalcy will be discussed and assessed. Also covered will be the concept of minimizing the occurrences and damages of recurring future events.

### **EM 343 - Incident Management (3)**

This course examines the National Incident Management System (NIMS). It explores the five major components of NIMS, preparedness, communications and information management, resource management, command and management and finally ongoing management and maintenance. In particular the course will address command and management and the Incident Command System (ICS). This course will explore both scene management and the interface with multi-agency coordinating groups. The course also addresses management of the multi-agency coordinating groups. The course will explore the difference between disaster management and daily incident management.

### **EM 383 - Preparedness & Response Operations (3)**

The purpose of this course is to promote effective disaster response and management. The course will examine the nature of disasters and the roles of various agencies and actors in response to them. The course will also explore various preparedness strategies that enable more effective disaster response. Past responses will be examined as well as problem solving to propose solutions and improvements that could positively impact future responses. Each student will be expected to gain a solid comprehension of common post-disaster problems as well as effective means of overcoming those challenges and problems.

### **EM 423 - Social Dimensions Of Disaster (3)**

This course will be an overview of empirical versus theoretical approaches; human behavior in disaster; myths and reality; group disaster behavior; community social systems and disaster; cultures, demographics, and disaster behavior distinctions; and model-building in sociological disaster research.

## **ENG-English**

### **ENG 133 - Technical Communication (3)**

Professional communication within STEM fields emphasizing readers' needs to interact with technical information using communication designed for that purpose through language, organization, design, and graphics. After gathering appropriate information using a variety of research methods, communicators will collaborate to present that information in a way that meets readers' needs.

**ENG 143 - College Composition (3)**

Intensive training in methods of exposition and research leading to the ability to write coherent, clear, and persuasive essays. This course focuses on the process of writing, which includes revision and editing of the equivalent of at least 20 pages of prose (approximately 5,000 words).

**ENG 153 - Introduction to Literature (3)**

Introduces the student to literature of some complexity and sophistication, developing a critical vocabulary and skills in reading on an advanced level. Analysis of at least three genres and taking into consideration the cultural and historical contexts of these works.

**ENG 1003 - Critical Reading & Writing (3)**

Emphasizes student reading skills necessary to successfully participate in course discussion, do research, and understand assignment instructions and requirements. Students will also respond in writing to assigned readings. Prerequisite: Completion of ESL program or permission from the Department Chair.

Prerequisite: Completion of ESL program or permission from the Department Chair.

**ENG 233 - Mythology (3)**

An introduction to world mythology, including both Western and non-Western myths. Prerequisite: ENG 143 or ENG 133

Prerequisite: ENG 143 or ENG 133.

**ENG 253 - World Literature (3)**

Introduces the student to Western and non-Western texts in translation which have influenced thought and culture. Through analysis and discussion, students will also develop an essential vocabulary and skills in critical reading. Selections will be drawn from a variety of historical eras, such as the ancient, medieval, and modern and will demonstrate diverse (i.e. gender, culture, and ethnicity), global perspectives.

**ENG 263 - Contemporary Themes in Literatures (3)**

A critical study of works of literature selected for their relevancy to current social, ethnic, minority, and ethical problems. Special emphasis placed upon minority writers. Prerequisite: ENG 143

Prerequisite: ENG 143.

**ENG 273 - Creative Writing (3)**

Directed experiments in the original composition of literary essays, plays, short stories, longer narratives, or poems.

Prerequisite: ENG 143

Prerequisite: ENG 143.

**ENG 2013 - British Literature I (3)**

A survey of British literature from its beginnings to 1760. Prerequisite: ENG 143 or ENG 133

Prerequisite: ENG 143 or ENG 133.

**ENG 2023 - British Literature II (3)**

A survey of British literature from 1760 to present. A broad range of texts will be covered in light of their historical, socio-political, and cultural contexts. Prerequisite: ENG 143

Prerequisite: ENG 143.

**ENG 2113 - American Literature I (3)**

A survey of American literature from its beginnings to 1890. Prerequisite: ENG 143

Prerequisite: ENG 143.

**ENG 2123 - American Literature II (3)**

A survey of American literature from 1890 to present. Prerequisite: ENG 143

Prerequisite: ENG 143.

**ENG 303 - Advanced Technical Communication (3)**

Examines how technical writers execute their job with an emphasis on how those techniques are applied to completed projects.

Prerequisite: ENG 133

Prerequisite: ENG 133.

**ENG 333 - Studies In Literature (3)**

Study of selected authors and topics. May be repeated for credit so long as course content is not substantially duplicated.

Prerequisite: ENG 143

Prerequisite: ENG 143.

**ENG 363 - The English Language (3)**

A study of the development of English from its origins to present day, including its place on the Indo-European language tree. The course will cover the development and change in English grammar, alphabet, spelling, syntax, and vocabulary as well as etymology and contemporary English dialects. Prerequisite: ENG 143 or ENG 133

Prerequisite: ENG 143 or ENG 133. Corequisite: None. Crosslisted as: N/A.

**ENG 373 - Literary Theory (3)**

Introduces major literary theories such as psychoanalytic theory, structuralism, deconstruction, feminism, New Historicism, post-colonialism. Prerequisite: ENG 143

Prerequisite: ENG 143.

**ENG 3303 - The Bible as Literature (3)**

A survey of selections from the Bible with an emphasis on its component genres, literary qualities, and cultural influence.

Prerequisite: ENG 143

Prerequisite: ENG 143.

**ENG 411 - Writing Center Consulting Laboratory (1)**

Practical experience tutoring writing with the Writing Center. Can be taken up to three times for credit. Corequisite: ENG 412

Corequisite: ENG 412.

**ENG 412 - Writing Center Consulting (2)**

A broad overview of composition and writing center theory, with a particular emphasis on its application in tutoring writing in small groups or conferences. Prerequisite: ENG 143 or ENG 133

Prerequisite: ENG 143 or ENG 133.

**ENG 423 - Drama (3)**

Studies of selected playwrights, movements, trends, and developments in world drama from the beginnings to the present day.  
Prerequisite: ENG 143

Prerequisite: ENG 143.

**ENG 433 - Shakespeare & His Times (3)**

Students will read at least eight of Shakespeare's plays from a variety of genres. Discussion will include a variety of theoretical lenses, Shakespeare scholarship, the sonnets, and the differences between written texts and performance.

**ENG 443 - Poetry (3)**

An investigation of the poetic process through the careful examination of selected poems and statements about poetry.

Prerequisite: ENG 143

Prerequisite: ENG 143.

**ENG 453 - Advanced Composition (3)**

This course prepares students for exposition and oral communication both in and outside the classroom setting through an in-depth study of the functions and conventions of various types of professional genres and research across different disciplines (such as English and Health Sciences). Students will investigate the role composition and research play in their chosen career paths through the execution of a primary research design project and presentation. Prerequisite: ENG 143 or ENG 133

Prerequisite: ENG 143 or ENG 133. Corequisite: none. Crosslisted as: none.

**ENG 4001 - Directed Studies in English (1)**

For senior students of superior ability able to assume a larger share of the responsibility for designing and pursuing a reading research project which is academically respectable. Prerequisite: Permission of the Department Chair

Prerequisite: Permission of the Department Chair.

**ENG 4002 - Directed Studies in English (2)**

For senior students of superior ability able to assume a larger share of the responsibility for designing and pursuing a reading research project which is academically respectable. Prerequisite: Permission of the Department Chair

Prerequisite: Permission of the Department Chair.

**ENG 4003 - Directed Studies in English (3)**

For senior students of superior ability able to assume a larger share of the responsibility for designing and pursuing a reading research project which is academically respectable. Prerequisite: Permission of the Department Chair

Prerequisite: Permission of the Department Chair.

**ENG 4013 - Capstone Study in English (3)**

A capstone course for students who plan to enter law or graduate school and who are capable of writing a polished, academically significant research paper in the field of English. Prerequisite: Permission of the Department Chair

Prerequisite: Permission of the Department Chair.

**ENG 4023 - Senior Capstone Internship (3)**

Students work at least 100 hours in an internship gaining discipline-related work experience leading to a formal presentation and an analytical research report of approximately 20 pages.

Prerequisite: Permission of the Department Chair.

### **ENG 501 - Research & Writing Skills for Professional Success (1)**

This course provides students with the knowledge and practice to improve their skills at reading, writing, and research-fundamental skills necessary for success in graduate school and beyond.

## **ENT-Entrepreneurship**

### **ENT 303 - Entrepreneurial Leadership (3)**

This course examines leadership, influence, and power as it relates to entrepreneurship with a strong emphasis on entrepreneurial character traits and business ethics. Historical, literary, and contemporary examples of successful entrepreneurs provide a framework for examining the theories of leadership and power. Corequisite: MGT 363

Corequisite: MGT 363.

### **ENT 323 - Engineering Concepts (for non-engineering majors) (3)**

Fundamental engineering concepts are introduced, with an emphasis on developing foundations for lifelong learning of technological issues. Broad-based technologies and the importance of technical communication are emphasized. Current and future technologies are discussed by visiting practitioners. Not open to students enrolled in the engineering and technology programs. Prerequisite: MGT 353

Prerequisite: MGT 353.

### **ENT 413 - Creativity-Product/Service Development (3)**

This course explores the nature of creativity from four interacting viewpoints: person, process, product, and environment. Its goal is to develop students' awareness of their creative potential. Activities include group work, discussion, and the development of an idea or invention. Prerequisite: BA 123

Prerequisite: BA 123.

### **ENT 423 - Entrepreneurship & Venture Planning (3)**

This course focuses on entrepreneurship and small business management. Through case studies, simulations, guest lectures, reading and business plan development, students become aware of the unique challenges facing small business owners and entrepreneurs. Students become familiar with the resources available to small business owners by developing and presenting a business start-up plan. Prerequisite: BA 123, MA 253

Prerequisite: BA 123, MA 253.

## **ES-Engineering Science**

### **ES 141 - Biology for Engineers (1)**

This course serves as an industry biology course specific to engineering applications. The following basic topics are discussed at an introductory level: the chemical make-up of living systems, structure and function at the sub-cellular and cellular levels, cell metabolism, and genetics. Students that come in with BIO 114 equivalent transfer credit would be exempt from this course. Prerequisite: Open to engineering and technology majors only

Prerequisite: Open to engineering and technology majors only.

### **ES 213 - Statics (3)**

The first course in engineering mechanics. Subjects cover includes; force and moment vectors, equivalent systems, trusses, frames, and machines, equilibrium of particles and rigid bodies, static friction, centroids and moments of inertia. Corequisite: MA 164, PH 224

Corequisite: MA 164, PH 224.

### **ES 223 - Dynamics (3)**

Kinematics of absolute and relative motion of particles and rigid bodies. Subjects include; kinetics of particles and particle systems. Principles of work and energy, impulse and momentum, and impact. Kinetics of rigid bodies in plane motion.

Prerequisite: MA 164 and PH 224, and Grade of C or better in ES 213

Prerequisite: MA 164 and PH 224, and Grade of C or better in ES 213 .

### **ES 233 - Engineering Materials (3)**

A study of the structure and properties of materials. Materials covered include metals, ceramics, polymers, and composites. Mechanical properties are emphasized, electrical properties, thermal properties, and environmental interactions are addressed. Structural features at the atomistic level, the crystal structure level, and the microstructure level of single and polyphase materials are studied in terms of their effects on material properties. Prerequisite: CH 103 or CH 104 or CH 155H; Corequisite: PH 224

Prerequisite: CH 103 or CH 104 or CH 155H; Corequisite: PH 224. Corequisite: PH 224.

### **ES 243 - Solid Mechanics (3)**

Concepts of stress and strain in engineering materials. Subjects include; Hooke's law and Poisson's relationship, analysis of axial, shear, flexural, and torsional stresses, combined stress, shear and moment distribution in beams, and deformation of structural members. Prerequisite: Grade of C or better in ES 213

Prerequisite: Grade of C or better in ES 213.

### **ES 253 - Electrical Science (3)**

Linear circuit analysis is studied by placing emphasis on the modified nodal admittance matrix method and circuit transformations. Students will: formulate a solution for any circuit containing terminally-defined resistors, capacitors, inductors, coupled inductors, ideal transformers, dependent and independent sources; use professional software to simulate circuits and to facilitate computations and mathematical operations. Prerequisites: MA 164

Prerequisite: MA 164.

### **ES 313 - Thermodynamics (3)**

Introduction to properties of substances and ideal gases by use of tables. Introduction to thermodynamic concepts of systems, control volumes, heat, work and internal energy. Formulation of the First and Second Laws of Thermodynamics with engineering applications, Vapor Water Systems Rankine cycle, First and Second Law analysis of power plant cycles.

Prerequisites: PH 224 and ES 213, and Grade of "C" or better in MA 164

Prerequisite: PH 224 and ES 213, and Grade of "C" or better in MA 164.

### **ES 323 - Fluid Mechanics (3)**

Fundamental properties of fluids. Fluid statics. Kinematics of fluid motion. Conservation of mass, energy and momentum as applied to compressible and incompressible fluids. Similarity. Introduction to laminar and turbulent boundary layers.

Prerequisite: ES 213; Corequisite: MA 213

Prerequisite: ES 213; Corequisite: MA 213. Corequisite: MA 213.

### **ES 343 - Heat Transfer (3)**

Introduction to heat transfer analysis. Study of the primary modes of heat transfer: conduction, convection, and radiation. Engineering applications include heat exchangers, cooling of electronic components, engines, insulation. Prerequisites: ES 313, MA 233, and ES 323 or MAE 3033 or Consent of Chair

Prerequisite: ES 313, MA 233, and ES 323 or MAE 3033 or Consent of Chair.

### **ES 382 - Engineering Economics (2)**

An introduction to the economics component of design and problem solving. Application of economic concepts from present and future value of money, depreciation, and taxes to problems involving replacement studies and selection between alternative uses of capital. Methods include equivalent worth, rate of return, and incremental techniques. Prerequisite: Junior standing or permission of instructor

Prerequisite: Junior standing or permission of instructor.

### **ES 4703 - Operations Management & Quantitative Decision Analysis (3)**

Understand quantitative tools available to plan and manage a project, service or production orientated operation. The class will provide insight into the quantitative decision making and optimization techniques including linear programming, queuing theory and various simulation methodologies. The discussion topics will also include project management, forecasting, inventory management, aggregate planning, materials resource planning, short term scheduling, lean production systems, maintenance and reliability. Prerequisites: MA 253 or MA 393 (Students cannot receive credit for this course and MGT 443)

Prerequisite: MA 253 or MA 393 (Students cannot receive credit for this course and MGT 443).

## **ETD-Design Engineering Technology**

### **ETD 101 - Introduction to Engineering Technology (1)**

This course is required for all freshman engineering technology students. Its purpose is to improve student success, to make the college experience more relevant to career goals, and to help students obtain as much assistance from the university as possible while working toward their degree. The course will cover community building, academic goals, effective learning methods, University orientation, and personal and professional development.

### **ETD 103 - Basic Technical Drawing (3)**

A course in the fundamentals of drafting. Use of instruments and materials, lettering and techniques of penciling. Primary emphasis is on shape and size description of three-dimensional objects. Preparation of drawings for various reproduction processes. Application of drawing geometry and study of sections and conventional practices.

### **ETD 113 - Geometric Dimensioning & Tolerancing (3)**

Introduction to geometric dimensioning and tolerancing including advanced applications of dimensioning principles, tolerances and precision dimensioning. Introduction to part measurement techniques as it relates to geometric dimensioning and tolerancing. Prerequisite: ETD 103

Prerequisite: ETD 103.

### **ETD 123 - Manufacturing Materials & Processes (3)**

An introduction of the physical and mechanical properties of polymers, ceramics, composites, and metal alloys. These four materials classes are quantitatively discussed in relation to modern industrial use. Processes include molding, casting, heat treating and testing of metals, machining, welding and forming in relation to product design and function.

### **ETD 143 - Descriptive Geometry (3)**

Introduction to the principles of multi-view drawings and the solutions of space problems. Methods for solutions of point, line and plane problems, and the angle between planes, parallelism and perpendicularity, revolution, intersection and development problems. Prerequisites: ETD 103

Prerequisite: ETD 103.

**ETD 163 - Environmental Health & Safety (3)**

This introductory level course investigates safety philosophy and the principles of safety. The student will study occupational safety and industrial hazard control with a focus on the basic principles of accident prevention. The analysis of safety performance, cost and identification of accident potential is also studied. Emphasis is placed on concepts and techniques proven useful in reducing accidents and injuries.

**ETD 173 - Computer Aided 3-D Modeling (3)**

An Introductory course which studies the concept of parametric modeling and its application in industry. In this course students will learn the fundamentals of 3D parametric modeling utilizing SolidWorks software which includes the study of detail drawing creation, and assembly modeling. Prerequisite: "C" or better in ETD 103 or EGR 143

Prerequisite: "C" or better in ETD 103 or EGR 143.

**ETD 203 - Basic Mechanisms (3)**

An introduction to kinematics and simple mechanisms. This course studies vector algebra, linkages, mechanism design, velocity and acceleration of mechanisms, and cams and gears. The use of graphical and analytical methods is employed. Prerequisites: MA 123, PH 154

Prerequisite: MA 123, PH 154.

**ETD 233 - Engineering & Manufacturing Systems (3)**

A study of engineering and manufacturing systems such as engineering documentation systems, design control and lean manufacturing technologies. Prerequisites: "C" or better in ETD 173

Prerequisite: "C" or better in ETD 173.

**ETD 253 - Dimensional Metrology (3)**

Emphasis on methods and principles of measuring basic physical qualities for inspection and quality control. Laboratory work in measuring physical variables such as size, flatness, circularity, and total run-out. An introduction and project work in related areas, such as reverse engineering, functional gauge design, and statistical process control. Prerequisites: ETD 113, ETD 123, ETD 173

Prerequisite: ETD 113, ETD 123, ETD 173.

**ETD 263 - Design, Analysis & Prototyping (3)**

The use of the solid models and simulation as an engineering tool for problem solving. The process necessary and creation of rapid prototypes using various systems. A study of advanced techniques using computer simulation to generate results with finite element analysis. Prerequisite: ETD 233

Prerequisite: ETD 233.

**ETD 273 - Electrical Fundamentals (3)**

Electrical circuit principles. Basic circuit laws, motors, generators, controls, distribution systems, and electrical codes are presented. Theory of electricity and magnetism, electrical phenomena, and measurements. Circuits, power, AC phenomena, capacitance, and conduction are studied. Prerequisite: PH 154

Prerequisite: PH 154.

**ETD 293 - Introduction to Computer Numerical Control Principles (3)**

History of numerical control and comparison with conventional machining systems. Standard coding systems and control terminology. Prerequisites: ETD 123, ETD 173



Prerequisite: ETD 123, ETD 173.

**ETD 313 - Design for Manufacture & Assembly (3)**

Principles and methodologies for designing parts and products for: ease and efficiency of manufacture and assembly; maintenance and usability during the service life, along with disposal and recycling at the end of service life. Students will be able to apply DFMA principles to lower the cost of designing, commissioning, and using new products. Prerequisite: ETD 123, ETD 233

Prerequisite: ETD 123, ETD 233.

**ETD 323 - Product Design & Development (3)**

Introduction to product analysis, development and design. Conceptual design, design for manufacture, reverse engineering, concurrent engineering, designing for special needs, prototyping, and product safety. Integration of previous work into complete product design project. Prerequisite: ETD 233

Prerequisite: ETD 233.

**ETD 333 - Statics & Strength of Materials (3)**

Principles of statics, including the analysis of structures using both analytic and graphical methods and friction along inclined surfaces. A more in depth study of the physical properties of engineering materials through analysis of simple direct and combined stresses, determination of structural sizes as function of unit stress, and beam bending and deflection. Prerequisites: MA 134 or Permission of the Instructor

Prerequisite: MA 134 or Permission of the Instructor.

**ETD 353 - Thermodynamics & Heat Transfer for Technology (3)**

This course is an introduction to the basic properties of substances and ideal gases through the use of tables and an overview of thermodynamic concepts of systems, control volumes, heat, work and internal energy. The introductory study of heat transfer analysis and the primary modes of heat transfer: conduction, convection, and radiation will also be covered. Prerequisite: PH 164 or equivalent engineering physics course.

Prerequisite: PH 164 or equivalent engineering physics course.

**ETD 363 - Elements Of Machines (3)**

The study of design principles and calculations of machine elements. To consideration of loads, stresses, and deformations as they relate to design is presented. Failure theories, mechanical material properties, and fatigue are also studied. Prerequisite: ETD 243 or ETD 333, PH 154

Prerequisite: ETD 243 or ETD 333, PH 154.

**ETD 401 - Special Problems in Engineering Technology (1)**

Independent or internship credit for the study of special topics of particular interest in design engineering technology. Course may be taken more than once with a maximum of three credit hours. Prerequisites: Permission of the Department Chair.

Prerequisite: Permission of the Department Chair.

**ETD 402 - Special Problems in Engineering Technology (2)**

Independent or internship credit for the study of special topics of particular interest in design engineering technology. Course may be taken more than once with a maximum of three credit hours. Prerequisites: Permission of the Department Chair.

Prerequisite: Permission of the Department Chair.

**ETD 403 - Special Problems in Engineering Technology (3)**

Independent or internship credit for the study of special topics of particular interest in design engineering technology. Course may be taken more than once with a maximum of three credit hours. Prerequisites: Permission of the Department Chair.

Prerequisite: Permission of the Department Chair.

**ETD 423 - Senior Design Project (3)**

Study of advanced design methods a used in engineering design. A study of the design process as practiced the industrial setting. The procedures used from the start of a design until its final production including presentations and design reports.

Prerequisites: ETD 263, ETD 323

Prerequisite: ETD 263, ETD 323.

**ETD 433 - Computer Numerical Control Principles (3)**

An advanced course that teaches students machining concepts along with CAD/CAM software knowledge in order to generate parts using computer numerical control (CNC) machines. The relationship and application of CNC to product design in engineering will also be explored.

**ETD 463 - Senior Design Project I (3)**

Introduction to product analysis, development and design. Conceptual design, design for manufacture, reverse engineering, concurrent engineering, designing for special needs, prototyping, and product safety. Integration of previous work into complete product design project. Prerequisite: Senior Standing

Prerequisite: Senior Standing.

**ETD 473 - Senior Design Project II (3)**

Study of advanced design methods as used in engineering design. A study of the design process as practiced in the industrial setting. The procedures used from the start of a design until its final production including presentations and design reports.

Prerequisites: ETD 463

Prerequisite: ETD 463.

## EXS-Exercise Science

**EXS 102 - Lifetime Wellness (2)**

Positive wellness based on the value of physical activity and healthy choices is explored. The lab consists of clinical experience with personal wellness status. Personalized exercise prescriptions will be provided.

**EXS 103 - Teaching Sport Skills I (3)**

The purpose of this class is to give the student an understanding of the skills, rules, and strategies for a wide range of sports. The use of proper teaching progressions and techniques will be covered and the students will be asked to write lesson plans and demonstrate their ability to teach. (Sport Management and Exercise Science majors/minors only.)

Prerequisite: Sport Management and Exercise Science majors/minors only.

**EXS 111 - Freshman Practicum for Exercise Science (1)**

A study in Health Science career options. Includes examination of responsibilities of physical therapist, physician assistant, sports performance coach or athletic trainer. Field Experience, Journal.

**EXS 113 - Intro to Exercise Science (3)**

This class will cover terminology, concepts, and careers in the field of exercise science, including first aid principles. Students

will evaluate the qualifications and responsibilities of careers in exercise science.

**EXS 123 - Teaching Sport Skills II (3)**

This class builds on what was taught in EXS 103. The purpose of this class is to give the student an understanding of the skills, rules, and strategies for a wide range of sports. The use of proper teaching progressions and techniques will be covered and the students will be asked to write lesson plans and demonstrate their ability to teach. (Sport Management and Exercise Science majors/minors only.)

Prerequisite: Sport Management and Exercise Science majors/minors only.

**EXS 131 - First Aid (1)**

Classroom discussion and practical application of basic first aid principles. American Red Cross certification available.

**EXS 203 - Risk and Sports (3)**

This course examines terminology, legal aspects and risks associated with sports performance and physical activity.

**EXS 212 - Adaptive Physical Education (2)**

Classroom discussion and supervised lab experience that familiarizes students with a general knowledge of adaptive physical education and the inclusion process from assessment to writing I.E.P. goals.

**EXS 213 - Motor Control (3)**

The study of how basic and applied knowledge of motor control underlies and enhances clinical, practical and research skills in those venues served by exercise scientists, physical educators and related health professionals.

**EXS 221 - Officiating (1)**

The study of officiating, rules and regulations of sports.

**EXS 233 - Drug Education (3)**

Examines the effects of alcohol, tobacco, and the "illicit" drugs on the physical, psychological, and social health of the individual. Performance-enhancing drugs are investigated.

**EXS 243 - Athletic Training (3)**

The role of the athletic trainer is examined. Qualifications, relationships and responsibilities of the trainer in relation to the athlete, coach, team physician and community are discussed. Practical application for injury recognition, evaluation, management, and rehabilitation.

**EXS 263 - Motor Learning (3)**

A study of the science of perceptual/motor learning including an understanding of the research in this area and application to the teaching of a variety of motor skills to people of different ability levels. The student should understand the problems that a learner faces in the acquisition of a variety of motor skills, develop a researched-based vocabulary, and have the ability to apply this knowledge by designing a teaching strategy that can assist the learner in this process.

**EXS 273 - Nutrition (3)**

A review of the nature of nutritional needs. Focus will include the function of nutrients in the body, weight control and the importance of balanced diets.

**EXS 283 - Fitness Evaluation Assessment (3)**

Examination of fitness and wellness assessment techniques. Students are expected to demonstrate competencies in a wide variety of testing and assessment procedures for analyzing fitness and wellness levels. Includes submax testing, blood pressure, body fat analysis, strength assessment, nutritional analysis, and individual exercise program development. American College of

Sport Medicine protocol is utilized.

**EXS 293 - Biomechanics (3)**

Understand the basic concepts of biomechanics, how they relate to the human body, and make connections between biomechanics and the sub disciplines of exercise science.

**EXS 323 - Performance Nutrition (3)**

This class will equip students with knowledge and an understanding of how nutrition plans a role in athletic performance. Students will learn dietary strategies that enhance exercise and sports performance. Prerequisite: EXS 273

Prerequisite: EXS 273.

**EXS 333 - Kinesiology (3)**

The study of the general body mechanics of the human organism; the activities of the physical education program in their relation to coordination and the proper body mechanics, analysis of movement. Prerequisite: Junior standing or permission of instructor

Prerequisite: Junior standing or permission of instructor.

**EXS 343 - Principles of Human Performance (3)**

The purpose of this course is to explore the concepts of human performance and designing skill specific plyometric, agility and stability programs over a periodization cycle. Prerequisite: Junior standing or permission of instructor

Prerequisite: Junior standing or permission of instructor.

**EXS 353 - Exercise Physiology (3)**

The study of body composition, muscular strength, power and endurance. The response of the cardiovascular and respiratory systems to exercise, and the developmental stages of growth are also explored. Prerequisite: Junior standing or permission of instructor

Prerequisite: Junior standing or permission of instructor.

**EXS 363 - Capstone Experience in Exercise Science I (3)**

The purpose of this class is to prepare seniors in Exercise Science to complete their Capstone Experience successfully. It will introduce them to basic research and statistical concepts that can be used to help them develop and design their own original project and correctly analyze the resulting data. By the completion of the class, students will have designed and selected their basic research program and selected appropriate analysis tools to correctly determine the meaning of the results. Prerequisite: Senior standing or permission of instructor

Prerequisite: Senior standing or permission of instructor.

**EXS 373 - Health Promotion & Problems (3)**

A theoretical and practical treatment of the concepts of disease prevention and health promotion. Topics include alcohol, tobacco and drug abuse, physical fitness, nutrition, chronic and communicable diseases, human sexuality and stress management. Prerequisite: Junior standing or permission of instructor

Prerequisite: Junior standing or permission of instructor.

**EXS 383 - Nutrition Counseling (3)**

This class will equip the student with knowledge and an understanding of protocol to give nutrition counseling to a wide range of clients based on their health history and personal wellness and fitness goals. Prerequisite: EXS 273

Prerequisite: EXS 273.

**EXS 393 - Advanced Athletic Training (3)**

Builds on experiences gained in EXS 243. Includes prevention, evaluation and treatment of athletic-related injuries. Emphasis given to injury assessment and topics related to sports medicine. Examines relationship of athletic trainers in management and care of injuries and their role as professional allied health practitioners. Prerequisites: BIO 154 or BIO 384, EXS 243

Prerequisite: BIO 154 or BIO 384, EXS 243.

**EXS 3001 - Topics in Exercise Science (1)**

This course is designed to help students explore topics in the exercise science field.

**EXS 3002 - Topics in Exercise Science (2)**

This course is designed to help students explore topics in the exercise science field.

**EXS 3003 - Topics in Exercise Science (3)**

This course is designed to help students explore topics in the exercise science field.

**EXS 3004 - Topics in Exercise Science (4)**

This course is designed to help students explore topics in the exercise science field.

**EXS 403 - Remedial Exercise & Rehabilitation (3)**

Students become familiar with common physical therapy modalities and their use in sports medicine. Where applicable, the following will be covered for each modality: physics, biophysics, effects, power application, indications and contraindication. Safety is emphasized during instruction and practical experience. Prerequisites: BIO 154, EXS 243, EXS 353

Prerequisite: BIO 154, EXS 243, EXS 353.

**EXS 413 - Corrective Exercise (3)**

The purpose of the corrective exercise class is to provide instruction and practice on inhibitory, lengthening, activation, and integration techniques. Prerequisites: EXS 333

Prerequisite: EXS 333.

**EXS 423 - Evaluation of Athletic Injuries (3)**

Specialized course dealing with anatomy, kinesiology, injury symptoms and specific tests to help trainers recognize and evaluate athletic injuries. Prerequisites: BIO 154, EXS 243

Prerequisite: BIO 154, EXS 243.

**EXS 433 - Developing Health Promotion Program for Adults (3)**

Presentation and examination of health promotion strategies and programs that emphasize lifestyle behaviors that impact health and wellness. Prerequisite: Junior standing or permission of instructor

Prerequisite: Junior standing or permission of instructor.

**EXS 443 - Therapeutic Modalities (3)**

Explores principles of therapeutic rehabilitation of orthopedic injuries including the role of the athletic trainer in the implementation and supervision of a sound rehabilitation program. Special topics include aquatic therapy, the body's response to healing and exercise, development of exercise programs, development and evaluation of tests, measurement techniques and programs, and applications of therapeutic exercise equipment and supplies. Prerequisites: BIO 154, EXS 243

Prerequisite: BIO 154, EXS 243.

**EXS 453 - Capstone Experience in Exercise Science II (3)**

The Capstone is a comprehensive final project, which demonstrates mastery of pedagogy and knowledge. Integration and synthesis of knowledge, skills, pedagogy, and concepts from the disciplines of physical education, exercise science, health education or sport management will be explored. Emphasis is placed on independent work and the development of a student project. Prerequisite: Senior standing or permission of instructor

Prerequisite: Senior standing or permission of instructor.

**EXS 471 - Advanced Global Perspectives Health & Wellness (3)**

The Global Understanding in Health and Wellness course is a study abroad trip intended to assist students in the comparative analysis of holistic health and wellness practices between the U.S. and selected countries. The trip will include site visits to holistic health centers, various cultural tours and key visits to international health and Olympic sport facilities. Students will be expected to complete assigned readings on key health and wellness practices in facilities. Students will be expected to complete assigned readings on key health and wellness practices in the U.S. and other countries to understand the interests and concerns of the global health and wellness community. Prerequisites: EXS 473; sophomore, junior, or senior standing with 2.5 GPA

Prerequisite: EXS 473; sophomore, junior, or senior standing with 2.5 GPA.

**EXS 473 - Global Perspectives Health & Wellness (3)**

The Global Understanding in Health and Wellness course is a study abroad trip intended to assist students in the comparative analysis of holistic health and wellness practices between the U.S. and selected countries. The trip will include site visits to holistic health centers, various cultural tours and key visits to international health and Olympic sport facilities. Students will be expected to complete assigned readings on key health and wellness practices in facilities. Students will be expected to complete assigned readings on key health and wellness practices in the U.S. and other countries to understand the interests and concerns of the global health and wellness community. Prerequisites: sophomore, junior, or senior standing with 2.5 GPA

Prerequisite: sophomore, junior, or senior standing with 2.5 GPA .

**EXS 474 - Intern in Fitness & Exercise Science (4)**

Observation of and participation in a field-related experience under the direction of a field supervisor and a University supervisor. Internship opportunities are limited to EXS majors only and must have the approval of the Department Chair. Prerequisite: Junior standing or permission of instructor

Prerequisite: Junior standing or permission of instructor.

**EXS 483 - Professional Development in Exercise Science (3)**

Explore and evaluate careers within the exercise science field. Students will be discussing the professional skill set, ethics and documentation within the setting through internship based learning experiences. Provides opportunity to interact with other allied health practitioners. Prerequisites: Advisor approval

Prerequisite: Advisor approval.

**EXS 493 - Strength and Conditioning Preparation (3)**

This class discusses how to apply the various energy systems and principles of exercise prescription, health programming and periodization to the strength and conditioning field. Proper technique with exercises and evaluation tools are incorporated to adequately prepare the student for a career in the strength and conditioning field and The Strength and Conditioning Specialist Certification Exam. Prerequisite: Senior standing or permission of instructor

Prerequisite: Senior standing or permission of instructor.

## FIN-Finance

### **FIN 303 - Managerial Finance (3)**

This course is a study of the principles of managerial finance including time value of money, capital budgeting, methods of financing, working capital management, financial statement analysis, and other financial topics. Prerequisites: AC 213, MA 253, BA 213 or CSIT 103

Prerequisite: AC 213, MA 253, BA 213 or CSIT 103.

### **FIN 303H - Managerial Finance (honors section) (3)**

This course is an extended version of the basic managerial finance course. It is designed for honors students and students majoring in finance and accounting. In addition to studying basic principles of managerial finance including time value of money, capital budgeting, methods of financing, working capital management, financial statement analysis, student will also devote a substantial portion of the course to applying these concepts to real data using Excel. Prerequisites: AC 213, MA 253, BA 213 or CSIT 103

Prerequisite: AC 213, MA 253, BA 213 or CSIT 103 .

### **FIN 323 - Money & Banking (3)**

This course is a study of the principles of monetary economics. An analysis of the structure and operation of financial institutions and the Federal Reserve System is included. The function of monetary policy within the framework of macroeconomic theory is examined. (Same as ECO 323) Prerequisite: ECO 223 or ECO 203

Prerequisite: ECO 223 or ECO 203. Crosslisted as: ECO 323.

### **FIN 343 - International Finance (3)**

This course involves a study of the topics essential to the understanding of international finance. Topics include foreign exchange markets and currency risk, international financial markets, international banking, trade financing, country risk analysis, accounting and taxation issues, capital budgeting, international lending, and borrowing techniques. Prerequisite: ECO 223 OR ECO 203

Prerequisite: ECO 223 OR ECO 203.

### **FIN 353 - Personal Finance (3)**

This course is an overview of financing decisions made by individuals for personal financial needs. The course will cover personal financial planning and goal setting, the time value of money, financial institutions, cash flow management and budgeting, controlling and managing debt and credit, major purchases decision-making, identity theft, personal taxes, life and property insurance decision-making, investment basics, foreclosure and bankruptcy, retirement planning, wealth building and career planning.

Prerequisite: MA 113.

### **FIN 363 - Venture Finance (3)**

This course examines the venture financing options available for new business startups; emphasizes creating and analyzing financial documents, approaching financial sources, assessing the financing alternatives, selling stock for growing companies, the capital structure decision and managing the financial condition of a new venture. Prerequisite: FIN 303

Prerequisite: FIN 303.

### **FIN 373 - Introduction to Econometrics (3)**

This course is designed for the finance and economics students as a continuation of MA 253 (Statistics). Students will first revisit the topics of probability, distributions, and hypothesis testing, exploring these topics more thoroughly. Most of the

semester will be devoted to building solid theoretical and practical foundation of econometrics. Students will proceed from the simple regression model onto multiple regression analysis in the context of cross-sectional data, time series data, and finally panel data. Violations and fixes to serial correlation and heteroskedasticity problems will be studied. Students will be asked to demonstrate and apply the concepts studied while carrying out an empirical research project. (Same as ECO 373) Prerequisite: ECO 223 or ECO 203, MA 253

Prerequisite: ECO 223 or ECO 203, MA 253 . Crosslisted as: ECO 373.

### **FIN 383 - Risk & Insurance (3)**

This course examines the nature of risk and how it can be managed through multiple options, but primarily through insurance. The course will explore basic principles of risk management and continue with the major forms of insurance and risk management programs. Students will explore the insurance delivery systems as well as insurance company operations. Students will explore legal principles related to insurance, explore government regulation of insurance, and examine insurance contracts. Life and health plans, personal and commercial policies will all receive attention in this course. Students will be introduced to a number of concepts, programs and insurance policies found in personal and business application. Prerequisite: FIN 303

Prerequisite: FIN 303.

### **FIN 393 - Financial Leadership (3)**

This course examines the role of individuals in leadership positions who oversee high level financials in the workplace and/or in non-profit organizations they serve. This course provides students with an overview of how to handle strategy decisions related to a variety of financial, tax, regulatory compliance, and information technology issues. The course will cover strategies, measurement and control systems, financial analysis tools, funding sources, and management improvement tips that will help provide the greatest possible value to the company. Students will discover the key attributes of financial responsibility as a leader and how it extends beyond the area of accounting competency. Students will learn how to find innovative ways to solve problems, and then use change management skills to implement them. Prerequisite: BA 123 or PSY 113 and MA 163 or MA 173

Prerequisite: BA 123 or PSY 113 and MA 163 or MA 173.

### **FIN 403 - Investments (3)**

An overview of the security markets, sources of investment information, and the classic process of analyzing and valuing securities is presented. Investment opportunities in a wide variety of financial and real assets are explored. The concept of portfolio theory in terms of risk and return is examined. Prerequisite: FIN 303

Prerequisite: FIN 303.

### **FIN 413 - Advanced Managerial Finance (3)**

An analytical approach to financial management of a corporation. Areas covered include: corporate governance, capital budgeting, cost of capital, long term financing, capital structure, dividend policy, working capital management and mergers. Prerequisite: FIN 303

Prerequisite: FIN 303.

### **FIN 423 - Portfolio & Wealth Planning (3)**

This course offers a broad approach to wealth management designed to help the student examine the importance of financial planning and develop skills needed to implement a successful financial plan. Students are introduced to basic financial concepts, investment analysis, risk management, portfolio theory, personal finance, saving and wealth accumulation, financial planning, and asset allocation. Students will answer questions from the perspective of a financial planner advising clients at different stages in their lives like: How much should a client need to retire? How should a client accumulate what they need to retire and how long will it last?

Prerequisite: BA 213, FIN 303.



**FIN 473 - Finance Modeling (3)**

Students learn how to build a realistic equity valuation model, utilizing software such as Bloomberg Professional Service and Excel. Students also get experience in managing an investment portfolio, assessing its performance, and employing various risk management techniques. Prerequisites: BA 213, FIN 303

Prerequisite: BA 213, FIN 303.

**FIN 493 - Topics In Finance (3)**

Offered to examine specific or current business or special financial issues. Possible examples could include asset management, corporate financing, securities analysis and management of financial institutions. Prerequisite: FIN 303

Prerequisite: FIN 303.

**FIN 5063 - Corporate Finance (3)**

This course focuses on the financial management of both publicly held and private corporations. Students are presented with a conceptual framework for addressing problems commonly faced by corporate decision makers and are provided opportunities to apply these concepts to contemporary business situations. Topics covered include but are not limited to: time value of money, the relationship between risk and return including the capital asset pricing model, the valuation and role of debt and equity, capital budgeting/project evaluation techniques, cost of capital, cash flow estimation, project risk analysis, real options, company valuation, and capital structure decisions.

Prerequisite: None.

**FIN 5203 - Finance for Engineers (3)**

This course is a study of managerial finance decision-making for engineers. Students will gain a deep knowledge of the economic viability of engineering decisions and learn an appropriate balance between design alternatives, resulting costs, and their impact on enterprise. Students will learn applied measurable concepts to maximize efficiency and competitive advantage.

**FIN 5823 - Financial Modeling (3)**

In this course, students will learn how to build robust financial forecasts and Excel models, as well as how to analyze and communicate the results to decision makers in the business organization. The focus is on financial modeling techniques used in corporate finance. Areas covered include forecasting financial statements, estimating cost of capital, equity valuation analysis, and capital budgeting. Students will learn how to use sensitivity analysis and simulation techniques in modeling risk. Students will also explore the basics of portfolio models.

**FIN 5833 - International Finance (3)**

This course will cover issues related to economies in the global environment, international financial markets, and international financial management. Throughout the course, students will learn the basic issues of the macro-economy and issues related to balance of payments between national economies. Additionally, the course focuses on the international financial markets, specifically the foreign exchange market, the international money markets, and the conditions that define their interrelation. Finally the course will consider issues associated with the operation of a firm in the global environment, including exchange rate risk management, international portfolio investing and international project evaluation and financing. Key corporate financial issues will be explored including exchange rate exposure, taxation, securities pricing, the cost of capital, and the evaluation of foreign projects. Prerequisites: Graduate standing

Prerequisite: Graduate standing.

**FIN 5843 - Financial Markets & Institutions (3)**

This course is an in-depth study of the U.S. money and capital markets, and institutions. The course examines regulation of the financial industry and the role of financial instruments.

Prerequisite: Graduate standing.

### **FIN 5853 - Investment Analysis & Portfolio Management (3)**

This course requires students to evaluate the mechanics of securities markets, types of available investments, and an introduction to determination of securities values. Problems of investment policy are approached through studies of portfolio selection, performance evaluation, and risk management methods.

Prerequisite: None.

### **FIN 6923 - Managerial Accounting & Finance (3)**

This course is an introduction and examination of essential accounting and finance principle, teaching students how to use accounting and financial information for effective decision making, planning, and controlling the operations of business enterprises. Significant emphasis is placed on corporate finance, introducing financial markets and institutions, asset valuation, and the relationships between risk and return. Other topics include break-even analysis and pricing, product cost systems, capital budgeting, and cost-volume-profit analysis.

## **FIT-Fitness**

### **FIT 1001 - Speed and Agility Training (1)**

Development of flexibility, quickness, agility, and overall athletic speed.

### **FIT 2011 - Coaching Internship (1)**

The course involves a meaningful work experience related to student's field of study or other functional areas of coaching in an approved program. The assignment and company must be approved by the Athletic Director. A maximum of 3 semester hours can be counted toward degree requirements, with a maximum of 3 credit hours for any one work session. Prerequisite: SM 413

Prerequisite: SM 413.

### **FIT 2012 - Coaching Internship (2)**

The course involves a meaningful work experience related to student's field of study or other functional areas of coaching in an approved program. The assignment and company must be approved by the Athletic Director. A maximum of 3 semester hours can be counted toward degree requirements, with a maximum of 3 credit hours for any one work session. Prerequisite: SM 413

Prerequisite: SM 413.

### **FIT 2013 - Coaching Internship (3)**

The course involves a meaningful work experience related to student's field of study or other functional areas of coaching in an approved program. The assignment and company must be approved by the Athletic Director. A maximum of 3 semester hours can be counted toward degree requirements, with a maximum of 3 credit hours for any one work session. Prerequisite: SM 413

Prerequisite: SM 413.

### **FIT 2101 - Walking/Jogging (1)**

Introduction to power walking and the fundamentals of jogging.

### **FIT 2111 - Racquet Sports (1)**

Introductory look at rules, skills, strategy, and etiquette of tennis, racquetball, badminton, and table tennis.

### **FIT 2121 - Learn to Ice Skate (1)**

This course is designed to help students learn to ice skate. The students will gain an understanding of skills and safety components in ice skating.

**FIT 2131 - Golf/Bowling (1)**

Introduction to the proper etiquette and fundamentals of golf and bowling. Service fee will be added for course enrollment.

**FIT 2151 - Social Board Games (1)**

The objective of this activity class is to expose the students to the history, rules, strategies and fundamentals of a variety of social board games including Chess, Checkers, Backgammon, Cranium, Scrabble, Trivial Pursuit, Pictionary, Taboo, and Monopoly.

**FIT 2171 - Pilates (1)**

Pilates workout for students designed to teach students the fundamental movement patterns and exercises associate with Pilates. This course will help build balance, strength, and coordination.

**FIT 2191 - Wrestling (1)**

The objective of this activity class is to improve the student's knowledge of the skills and strategies of wrestling through a variety of drills and games.

**FIT 2221 - Golf I (1)**

The course is an introduction to the game of golf. Golf history, terminology, rules, and etiquette will be introduced. The student will gain the golf skills (swing, pitching, chipping, and putting) to play a 9-hole round of golf.

**FIT 2241 - Bowling (1)**

Introduction to the proper etiquette and fundamentals of bowling. This activity class is designed to improve the student's knowledge of the skills and strategies of bowling through a variety of drills, exercises, and games. Grading is on a (S) Satisfactory or (U) Unsatisfactory basis.

**FIT 2271 - Conditioning (1)**

Development of cardiovascular and strength conditioning. Course will meet three days a week or the equivalent of three hours per week.

**FIT 2281 - Strength & Training for Hockey (1)**

The course is designed to help students learn how to develop and participate in strength and conditioning programs for hockey.

**FIT 2331 - Indoor/Outdoor Soccer (1)**

The objective of this activity class is to improve the student's knowledge of the skills and strategies of indoor and outdoor soccer through a series of drills and games.

**FIT 2341 - Lacrosse (1)**

The objective of this activity class is to introduce the game of lacrosse, its history, the skills, and the strategy of the game.

**FIT 2351 - Karate (1)**

Introduction to the fundamentals, skills, and rules of karate.

**FIT 2361 - Ballroom Dancing (1)**

The objective of this activity class is to expose the student to a number of social dances including the fox trot, waltz, tango, salsa and swing. The proper steps, form, and coordination with the music will enhance the student's confidence on the dance floor.

**FIT 2371 - Volleyball (1)**

The objective of this activity class is to improve the student's knowledge of the skills, rules and strategies of men's and

women's volleyball through a variety of drills, games and tests.

**FIT 2381 - Basketball (1)**

The objective of this activity class is to improve the student's knowledge of the skills and strategies of basketball through a series of drills and games.

**FIT 2391 - Ice Hockey (1)**

The objective of this activity class is to improve the student's knowledge of the skills and strategies of ice hockey through a series of drills and games.

**FIT 2411 - Yoga (1)**

This course is designed to teach students the fundamental movement patterns and exercises associated with yoga. This course will help build balance, strength, and flexibility.

**FIT 2421 - Introduction to Broomball (1)**

An introduction to basic broomball skills. Designed for those who have never played broomball, students with limited broomball experience, or students with broomball experience but no formal instruction.

Prerequisite: NA. Corequisite: NA. Crosslisted as: NA.

**FIT 2431 - Beginner Bridge (1)**

The objective of this activity class is to expose the students to the social, international card game – Bridge. This course is not suitable for students who have previously played Bridge. Those who enjoy Euchre and/or other “trick taking” card games will find Bridge to be enjoyable.

Prerequisite: NA. Corequisite: NA. Crosslisted as: NA.

**FIT 4001 - Special Projects in Fitness (1)**

Credit earned through directed reading, independent study, research or supervised lab or field work. Maximum three hours credit. Prerequisite: Permission of the Department Chair

Prerequisite: Permission of the Department Chair.

**FIT 4002 - Special Projects in Fitness (2)**

Credit earned through directed reading, independent study, research or supervised lab or field work. Maximum three hours credit. Prerequisite: Permission of the Department Chair

Prerequisite: Permission of the Department Chair.

**FIT 4003 - Special Projects in Fitness (3)**

Credit earned through directed reading, independent study, research or supervised lab or field work. Maximum three hours credit. Prerequisite: Permission of the Department Chair

Prerequisite: Permission of the Department Chair.

## FLM-Film

**FLM 203 - Film Appreciation (3)**

This course introduces students to basic film history and elements of film form including cinematography, mise-en-scene, acting, editing, and sound. Through lectures and readings students are exposed to basic cinema vocabulary and various approaches to narrative form and film type. Film screenings of both classic and contemporary films are used to introduce approaches to film criticism. Corequisite: Lab Required

Corequisite: Lab Required.

## FPY-Forensic Psychology

### **FPY 603 - Theory & Practice of Forensic Psychology (3)**

A study of the fundamental elements encompassing the practical and research application of forensic psychology. Students will examine the variables associated to: (a) ethical issues, (b) psychological assessment, (c) police and correctional psychology, (d) child custody evaluations, (e) trial consultation procedures, (f) criminal investigative techniques, (g) eyewitness memory, and (h) insanity pleas and competency evaluations. Prerequisite: Must be admitted to either the MSCJ or Certificate Program

Prerequisite: Must be admitted to either the MSCJ or Certificate Program.

### **FPY 613 - Psychopathology (3)**

An in-depth analysis of mental illness and its association with criminal behavior, to include identification of patterns of psychopathy and sociopathy and the comparison of disparities and similarities between the two. Various disorders will be examined and applied the causation of crime. This course will also examine the DSM-IV in relation to criminal behavior. Prerequisite: Must be admitted to either the MSCJ or Certificate Program

Prerequisite: Must be admitted to either the MSCJ or Certificate Program.

### **FPY 623 - Evaluation & Treatment of Special Populations (3)**

This course provides an overview of the methods and modalities utilized to assess and treat sex offenders, substance abuse offenders, juveniles, and domestic violence perpetrators. Students will concentrate on each classification and interrelationships associated to application, treatment, assessment, and evaluation of the variables accompanying each classification. Prerequisite: Must be admitted to either the MSCJ or Certificate Program

Prerequisite: Must be admitted to either the MSCJ or Certificate Program.

### **FPY 643 - Victimology (3)**

This course involves the study of victims and witnesses of crime. An emphasis will be placed on the psychological and emotional detriments associated with being victimized and the classification of the types of victims. Students will learn how to apply criminological theory to address why offenders choose their victims. Additionally, students will examine a victim's reaction to crime.

Prerequisite: None.

### **FPY 693 - Forensic Psychology Demonstration Project (3)**

An in-depth analysis and synthesis of the concepts contained within the concentration courses. Conducted under the direction of a criminal justice faculty member the student will design and implement a capstone project, and the present the results to a committee of two full-time or adjunct professors who specialize in criminal justice and/or forensic psychology. Prerequisite: CRJ 593, Must be taken in the final term of the MSCJ or Certificate Program, and may be taken with one other MSCJ course

Prerequisite: CRJ 593, Must be taken in the final term of the MSCJ or Certificate Program, and may be taken with one other MSCJ course.

## FRN-French

### **FRN 113 - French I (non-native speakers) (3)**

An introduction to the French language with an emphasis on reading and writing in French. Vocabulary development and the basics of French structure are also covered. No previous study of French is required. **NATIVE SPEAKERS OF FRENCH MAY NOT REGISTER FOR FRN 113**

**FRN 123 - French II (3)**

A continuation of French 113, integrating listening, speaking, and reading, and writing skills. Basic grammar and French cultures are covered. Prerequisite: FRN 113

Prerequisite: FRN 113.

**FS-Forensic Science****FS 203 - Principles of Forensic Science I (3)**

This course is designed as an introduction and overview of the various branches of forensic science such as pathology, toxicology, anthropology, and entomology, and how the various fields play a part in the criminal justice system as they relate to the collection and analysis of crime scene evidence. General topics in forensic science such as ethics, crime scene investigation procedures, and law will be discussed. Prerequisite: Forensic Science majors or permission of the Department Chair

Prerequisite: Forensic Science majors or permission of the Department Chair.

**FS 213 - Digital Forensic Science (3)**

This course introduces the student to investigative techniques involving computers and other electronic devices. Topics include investigative procedures, computer hardware, data recovery methods, and laws concerning digital devices. This course also covers how computers are used in investigations. (Same as INF 213 and LE 213) Prerequisite: ENG 133, CSIT 103, INF 183

Prerequisite: ENG 133, CSIT 103, INF 183 . Crosslisted as: INF 213 and LE 213.

**FS 223 - Principles of Forensic Science II (3)**

This course is a continuation of FS 203. It is designed to introduce the principles of the forensic science laboratory including such topics as microscopy, DNA techniques, latent print analysis, controlled substance analysis, and informatics. Prerequisite: FS 203

Prerequisite: FS 203.

**FS 343 - Criminalistics & Crime Scene Investigations (3)**

Introduction to criminalistics and crime scene investigation. Methods of processing a crime scene: documentation, location, and collection of evidence, proper collection and handling procedures, selection and presentation for analytical examination, and presentation of the process and findings in court. (Same as CRJ 343 and LE 343) Prerequisite: Junior standing or permission of instructor

Prerequisite: Junior standing or permission of instructor. Crosslisted as: LE 343 or CRJ 343.

**FS 351 - Criminalistics & Crime Scene Laboratory (1)**

A laboratory course which explores the basic techniques of collecting and analyzing evidence taken from crime scenes. (Same as LE 351) Prerequisite: FS 343 or LE 343

Prerequisite: FS 343 or LE 343. Crosslisted as: LE 351.

**FS 353 - Criminalistics & Crime Scene Investigations II (3)**

Advanced criminalistics and crime scene investigation. A detailed review of current methodology of collection, processing and court presentation of evidence. Analysis of the roles of law enforcement and forensic scientists.

Prerequisite: FS 343 or CRJ 343.

### **FS 373 - Forensic Comparative Science (3)**

An introduction to the examination process of comparative science evidence. The philosophical study presented will provide the foundation for the student to judge sufficiency of details when determining the source of crime scene evidence. Practical comparative exercises of fractures and tears, firearm and tool marks, finger and palm print, and shoe and tire print examinations, will be included within the class. The class will be approximately half lecture and half examination exercises. Prerequisite: FS 203

Prerequisite: FS 203.

### **FS 383 - Fire, Arson & Explosion Investigation (3)**

An in-depth study of fire, arson, and explosion scene investigation. Emphasis will be placed on the use of the Scientific Method, the principles and techniques of scene preservation and analysis, management of investigation functions, documentation of the scene, and determination of the origin and cause of fires.

Prerequisite: CH 144 or CH 104, CRJ 263 or CRJ 273 .

### **FS 422 - Expert Testimony in Forensic Science (2)**

Consideration of a scientist's role in courtroom testimony, communication of scientific data to the general public, courtroom demeanor, trial preparation, and mock trial experiences. Prerequisite: Senior standing in forensic science program or permission of the Department Chair, SP 203

Prerequisite: Senior standing in forensic science program or permission of the Department Chair, SP 203.

### **FS 423 - Professional Practice in Forensic Science (3)**

This course will consider the scientist's role in courtroom testimony, communication of scientific data to the general public, courtroom demeanor, trial preparation, and mock trial experiences. Topics pertinent to employment and active participation in the forensic science community will also be discussed.

Prerequisite: Senior standing in forensic science program or permission of the Department Chair, SP 203.

## **GE-General Engineering**

### **GE 101 - Introduction To Engineering (1)**

This course is required for all freshman engineering students. Its purpose is to improve student success, to make the college experience more relevant to career goals, and to help students obtain as much assistance from the University as possible while working towards their engineering degrees. The course will cover community building, academic goals, effective learning methods, University orientation, and personal and professional development.

### **GE 113 - Introduction to Engineering Design (3)**

Fundamental concepts of engineering design and development are introduced. Teams of students investigate an engineering problem, research alternative solutions, develop a design, and build and evaluate a prototype.

### **GE 171 - Special Topics in Engineering (1)**

This course will be offered on an as-needed basis, and the topics and credit hours will depend on the need.

### **GE 301 - Engineering Internship (1)**

This course involves a meaningful work experience related to the student's field of study in engineering. The Engineering Internship Coordinator must approve the assignment and company. This course may be taken to a maximum of three credit hours. Prerequisites: Engineering major, 2.5 GPA, junior standing, and permission of the Department Chair. Prerequisites: Engineering major, 2.5 GPA, junior standing, and permission of the Department Chair.

Prerequisite: Prerequisites: Engineering major, 2.5 GPA, junior standing, and permission of the Department Chair.

### **GE 302 - Engineering Internship (2)**

This course involves a meaningful work experience related to the student's field of study in engineering. The Engineering Internship Coordinator must approve the assignment and company. This course may be taken to a maximum of three credit hours. Prerequisites: Engineering major, 2.5 GPA, junior standing, and permission of the Department Chair. Prerequisites: Engineering major, 2.5 GPA, junior standing, and permission of the Department Chair.

Prerequisite: Prerequisites: Engineering major, 2.5 GPA, junior standing, and permission of the Department Chair.

### **GE 303 - Engineering Internship (3)**

This course involves a meaningful work experience related to the student's field of study in engineering. The Engineering Internship Coordinator must approve the assignment and company. This course may be taken to a maximum of three credit hours. Prerequisites: Engineering major, 2.5 GPA, junior standing, and permission of the Department Chair. Prerequisites: Engineering major, 2.5 GPA, junior standing, and permission of the Department Chair.

Prerequisite: Prerequisites: Engineering major, 2.5 GPA, junior standing, and permission of the Department Chair.

### **GE 313 - SPC & Lean Manufacturing (3)**

This course provides the knowledge needed to effectively use Statistical Process Control (SPC). The relationship to quality costs, on-time delivery, concepts of variation, and an analysis of the organization-specific SPC applications will be introduced. Utilizing SPC to improve and maintain consistent production will be covered. The use of Lean manufacturing to shorten the time between the customer order and the product build/shipment by eliminating sources of waste will also be covered through the study of system performance, identification and elimination of waste, elimination of sources of variability, and a good understanding and use of the principles of operations management. Prerequisite: MA253 or equivalent introductory statistics course.

Prerequisite: MA253 or equivalent introductory statistics course.

### **GE 401 - Professional Practice (1)**

This course covers the two broad areas of professional practice. The first consists of topics pertinent to career aspects of the profession: job search activities, graduate school information, lifelong learning, professional registration, and the role of professional societies. The second area concerns the social responsibilities of the practicing professional engineer: professional ethics, the role of engineering in public policy, the need for knowledge of current affairs, and consideration of the impact of technology upon society. Prerequisite: Junior standing in engineering

Prerequisite: Junior standing in engineering.

### **GE 403 - Engineering Project (3)**

A design or capstone project, with industrial or real-world application, producing all necessary and appropriate documentation, and if applicable, models, and prototypes. The project should entail a minimum of 3 hours of work per week. The project must be pre-approved by the Dean for the College of Graduate and Professional Studies and/ or a PE certified faculty member from the school.

Prerequisite: The project must be pre-approved by the Dean for the College of Graduate and Professional Studies and/ or a PE certified faculty member from the school.

### **GE 413 - Design of Experiments (3)**

This course will highlight optimization and improvement of products or manufacturing processes by using statistical techniques to design and analyze experiments. The concepts of factorial and fractional factorial designs of experiments will be introduced. Six Sigma and Lean applications of Microsoft Excel and Minitab software programs for hypothesis testing, analysis of variance, and measurement systems analysis will also be covered. Prerequisite: MA253 or equivalent introductory statistics course.



Prerequisite: MA253 or equivalent introductory statistics course.

### **GE 5093 - Design Thinking (3)**

This course will shape the principles and strategies of creative design and provide a path for students to identify and develop the creative potential required to transform how we identify and solve problems. Solutions for business and society are not merely the domain of creative types, the methods demonstrated within this curriculum will provide students the confidence and opportunity required to illustrate and implement the creative design solutions required for the future.

### **GE 5103 - Project Management (3)**

The course examines project management from the strategic and operational point of view. Project management principles and methodology are covered with special focus on planning, scheduling, controlling, and coordinating individual and group efforts. Project management tools such as the critical path and Gantt charts will be reviewed as well as methods for controlling the four most important elements of any project: scope, time, cost, and resources. The course will focus on project management in manufacturing and industrial settings.

### **GE 5113 - New Product Development & Innovation Strategies (3)**

Market and technology driven innovation strategies to identify and evaluate opportunities for new products will be presented. Methodologies to rapidly develop and market new products meeting customer expectations, target cost, quality, and delivery time will be covered. Procedural details and benefits of implementing a multidiscipline gated product development process involving go-no-go decision at the beginning and the end of various phases including feasibility study, concept development, design, prototype development, validation, product launch and life-cycle management will be discussed.

### **GE 5133 - Lean Six Sigma (3)**

This course will cover statistical Six-Sigma driven Lean Enterprise methodologies to enhance organizational processes and customer defined value to achieve most efficient product cost. Other synergetic methodologies to integrate world-class best practices of engineering and manufacturing leading to operational excellence through cross-functional teamwork and continuous improvements to achieve customer satisfaction and improved profitability will also be discussed. Real-world case studies and problem-solving exercises will be offered as needed to help reinforce the knowledge and concepts involved.

Prerequisite: Graduate standing

Prerequisite: Graduate standing.

### **GE 5163 - Engineered Quality (3)**

This course offers a broad view of Quality Engineer foundations to reinforce management and leadership within the Quality Management System (QMS). The focus aligns process efficiency and total quality management to generate the highest customer value. Various topics are reviewed including: Cost of Quality (COQ), ISO, auditing guidelines, product and process design, material control, metrology, acceptance sampling, reliable Measurement Systems and Analysis (MSA), preventative/corrective actions, process control improvement tools and hazard identification. Students have the ability to utilize this coursework to apply for the Certified Quality Engineer Exam. Prerequisite: Graduate standing

Prerequisite: Graduate standing.

## **GEO-Geography**

### **GEO 213 - Physical Geography (3)**

An analysis of the spatial and functional relationships among landforms, climates, soils, water, and the living world. This course also addresses the connections between environmental processes and human activity, such as human impact on the environment. (Same as EAS 213)

Crosslisted as: EAS 213.

**GEO 303 - Human Geography (3)**

Topical studies to show how human beings have altered and adapted to their physical environments over time through technology, migration, and demographic changes. Focus is on cultural identity and landscape, cultural interaction, and conflict. Prerequisite: Junior standing or permission of instructor

Prerequisite: Junior standing or permission of instructor.

**GEO 313 - Geography of North America (3)**

A regional approach to the United States and Canada. An in-depth look at economic, political, historical, and cultural developments in the context of the physical environment. Focus on the present and the future of each region, as well as how those futures are intertwined. Global context is also considered. Prerequisite: Junior standing or permission of instructor

Prerequisite: Junior standing or permission of instructor.

**GEO 323 - World Geography (3)**

A study of the major cultural regions of the world, with emphasis on human social development (economic, cultural, historical, political), in the context of a given physical environment. Focus is on the present and future of each region, as well as how those futures are intertwined. Prerequisite: GEO 303

Prerequisite: GEO 303.

**GEO 4001 - Readings In Geography (1)**

Credit earned through directed reading, independent study, research or supervised field work. Maximum four hours credit. Prerequisite: Permission of Department Chair

Prerequisite: Permission of Department Chair.

**GEO 4002 - Readings In Geography (2)**

Credit earned through directed reading, independent study, research or supervised field work. Maximum four hours credit. Prerequisite: Permission of Department Chair

Prerequisite: Permission of Department Chair.

**GEO 4003 - Readings In Geography (3)**

Credit earned through directed reading, independent study, research or supervised field work. Maximum four hours credit. Prerequisite: Permission of Department Chair

Prerequisite: Permission of Department Chair.

**GEO 4004 - Readings In Geography (4)**

Credit earned through directed reading, independent study, research or supervised field work. Maximum four hours credit. Prerequisite: Permission of Department Chair

Prerequisite: Permission of Department Chair.

**GER-German****GER 104 - German I (non-native speakers) (4)**

Introduction to the German language and culture. Pronunciation, conversation and basic grammar skills are stressed. No previous study of German is required.

### **GER 114 - German II (4)**

Continues conversation and grammar skills. Additional emphasis on reading and writing. Prerequisite: GER 104 or permission of the instructor

Prerequisite: GER 104 or permission of the instructor.

### **GER 203 - German III (3)**

An intermediate German class with an emphasis on reading and writing skills and grammar review. Students read selected original literary texts by German authors and write short paragraphs related to the texts. Conversational skills are also emphasized. Prerequisite: GER 114 or permission of the instructor

Prerequisite: GER 114 or permission of the instructor.

### **GER 213 - German IV (3)**

A continuation of German III with an emphasis on reading and writing skills and grammar review. The difficulty level of the reading selections increases in this course. Prerequisite: GER 203 or permission of the instructor

Prerequisite: GER 203 or permission of the instructor.

## **GLY-Geology**

### **GLY 271 - Geology Laboratory (1)**

An introductory laboratory study of basic physical geology. The laboratory emphasizes skills needed for the identification of minerals and rocks, for the interpretation of land surface features based on topographic maps and for the understanding of folding, faulting, and rock relationships Trine University 351 through the interpretation of geologic maps. Corequisite or Prerequisite: GLY/EAS 273 (same as EAS 271)

Prerequisite: GLY 273. Crosslisted as: EAS 271.

### **GLY 273 - Geology (3)**

An introduction to the field of geology. Study of minerals and rocks and their formation within the context of the earth's geologic history. Emphasis on soils, running water, and groundwater. Plate tectonics, glaciers, volcanoes, erosion, and weathering are also covered. (Same as EAS 273)

Crosslisted as: EAS 273.

## **GM-Golf Management**

### **GM 131 - Player Development I (1)**

This course is designed to promote game improvement, further explore teaching methodology, and improve technical game skills for Golf Management Majors. Prerequisite: Golf Management Major or Minor

Prerequisite: Golf Management Major or Minor.

### **GM 203 - Golf Shop Management (3)**

This is an introduction to the management of various types of golf facilities. Topics of study include Business Planning, Personnel Management, Tournament and Handicapping Operations, Golf Car Fleet Operations, Merchandising and Inventory Management and Customer Relations. Prerequisite: Golf Management Major or Minor

Prerequisite: Golf Management Major or Minor.

**GM 213 - Club Design, Repair & Fitting (3)**

This course gives students a historical perspective on club design. Students then have opportunity to learn basic club repair and fitting techniques using various industry tools and methodologies. Prerequisite: Golf Management Major or Minor

Prerequisite: Golf Management Major or Minor.

**GM 223 - Promotion & Marketing of Golf Facilities (3)**

This is a study of the various tools and techniques in golf facility promotion. Social media, traditional advertising mediums, special promotions, sales, brochures, tournaments, fund-raisers, and other advertising opportunities are explored. Students determine target markets for various golfing functions that align with the overall business plan for the facility. Prerequisite: GM 203

Prerequisite: GM 203.

**GM 231 - Player Development II (1)**

This course designed to promote game improvement, further explore teaching methodology, and improve technical game skills for Golf Management Majors. Prerequisite: GM 131

Prerequisite: GM 131.

**GM 233 - Internship (3)**

Students will be assigned to golf courses or golf facilities to gain experience in golf operations and management. The term of each internship will vary from three to ten weeks, depending on the nature of the position and responsibilities. Prerequisite: GM 203

Prerequisite: GM 203.

**GM 303 - Teaching the Short Game (3)**

This is a comprehensive study of the methods of teaching and executing the chip shot, the pitch shot, putting, and bunker play. Students will have opportunities to conduct lessons to demonstrate their teaching style. Golf management majors only.

Prerequisite: GM 203

Prerequisite: GM 203.

**GM 323 - Teaching the Golf Swing (3)**

This course examines the principles and theories of golf instruction. Study examines terminology, teaching approaches and styles, practice drills and exercises, teaching aids, and other related areas in the teaching of the swing. Students explore teaching styles for individual and group instruction, golf schools, and demonstrations. Golf management majors only.

Prerequisite: GM 203

Prerequisite: GM 203.

**GM 331 - Player Development III (1)**

This course designed to promote game improvement, further explore teaching methodology, and improve technical game skills for Golf Management Majors. Prerequisite: GM 231

Prerequisite: GM 231.

**GM 343 - Golf Facility Operations (3)**

Students will study the grassroots of golf facilities: agronomy, course architecture, construction (including irrigation, drainage, and contouring), and structural facilities (maintenance barns, pro shop, dining areas, practice areas, driving ranges, golf car storage, etc.). The relationships between inside and outside operations at golf facilities will also be examined. Prerequisite: GM

203

Prerequisite: GM 203.

**GM 411 - Food & Beverage Management (1)**

This course is an introduction to food and beverage industry, including operations and legal issues. Food and beverage service levels at golf facilities will be examined from concessions all the way up to fine dining. Prerequisites: GM 203

Prerequisite: GM 203.

**GM 431 - Player Development IV (1)**

This course designed to promote game improvement, further explore teaching methodology, and improve technical game skills for Golf Management Majors. Prerequisite: GM 331

Prerequisite: GM 331.

**GM 452 - Golf Management Leadership (2)**

This course integrates information in other Golf Management classes to allow students to develop unique leadership styles and methods. Students will also develop a portfolio, revise resumes and cover letters, and apply/interview, for careers upon graduation. Prerequisite: GM 203

Prerequisite: GM 203.

**GM 462 - Senior Seminar in Golf Management (2)**

This course will provide students with a framework for using critical thinking skills to integrate concepts, theories, and methods of inquiry presented through general education and Golf Management studies. Through reading, exercises, self-assessments, presentations, and teamwork, students will learn more about meaningful career options, challenges they will face, and how to plan for advancement and success. Prerequisite: GM 203, GM 303, GM 323

Prerequisite: GM 203, GM 303, GM 323.

**GM 4001 - Research Topics Golf Management (1)**

Special studies of topics related to golf management conducted in independent study under the direction of the staff. May be taken in conjunction with internships, and may be taken for variable credit, for a maximum of four credits.

**GM 4002 - Research Topics Golf Management (2)**

Special studies of topics related to golf management conducted in independent study under the direction of the staff. May be taken in conjunction with internships, and may be taken for variable credit, for a maximum of four credits.

**GM 4003 - Research Topics Golf Management (3)**

Special studies of topics related to golf management conducted in independent study under the direction of the staff. May be taken in conjunction with internships, and may be taken for variable credit, for a maximum of four credits.

**GM 4004 - Research Topics Golf Management (4)**

Special studies of topics related to golf management conducted in independent study under the direction of the staff. May be taken in conjunction with internships, and may be taken for variable credit, for a maximum of four credits.

## GS-General Studies

**GS 4003 - Senior Capstone Project (3)**

The capstone project will give students the opportunity to demonstrate the integration of the two to three academic programs they have chosen for the self-directed concentration. The project will include an oral and written presentation encapsulating the

rationale for the programs selected and the nature of the relationship between them. Prerequisite: Senior standing

Prerequisite: Senior standing.

## HC-Healthcare Management

### **HC 203 - US & World Healthcare Systems (3)**

This course sets the foundation of our healthcare system. The course content helps the student understand systems thinking as it applies to the multiple segments of public, community and academic centered health. Each of these care delivery components are discussed, as well as their functional relationship. Throughout the course, contrasts and comparisons are made to the international delivery of medical care.

### **HC 213 - Healthcare Market Analysis (3)**

Analysis of healthcare strategic planning is explored. Utilizing a mission driven approach, strategic planning is assessed, identifying internal and external strengths and weaknesses of the healthcare market. Learners apply critical thinking to analyze and leverage the position of stakeholders. Learners research and develop marketing concepts designed to assist in the implementation of a strategic plan.

### **HC 303 - History of American Healthcare (3)**

This course is an introductory course in healthcare management. The course will present the history of healthcare systems in America from the late 1800's through the present day. Emphasis will be placed on an understanding of key historical forces which have shaped new millennium models of the American healthcare delivery system.

### **HC 313 - Professional Relationships (3)**

This course stands out as a unique encounter in how to deal with the management relationships with physicians and other professionals that work in healthcare. Healthcare is unique in its separated leadership of business and medical care delivery. The development of skills to manage in this environment is paramount to being the culture of a healthcare organization. Effective strategies in structuring compensation for providers is analyzed.

### **HC 323 - Technology & Clinical Systems (3)**

This course examines the advanced edge of healthcare change. Using individualized medicine as the focus, the student explores the dynamics surrounding the specifics of healthcare change. Students will explore the concepts of being flexible in their administrative role as well as work in teams with collaborative expectations in this specific area of leadership.

### **HC 333 - Management Techniques & Principles (3)**

This course will offer a variety of industrial management techniques applicable to department-level projects within a healthcare facility. The course will incorporate projects and statistical analysis of current operations. Hospital ancillary support departments as well as direct patient care departments will be reviewed. Recommendations for improvement will be derived from the analysis of workflow data and other internal information sources. The course addresses the overall management of a healthcare facility and explores issues such as how to determine what is broken in the organization, prioritization of changes or improvements, long-term impact of current problems, and response strategies to internal and external forces. Prerequisite: MA 253

Prerequisite: MA 253.

### **HC 363 - Information Systems Strategies (3)**

This course identifies leadership skills to apply to management and decision making of health information technology. The focus is on clinical, business, financial and the strategic use of medical information technology. The use of medical technology to mitigate risk and errors in medical care delivery is explored. Given the rapid change in health informatics the use and application of the newest technology is continuously updated so that the student is equipped to lead in today's business and medical informatics application.

### **HC 413 - Healthcare Accounting (3)**

This course introduces the student to accounting specifically related to the health care industry. Audit procedures, insurance (including Medicare and Medicaid) reimbursement, fund accounting, government and grant accounting are also covered. This course uses computer applications. Prerequisite: AC 213

Prerequisite: AC 213.

### **HC 423 - Healthcare Finance (3)**

An analytical approach to financial management of a corporation. Areas covered include: Operating and capital budgets, capital purchases, cost benefit analysis and break-even analysis, financial statement analysis and the financing of facilities. The course is considered the second course and continuation of Managerial Finance with a specialization in health care issues.

Prerequisite: FIN 303, HC 413

Prerequisite: FIN 303, HC 413.

### **HC 433 - Applied Finance & Revenue Cycle (3)**

In healthcare, corporate financial principles and the revenue cycle are integrally tied. This course provides an in-depth examination of the critical components of healthcare financial operations. The content of this course includes the regulatory and legal aspects in understanding the finance issues of corporate compliance. Course content provides the understanding that a student will need to be an effective leader in financially managing their area of operational responsibility.

### **HC 443 - Healthcare Delivery Systems (3)**

This course will evaluate and describe various financing mechanisms available within the healthcare industry. Issues related to insurance and managed care will be explored. The ongoing problem of healthcare availability and accessibility in the United States will be reviewed. The impact of economics, national health status statistics and public policy legislation affecting the U.S. healthcare system will be discussed. A research paper related to the current status of the healthcare delivery system of a foreign country will be required.

### **HC 463 - Effective Quality Management (3)**

The history of healthcare quality is explored including the reduction of medical errors. A working knowledge is gained of the application of quality tools used for organizational improvement. Understanding the principles of reimbursement that will impact value-based quality systems of care to Lean and Six Sigma implementation is included in this course of study.

### **HC 473 - Healthcare Capstone (3)**

The healthcare administration capstone represents an exercise in the culmination of knowledge gained in this entire course of study. Based on a case study approach real world simulation occurs affording the student an ability to manage and evaluate complex healthcare business problems and opportunities. The student is challenged with exercises of qualitative and quantitative analysis as well as a high level of critical thinking skills that would be needed as a healthcare leader. Prerequisites: All required coursework in Health Care Administration core

Prerequisite: All required coursework in Health Care Administration core.

### **HC 6803 - Leadership & Management Healthcare Systems (3)**

This course is an in-depth study of a range of issues and related problems faced by practicing managers and leaders in the rapidly changing healthcare/health services delivery system. Special emphasis is placed on the issues relevant to current challenges, and this emphasis is of utilitarian value to the participants. Examples of issues include rural and urban healthcare, managed care, ethics of healthcare, integrating technology, and leadership styles and traits. Prerequisites: All LDR Core (5000-level) courses OR admission to non-degree graduate certificate program

Prerequisite: All LDR Core (5000-level) courses OR admission to non-degree graduate certificate program.

**HC 6823 - Legal & Ethical Issues in Healthcare Leadership (3)**

The course studies the legal framework of health Services and healthcare delivery, as well as the ethical issues confronted by healthcare administrators in various healthcare settings. Topics will include licensure, medical malpractice, liability, insurance issues, legal standards for care, confidentiality of records (HIPAA), informed consent, and patient rights and patient advocacy. Prerequisites: All LDR Core (5000-level) courses OR admission to non-degree graduate certificate program

Prerequisite: All LDR Core (5000-level) courses OR admission to non-degree graduate certificate program.

**HC 6843 - Organization & Economics of Healthcare Delivery Systems (3)**

The course provides an overview of the development of the current status of the healthcare system in the United States, its organizational structure, and operation of the various healthcare organizations, governmental as well as non-governmental, at the federal, state, and local levels. The course examines the structure and issues of the major Healthcare delivery systems including operation, marketing, financial management and sustainability of outpatient clinics, physician's offices, hospitals, long-term care facilities, self-help organizations, patient advocacy groups, accrediting agencies, and the insurance industry. Concepts addressed include demand (what physicians, patients and families want), supply, distribution, utilization of resources, market theories, and cost-benefit analysis, as they apply to healthcare as a service industry and including current and future payment systems for healthcare. Prerequisites: All LDR Core (5000-level) courses OR admission to non-degree graduate certificate program

Prerequisite: All LDR Core (5000-level) courses OR admission to non-degree graduate certificate program.

**HC 6863 - Healthcare Leadership Capstone (3)**

This capstone course will provide students the opportunity to integrate and synthesize previous coursework in leadership with healthcare content through the creation and implementation of applied programming or secondary/archival research.

Prerequisites: All LDR Core (5000-level) Courses and LDR 6803, LDR 6823, LDR 6833, LDR 6843. Students must complete this course last in the MSOL Program.

Prerequisite: All LDR Core (5000-level) Courses and LDR 6803, LDR 6823, LDR 6833, LDR 6843. Students must complete this course last in the MSOL Program.

**HCI - Healthcare Informatics****HCI 5003 - Intro to Health Informatics (3)**

This course examines the principles of health informatics. Students will analyze health informatics processes including the storage, retrieval, acquisition, and utilization of healthcare information with an aim to improve care quality, reduce errors, and engage patients in their care processes. This course provides students with fundamental ideas, concepts, and technology and information systems to aid in providing care. This course will demonstrate the role of informatics and utility in healthcare delivery, incorporating practical examples of operational systems currently in the field of informatics. Topics covered in this course include primary principles governing clinical decision, information retrieval, telemedicine, evidence-based medicine, and bioinformatics.

Prerequisite: None. Corequisite: None. Crosslisted as: None.

**HCI 5013 - Health Research and Analytics (3)**

This course provides an overview of foundational concepts and ideas around utilizing and analyzing healthcare data. The principles of data science and its practical application to diverse areas of health informatics will also be covered in this course. Students will learn the approaches, methods, tools, and concepts of health services research, analysis, presentation, and interpretation of findings. Additionally, this course will include the role of research in public health informatics and its impact on population health and care processes. Students will also work on publicly available data to apply the concepts from this course.



Prerequisite: None. Corequisite: None. Crosslisted as: None.

### **HCI 5023 - Interoperability Healthcare & Data (3)**

This course provides an overview of foundational concepts and ideas related to healthcare interoperability. It also covers foundational aspects of healthcare data standardization and its relationship to data architecture, meaningful use, electronic health records (EHR), security, privacy, and most common clinical vocabularies. Students will learn about the dynamics associated with national health standards and the Office of the National Health Coordinator for Health Information Technology (ONC) in supporting standardization and interoperability in the United States. Students will learn the approaches, methods, tools, and concepts utilized in care processes, research, quality improvement, and adoption of evidenced processes in ensuring interoperability in health services research, analysis, presentation, and interpretation of findings.

Prerequisite: None. Corequisite: None. Crosslisted as: None.

## **HED-Higher Education Leadership**

### **HED 6513 - Students & Stakeholders in Higher Education Capstone (3)**

This course introduces students to the major human development theories involving college students in American higher education. Special attention will be given to contemporary student development theory and research. Focus will also be directed toward understanding how this body of theory and research can be used to guide the design of policies and practices in higher education. Prerequisites: All LDR Core (5000-level) courses OR admission to non-degree graduate certificate program

Prerequisite: All LDR Core (5000-level) courses OR admission to non-degree graduate certificate program.

### **HED 6533 - Teaching & Learning Higher Education (3)**

This course provides an overview of the issues, principles, and practices associated with effective college teaching. The course assumes, identifies, and uses a body of scholarly knowledge and research appropriate for study and application to the profession of college/university teaching. Topics examined include learning and diversity, teaching models and strategies, teacher and student behaviors and learning outcomes, and instructional improvement strategies. The interaction of theory and practice is an important theme (and challenge) of the course. Prerequisites: All LDR Core (5000-level) courses OR admission to non-degree graduate certificate program

Prerequisite: All LDR Core (5000-level) courses OR admission to non-degree graduate certificate program.

### **HED 6553 - Principles & Practices of Academic Advising (3)**

This course examines the foundations of academic advising as essential components of student success and retention in higher education. Topics include developmental advising; research on academic advising; models and delivery systems; advising skills; including diverse populations; influences on the helping process such as personal characteristics, verbal and nonverbal responses and behaviors, and ethical considerations; and evaluation, assessment, and reward systems for advisors and advising programs. Prerequisites: All LDR Core (5000-level) courses OR admission to non-degree graduate certificate program

Prerequisite: All LDR Core (5000-level) courses OR admission to non-degree graduate certificate program.

### **HED 6573 - Instructional Leadership in Higher Education Capstone (3)**

This course is the capstone course for all students in the Instructional Leadership Concentration, Higher Education Track. The capstone is a special project conducted within an existing educational setting. It may be arranged within the organization in which the student is employed or in another organization which agrees to work with the student on a project of mutual interest. The capstone experience affords each student an opportunity to apply the skills, knowledge, and abilities gained through the leadership core and concentration-area content courses in a process that will generate a solution(s) to or facilitate substantive consideration of a current educational need or issue. Prerequisites: All LDR Core (5000-level) Courses and LDR 6513, LDR 6533, LDR 6553, LDR 6583. Students must complete this course last in the MSOL Program

Prerequisite: All LDR Core (5000-level) Courses and LDR 6513, LDR 6533, LDR 6553, LDR 6583. Students must complete this course last in the MSOL Program.

## HIS-History

### **HIS 103 - American History I (3)**

Traces the major trends in the history of the United States from colonial times to the end of Reconstruction. Concentrates upon the diplomatic, political, economic, intellectual, and cultural achievements of the American nation, set within the larger framework of the European world.

### **HIS 113 - American History II (3)**

Increasing emphasis on the post-Civil War industrial development of the United States and its subsequent role as a great world power to present.

### **HIS 203 - World Civilization I (3)**

A historical review of human civilization from prehistoric times through the Renaissance. The class focuses upon the political, economic, and cultural achievements of various civilizations of the world.

### **HIS 213 - World Civilization II (3)**

A survey of major civilizations of the world in the post-Renaissance period, including Asian, African, and Western European civilizations in the areas of politics, economics, and scientific, and cultural developments. Emphasis is placed on the increasing interdependence of world civilizations and people.

### **HIS 251 - Ancient Greece from the Persian Through Peloponnesian Wars (1)**

An examination of the culture of Athens and Sparta during the 5th century B.C., concentrating on the Persian and Peloponnesian wars and their lasting effects on Western Civilization. (Same as PHL 251)

Crosslisted as: PHL 251.

### **HIS 253 - The Japanese People (3)**

A humanistic approach to the study of the Japanese people. An emphasis on using a historical context to reveal domestic political, social, and economic associations, as well as important achievements in literature, religion, philosophy and art.

### **HIS 263 - Indiana History (3)**

History of Indiana with an emphasis on Indiana's growth and development and its place within U.S. history.

### **HIS 273 - Topics in History (3)**

In depth survey of a selected topic in history. The course changes each semester with the specific topic of study announced in the class schedule.

### **HIS 323 - The Contemporary World (3)**

An analysis of current global issues from a historical perspective with an emphasis on developing an awareness of cultural diversity and an understanding of the role of international governmental and nongovernmental organizations. (Same as POLS 323) Prerequisite: POLS 113 or HIS 113

Prerequisite: POLS 113 or HIS 113. Crosslisted as: POLS 323.

### **HIS 343 - American Political Thought (3)**

A survey and analysis of significant political ideas from colonial times to the present. Some of the ideas discussed in the survey include the philosophies of liberalism, conservatism, and pragmatism, as well as the political thinking of such men as Alexander Hamilton, Thomas Jefferson, John C. Calhoun, Henry Thoreau, Herbert Spencer, and Lester Ward. (Same as POLS 343) Prerequisite: POLS 113

Prerequisite: POLS 113. Crosslisted as: POLS 343.

**HIS 353 - The Civil War & Reconstruction (3)**

A historical review of the American Civil War and Reconstruction. The class focuses on the political, economic, cultural ramifications within American History. Prerequisites: HIS 103, HIS 113, or POLS 113

Prerequisite: HIS 103, HIS 113, or POLS 113 .

**HIS 363 - United States Foreign Policy (3)**

A history of the United States involvement in world affairs from the War of Independence to the present, the close relationship between the foreign policy and domestic concerns is emphasized; an analysis of the policymaking bureaucracy. (Same as POLS 363) Prerequisites: HIS 113

Prerequisite: HIS 113. Crosslisted as: POLS 363.

**HIS 403 - American Constitutional Development (3)**

A study of the historical and judicial developments of the Constitution of the United States by analyzing court decisions and the philosophies of the justices of the Supreme Court. Emphasis on the court's role in the development of national economic policy, with a focus on the court's position on civil rights and liberties, political freedom, and social equality. (Same as POLS 403) Prerequisites: POLS 113

Prerequisite: POLS 113. Crosslisted as: POLS 403.

**HIS 423 - The United States as a World Power (3)**

A study of social, economic, intellectual, and political developments within the United States from approximately 1939 to the present. Emphasis is placed on relating America's developments to its role in international affairs. (Same as POLS 423) Prerequisite: HIS 113

Prerequisite: HIS 113. Crosslisted as: POLS 423.

**HIS 433 - The American Revolution (3)**

A history of the War of Independence and the formation of national government to 1787. Prerequisite: HIS 103

Prerequisite: HIS 103.

**HIS 443 - Readings in American History (3)**

An independent study and research on selected topics in American History. Open to students with departmental approval. Prerequisite: Junior standing or permission of instructor

Prerequisite: Junior standing or permission of instructor.

**HIS 453 - Readings In World History (3)**

An independent study and research on selected topics in World History. Open to students with departmental approval. Prerequisite: Junior standing or permission of instructor

Prerequisite: Junior standing or permission of instructor.

**HIS 4001 - Independent Studies in History (1)**

Credit earned through directed reading, independent study, research, or supervised field work. Maximum 4 hours credit. Prerequisite: Permission of Department Chair

Prerequisite: Permission of Department Chair.

**HIS 4002 - Independent Studies in History (2)**

Credit earned through directed reading, independent study, research, or supervised field work. Maximum 4 hours credit.  
Prerequisite: Permission of Department Chair

Prerequisite: Permission of Department Chair.

**HIS 4003 - Independent Studies in History (3)**

Credit earned through directed reading, independent study, research, or supervised field work. Maximum 4 hours credit.  
Prerequisite: Permission of Department Chair

Prerequisite: Permission of Department Chair.

**HIS 4004 - Independent Studies in History (4)**

Credit earned through directed reading, independent study, research, or supervised field work. Maximum 4 hours credit.  
Prerequisite: Permission of Department Chair

Prerequisite: Permission of Department Chair.

**HNR-Honors Seminar****HNR 121 - Introduction to Honors Seminar (1)**

An introduction to the Honors Program. Current topics will be discussed in an informal atmosphere. Emphasis will be placed on thinking critically as well as the ability to convey one's opinions through written essays. Prerequisite: Admission into the Honors Program

Prerequisite: Admission into the Honors Program.

**HNR 200 - Honors Second Year Seminar (no credit) (0)**

A continuation of the honors program core courses introducing students to different ideas and viewpoints through presentations and discussions with guest speakers. This course is graded on a pass/fail basis. Prerequisite: HNR 121 or Permission of the Honors Program Director

Prerequisite: HNR 121 or Permission of the Honors Program Director.

**HNR 201 - Honors Second Year Seminar (1)**

A continuation of the honors program core courses introducing students to different ideas and viewpoints through presentations and discussions with guest speakers. This course is graded on a pass/fail basis. Prerequisite: HNR 121 or Permission of the Honors Program Director

Prerequisite: HNR 121 or Permission of the Honors Program Director.

**HNR 211 - Honors Humanities Seminar (1)**

An honors seminar on special topics in the humanities. May be retaken for credit as long as the topics differ.

**HNR 212 - Honors Humanities Seminar (2)**

An honors seminar on special topics in the humanities. May be retaken for credit as long as the topics differ.

**HNR 221 - Honors Social Science Seminar (1)**

An honors seminar on special topics in the social sciences. May be retaken for credit as long as the topics differ.

**HNR 222 - Honors Social Science Seminar (2)**

An honors seminar on special topics in the social sciences. May be retaken for credit as long as the topics differ.

**HNR 223 - Honors Social Science Seminar (3)**

An honors seminar on special topics in the social sciences. May be retaken for credit as long as the topics differ.

**HNR 300 - Honors Enrichment Trip (no credit) (0)**

A study of a nearby city in detail through a closer look at its history, neighborhoods, politics, and culture. Exploration of the city will be used to further investigate the details they learned in the classroom. This course is graded on a pass/fail basis.

Prerequisite: HNR 200/201 or Permission of the Honors Program Director

Prerequisite: HNR 200/201 or Permission of the Honors Program Director.

**HNR 301 - Honors Enrichment Trip (1)**

A study of a nearby city in detail through a closer look at its history, neighborhoods, politics, and culture. Exploration of the city will be used to further investigate the details they learned in the classroom. This course is graded on a pass/fail basis.

Prerequisite: HNR 200/201 or Permission of the Honors Program Director

Prerequisite: HNR 200/201 or Permission of the Honors Program Director.

**HNR 311 - Honors Humanities Seminar (1)**

An honors seminar on special topics in the humanities. May be retaken for credit as long as the topics differ.

**HNR 312 - Honors Humanities Seminar (2)**

An honors seminar on special topics in the humanities. May be retaken for credit as long as the topics differ.

**HNR 313 - Honors Humanities Seminar (3)**

An honors seminar on special topics in the humanities. May be retaken for credit as long as the topics differ.

**HNR 322 - Honors Social Science Seminar (2)**

An honors seminar on special topics in the social sciences. May be retaken for credit as long as the topics differ.

**HNR 323 - Honors Social Science Seminar (3)**

An honors seminar on special topics in the social sciences. May be retaken for credit as long as the topics differ.

**HNR 401 - Honors Seminar (1)**

An honors seminar on special topics not considered to be either a humanity or a social science. May be retaken for credit as long as the topics differ.

**HNR 411 - Honors Humanities Seminar (1)**

An honors seminar on special topics in the humanities. May be retaken for credit as long as the topics differ.

**HNR 413 - Honors Humanities Seminar (3)**

An honors seminar on special topics in the humanities. May be retaken for credit as long as the topics differ.

**HNR 421 - Honors Social Science Seminar (1)**

An honors seminar on special topics in the social sciences. May be retaken for credit as long as the topics differ.

**HNR 431 - Honors Mathematics & Science Seminar (1)**

An honors seminar on special topics in the mathematics or sciences. May be retaken for credit as long as the topics differ.

**HNR 432 - Honors Mathematics & Science Seminar (2)**

An honors seminar on special topics in mathematics or science. May be retaken for credit as long as the topics differ.

**HNR 433 - Honors Mathematics & Science Seminar (3)**

An honors seminar on special topics in the mathematics or sciences. May be retaken for credit as long as the topics differ.

**HNR 442 - Honors Seminar (2)**

An honors seminar on special topics not considered to be either a humanity or a social science. May be retaken for credit as long as the topics differ.

## HOS-Hospitality

**HOS 103 - Current Trends in Tourism (3)**

The objective of this class is to look at the research, stats, and current trends as they relate to the Tourism Industry. Upon examination of the research, the class will discuss how the industry continues to adapt to meet the ever changing demands of the public.

**HOS 203 - Lodging Management (3)**

The objectives of this class are to examine the policies, techniques and trends in hotel administration from a front office perspective. Topics such as organization, ethics, procedures, and communication amongst the hotel staff and with the hotel guest will be examined. Prerequisite: Hospitality and Tourism Management Majors Only

Prerequisite: Hospitality and Tourism Management Majors Only.

**HOS 213 - Sophomore Internship in Hospitality Management (3)**

This sophomore experience is the first of two internships required for a Hospitality Management major. This field related experience is under the direction of a field supervisor and University supervisor. The Internship must have the approval of the Department Chair.

Prerequisite: The Internship must have the approval of the Department Chair.

**HOS 303 - Hospitality & Tourism Marketing (3)**

The objective of this class is to provide the student with an understanding of the techniques used to market the many facets of the hospitality and tourism industry. Packaging pricing, promoting, advertising and merchandising will all be explored as they relate to restaurant sales, hotel occupancy, and the travel and tourism industry. Prerequisite: MK 203

Prerequisite: MK 203.

**HOS 313 - Catering (3)**

The objective of this class is look at catering from a business perspective including pricing, production, promoting, packaging, and customer service. Prerequisite: HOS 103

Prerequisite: HOS 103.

**HOS 322 - Meeting & Event Planning (2)**

This class looks at meeting and event planning from an organizational and administration perspective. Customer service as it relates to meeting the needs of the client will be examined. The culminating projects of this class are the creation of an event planning resource notebook and the class project of putting on a "campus event".

### **HOS 402 - Beverage Management (2)**

The objective of this class is to give the student an education in the purchasing, storing, serving, and production of alcoholic and non-alcoholic beverages. Prerequisites: 21 years of age

Prerequisite: 21 years of age.

### **HOS 404 - Quality Food Preparation (4)**

The class will examine food preparation methods and service techniques important to the success of a food service operation. Menu planning, food preparation and production along with proper food service methods will be studied. A basic knowledge of food service operations will be taught in a lab setting through the production of an "A Night out on the Town". Student will exhibit their skills by performing a variety of tasks in a cooperative environment as they produce a dining experience to the general public. Prerequisite: Hospitality and Tourism Management Majors Only

Prerequisite: Hospitality and Tourism Management Majors Only. Corequisite: Lab Required.

### **HOS 413 - Casino, Spa & Resort Management (3)**

This class examines the day to day operations of casinos, spas, and resorts from a front office perspective including the law, procedures, and organizational structure. This class incorporates both classroom and field experiences to give the student the necessary perspective of how these facilities become successful. Prerequisite: BA 123

Prerequisite: BA 123.

### **HOS 423 - Sanitation & Health in the Food Service , Lodging & Tourism Industry (3)**

This class will discuss food safety and other health related issues common to the Hospitality Industry, and other institutional programs like hospitals, schools, restaurants, cruise ships, airlines, and other form of travel. Students must pass a National Sanitation Certification examination upon completion of the course. Prerequisite: Hospitality and Tourism Management Majors Only

Prerequisite: Hospitality and Tourism Management Majors Only.

## **HPE-Health Physical Education**

### **HPE 202 - Introduction to Adaptive Physical Education (2)**

Classroom discussion and supervised lab experience that familiarizes students with a general knowledge of various disability groups and the physical education needs of these special students.

### **HPE 221 - Officiating (1)**

Knowledge of the rules and officiating practices of sports.

### **HPE 273 - Nutrition (3)**

A review of the nature of nutritional needs. Focus will include the function of nutrients in the body, weight control and the importance of balanced diets.

### **HPE 352 - Family Life Education (2)**

Investigation of the biological, psychological and sociological components of sexuality and family life. Issues discussed include the anatomy and physiology of the reproductive systems, gender roles, family living, marriage, parenthood, divorce, and abuse/violence. Prerequisite: Junior standing or permission of instructor

Prerequisite: Junior standing or permission of instructor.

## HR-Human Resources

### **HR 303 - Compensation & Benefits (3)**

This course examines the role of compensation and benefits in today's workplace. It emphasizes the role, importance, and impact of a defined compensation and benefits strategy. Emphasis will be on assessment of compensation and benefit plans. Topics include traditional and non-traditional bases of pay, strategies for developing benefits plans, administering compensation, and benefit plans. Prerequisite: FIN 303

Prerequisite: FIN 303.

### **HR 323 - Safety & Health Management (3)**

This course examines the role of occupational safety and health in the workplace today. It emphasizes the need for and the impact of having a strong safety and health program. Topics include identification and assessment of major types of occupational hazards including falls, mechanical, environmental, electrical, fire, weather, and stress. OSHA regulations, fines and authority, safety standards, accident prevention and investigation, safety and analysis, and safety and health management concepts are also covered.

### **HR 343 - Healthcare Human Resource Management (3)**

This course provides learners with the tools needed to work with diverse populations, personalities, and positions of individuals in the healthcare sector. Learners will analyze the full continuum of human resource management including effective workforce planning throughout this course.

### **HR 403 - Project Management (3)**

A study of effective project planning and management. Topics covered include project goals, objectives, and feasibility. Estimation of completion times and costs, evaluation and review, incentives, and quantitative analysis are also topics. Case studies and project management software used extensively. (Same as MGT 383) Prerequisite: HR 323

Prerequisite: HR 323. Crosslisted as: MGT 383.

### **HR 5923 - Strategic Human Resources Management (3)**

This course is designed to provide students with a theoretical framework of strategic human resource management as it applies to organizational effectiveness. The focus of this course is strategic human resource management and the process of linking the human resource function with the strategic objectives of the organization to improve performance. This course focuses on processes and conceptual issues related to recruitment, selection, and retention. Topics include policies, ethical and legal compliance as well as practices related to attraction, development, training, diversity, and performance management.

Prerequisite: None.

### **HR 5943 - Certified Professional Human Resources Preparation (3)**

This course is intended to provide a preparation of the Professional Human Resource Certification. It will provide students with knowledge areas of management, laws governing the employment relationship, health and safety. The goals of the course are twofold: first, to familiarize students with the many issues and problems confronting employees, employers, supervisors, and human resources professionals; second, to prepare students for the certification offered through the Society for Human Resource Management. Prerequisites: All LDR Core (5000-level) courses OR admission to non-degree graduate certificate program

Prerequisite: All LDR Core (5000-level) courses OR admission to non-degree graduate certificate program.

### **HR 5953 - Compensation & Benefits Management (3)**

This course is designed to enhance the student's knowledge of an advanced comprehensive compensation system that would explore both direct and indirect compensation strategic design, development, implementation, administration, and evaluation. This will also include the effects of compensation system design on other HR functional areas, including but not limited to



internal and external equity, pay for performance, and benefit administration. Prerequisites: All LDR Core (5000-level) courses OR admission to non-degree graduate certificate program

Prerequisite: All LDR Core (5000-level) courses OR admission to non-degree graduate certificate program.

### **HR 5963 - Human Resource Management Capstone (3)**

This course is designed to provide a capstone or conclusion to the Human Resource Management Concentration. Its objective is to provide an opportunity to conduct independent research on a Human Resource Management theme, analyzing a contemporary HR issue. The topic will be selected by the students, so that they can integrate the linkages between the themes, areas, and disciplinary foci of study, and apply the analytical frameworks, professional writing, research, and leadership skills acquired during the program. Prerequisites: All LDR Core (5000-level) Courses and LDR 5923, LDR 5933, LDR 5943 and LDR 5953. Students must complete this course last in the MSOL Program.

Prerequisite: All LDR Core (5000-level) Courses and LDR 5923, LDR 5933, LDR 5943 and LDR 5953. Students must complete this course last in the MSOL Program.

## **HS-Health Science**

### **HS 104 - Anatomy & Physiology I for Applied Science Majors (4)**

This course is designed to prepare students for a career in health sciences. In this first of a two-course series, students develop an understanding of the close inter-relationship between anatomy, physiology and pathology as seen in the human organism. It introduces students to the cell, which is the basic structural and functional unit of all organisms, and covers tissues, integument, skeleton, muscular and nervous systems as an integrated unit. Prerequisite: Applied Science Major

Prerequisite: Applied Science Major.

### **HS 114 - Anatomy & Physiology II for Applied Science Majors (4)**

This course is designed to prepare students for a career in health sciences. IN this second of a two-course series, students develop an understanding of the close inter-relationship between anatomy, physiology and pathology as seen in the human organism. This course examines endocrine, cardiovascular, respiratory, lymphatic and immune, gastrointestinal, urinary and reproductive systems. Prerequisite: Applied Science Major

Prerequisite: Applied Science Major.

## **HUM-Humanities**

### **HUM 203 - Humanities Seminar (3)**

Variable topic humanities-based course focused on both academic and nonacademic discourses, narrative, research and argumentation. This class is writing intensive (which means each student will produce approximately 25 pages of prose). **This course must be completed at Trine University, no transfers or course substitutions.** Prerequisites: ENG 133 or ENG 143 or ENG 153

Prerequisite: ENG 133 or ENG 143 or ENG 153.

### **HUM 231 - Special Topics Language & Humanities (1)**

Studies of one of the major topics in the Humanities, focusing on carefully chosen modes of expression that shape our culture. Topic will be announced in the class schedule. This course will change every time it is offered and may therefore be repeated for credit.

### **HUM 232 - Special Topics Language & Humanities (2)**

Studies of one of the major topics in the Humanities, focusing on carefully chosen modes of expression that shape our culture. Topic will be announced in the class schedule. This course will change every time it is offered and may therefore be repeated

for credit.

### **HUM 233 - Special Topics Language & Humanities (3)**

Studies of one of the major topics in the Humanities, focusing on carefully chosen modes of expression that shape our culture. Topic will be announced in the class schedule. This course will change every time it is offered and may therefore be repeated for credit.

### **HUM 3001 - Independent Study in Humanities (1)**

Course content in a humanities discipline to be arranged for the individual student according to his/her interest and aptitudes. The number of credit hours will determine the scope of the content. Prerequisite: Permission from the Department Chair

Prerequisite: Permission from the Department Chair.

### **HUM 3002 - Independent Study in Humanities (2)**

Course content in a humanities discipline to be arranged for the individual student according to his/her interest and aptitudes. The number of credit hours will determine the scope of the content. Prerequisite: Permission from the Department Chair

Prerequisite: Permission from the Department Chair.

### **HUM 3003 - Independent Study in Humanities (3)**

Course content in a humanities discipline to be arranged for the individual student according to his/her interest and aptitudes. The number of credit hours will determine the scope of the content. Prerequisite: Permission from the Department Chair

Prerequisite: Permission from the Department Chair.

## **INF-Informatics**

### **INF 132 - Integrated Development (Visual Basics) (2)**

User interface design fundamentals using VBasic, control objects, event-driven Windows applications, forms, functions, arrays, parameter passing, graphical user interface, using components of an integrated development environment. Prerequisite: MA 113 or equivalent.

Prerequisite: MA 113 or equivalent.

### **INF 143 - Introduction to C# (3)**

An introductory course in the fundamentals of C# including user interface design, control objects, event-driven applications, forms, functions, arrays, parameter passing, and using the components of an integrated development environment.

Prerequisite: MA 113 or equivalent

Prerequisite: MA 113 or equivalent.

### **INF 153 - Introduction to Python (3)**

This course introduces computer programming using the Python programming language. Emphasis is placed on procedural programming, algorithm, design, and language constructs common to most high level languages. An introduction to Python classes and object oriented design is included. Prerequisite: MA 113 or equivalent

Prerequisite: MA 113 or equivalent.

### **INF 163 - Structured Logic & Design (C Programming) (3)**

Algorithmic problem solving and programming using top-down design, stepwise refinement and functional decomposition. Declarations, operations, assignment conditional and loop statements, parameter passing, arrays, and structures. Prerequisites: MA 113 or equivalent

Prerequisite: MA 113 or equivalent.

**INF 183 - Introduction to LINUX (3)**

This course is intended to introduce students to the Linux operating system with emphasis on systems installation, configurations, customization, and maintenance of Linux-based systems. Prerequisite: CSIT 103

Prerequisite: CSIT 103.

**INF 213 - Digital Forensic Science I (3)**

This course introduces the student to investigative techniques involving computers and other electronic devices. Topics include investigative procedures, computer hardware, data recovery methods, and laws concerning digital devices. This course also covers how computers are used in investigations. (Same as FS 213 and LE 213) Prerequisite: ENG 133, CSIT 103, INF 183

Prerequisite: ENG 133, CSIT 103, INF 183 . Crosslisted as: FS 213 and LE 213.

**INF 263 - Data Management (3)**

This course discusses the concepts, techniques, and tools necessary to develop applications using relational database management systems. Topics covered in this course include conceptual data modeling, design of database systems using entity relationship models, and normalization. Other concepts include file organization, database representation, descriptions, software reliability, security, integrity, relational databases, and query languages. Prerequisites: CSIT 103

Prerequisite: CSIT 103.

**INF 313 - Digital Forensic Science II (3)**

This course continues the Digital Forensics I course by advancing into more detailed analysis techniques as expected by law enforcement and the court system. Topics include evidence collection procedures, detailed hardware analysis and report preparation. Prerequisite: INF 213

Prerequisite: INF 213.

**INF 343 - Information Security (3)**

Principles of information security, including concepts and theory of security policies, access control methods, site security, information security, system security , user security, application security, and managing security functions through cryptographic services, protocols, authentication, authorization, and access control technologies. Prerequisite: CSIT 223

Prerequisite: CSIT 223.

**INF 373 - Computer Architecture (3)**

This course focuses on the organization and architecture of computer systems hardware; memory systems; storage devices; input/output devices; instruction set architectures; addressing modes; processor design and computer arithmetic. Students present PC-related topics. Prerequisite: CSIT 103

Prerequisite: CSIT 103.

**INF 383 - Principles of Health Informatics (3)**

This course offers an overview of the field of health informatics by providing students with fundamental knowledge of the concepts of health informatics and how technology can be used in the delivery of health care. Prerequisite: CSIT 253

Prerequisite: CSIT 253.

**INF 393 - Data Visualization (3)**

Introduction to data visualization including both the principles and techniques. Students will learn the value of visualization, specific techniques in information visualization and scientific visualization, and understand how to best leverage visualization

methods. Prerequisite: INF 263

Prerequisite: INF 263.

### **INF 3111 - Informatics Internship (1)**

This course involves meaningful work experience related to the student's field of study or other functional areas of Informatics at an approved company. The assignment must be approved by both the student's advisor and the Department Chair. A maximum of three (3) credit hours may be granted in a given semester. Prerequisite: Informatics major, 3.0 GPA, Junior/Senior standing, and permission of advisor and the Department Chair.

Prerequisite: Informatics major, 3.0 GPA, Junior/Senior standing, and permission of advisor and the Department Chair. .

### **INF 3112 - Informatics Internship (2)**

This course involves meaningful work experience related to the student's field of study or other functional areas of Informatics at an approved company. The assignment must be approved by both the student's advisor and the Department Chair. A maximum of three (3) credit hours may be granted in a given semester. Prerequisite: Informatics major, 3.0 GPA, Junior/Senior standing, and permission of advisor and the Department Chair.

Prerequisite: Informatics major, 3.0 GPA, Junior/Senior standing, and permission of advisor and the Department Chair. .

### **INF 3113 - Informatics Internship (3)**

This course involves meaningful work experience related to the student's field of study or other functional areas of Informatics at an approved company. The assignment must be approved by both the student's advisor and the Department Chair. A maximum of three (3) credit hours may be granted in a given semester. Prerequisite: Informatics major, 3.0 GPA, Junior/Senior standing, and permission of advisor and the Department Chair.

Prerequisite: Informatics major, 3.0 GPA, Junior/Senior standing, and permission of advisor and the Department Chair. .

### **INF 403 - Advanced Database Management (3)**

This course includes advanced topics for relational and object oriented database, enhanced query tables, report features, macros, and Visual Basic applications, relational algebra including RAR modeling, and SQL applications development. Prerequisite: INF 263

Prerequisite: INF 263.

### **INF 413 - Mobile Forensics (3)**

With the unimaginable growth, prevalence, and proliferation of the mobile device industry, more evidence and information important to investigations will be found on them. This course focuses on the collection, preservation, and analysis of digital evidence techniques used by today's mobile forensic examiners as well as on the design of the popular mobile operating systems to defend against common attacks and exploits. Prerequisites: INF 313

Prerequisite: INF 313.

### **INF 433 - Data Mining & Visualization (3)**

This course is designed to study the principles and practices of data mining and tasks both descriptive (e.g. exploratory data analysis, classification, association) and prescriptive (e.g. prediction, regression and estimation) to analyze and obtain patterns in large observational data sets. This course will also include the application of diverse visualization practices. Prerequisite: INF 393

Prerequisite: INF 393.

### **INF 443 - Advanced Cybersecurity Concepts (3)**

This course provides a monitored structure for application of the skills and knowledge acquired throughout the Cybersecurity

program. Emphasis is placed on the use of real-world security problems, issues, and situations. Course assignments will require the use of protection, detection, deterrence, and response techniques in addressing threats, vulnerabilities, and risks found in businesses today. Prerequisites: INF 313, INF 343

Prerequisite: INF 313, INF 343.

**INF 493 - Informatics Capstone (3)**

In this course, Informatics majors apply the techniques they have learned in prior coursework to a significant project of their own definition. The project may be completed through group effort. The design of the course follows the goals for the capstone experience. Students define the information problem for themselves, determine what techniques to use for the information problem they identify, and integrate human-centered and technical dimensions of information systems. Prerequisite: Senior Standing

Prerequisite: Senior Standing.

**INF 4001 - Independent Research in Informatics (1)**

Independent research under the direction of an individual instructor. A research paper or project is required. Prerequisite: Informatics major, 3.0 GPA, Junior/Senior standing, and permission of advisor and the Department Chair.

Prerequisite: Informatics major, 3.0 GPA, Junior/Senior standing, and permission of advisor and the Department Chair. .

**INF 4002 - Independent Research in Informatics (2)**

Independent research under the direction of an individual instructor. A research paper or project is required. Prerequisite: Informatics major, 3.0 GPA, Junior/Senior standing, and permission of advisor and the Department Chair.

Prerequisite: Informatics major, 3.0 GPA, Junior/Senior standing, and permission of advisor and the Department Chair. .

**INF 4003 - Independent Research in Informatics (3)**

Independent research under the direction of an individual instructor. A research paper or project is required. Prerequisite: Informatics major, 3.0 GPA, Junior/Senior standing, and permission of advisor and the Department Chair.

Prerequisite: Informatics major, 3.0 GPA, Junior/Senior standing, and permission of advisor and the Department Chair. .

**INF 4111 - Special Topics in Informatics (1)**

Addresses advanced topics in Informatics that vary by year. Prerequisite: Junior/Senior standing, and permission of advisor and the Department Chair.

Prerequisite: Junior/Senior standing, and permission of advisor and the Department Chair. .

**INF 4112 - Special Topics in Informatics (2)**

Addresses advanced topics in Informatics that vary by year. Prerequisite: Junior/Senior standing, and permission of advisor and the Department Chair.

Prerequisite: Junior/Senior standing, and permission of advisor and the Department Chair. .

**INF 4113 - Special Topics in Informatics (3)**

Addresses advanced topics in Informatics that vary by year. Prerequisite: Junior/Senior standing, and permission of advisor and the Department Chair.

Prerequisite: Junior/Senior standing, and permission of advisor and the Department Chair. .

**INF 503 - Advanced Database (3)**

Advanced topics for relational and object oriented database, enhanced query, tables, report features, macros, and Visual Basic

applications, relational algebra including RAR modeling. SQL informatics applications development. Students will conclude the course with a project developing a functioning, business database. Prerequisite: Graduate student enrolled in the Information Systems Programs.

Prerequisite: Graduate student enrolled in the Information Systems Programs.

## IS-Information Studies

### **IS 483 - Information Systems Capstone Proposal (3)**

A Capstone design project is selected from a wide variety of areas related to Computer Science and Information Systems. Students use a systems project approach to design the preparation of specifications, scheduling, modeling, simulations, and technological, financial and environmental aspects. Multi-disciplinary teamwork is emphasized. A Final Report Documentation and a power point presentation of the selected project is required. Prerequisite: Senior Standing

Prerequisite: Senior Standing.

### **IS 493 - Information Systems Capstone Project (3)**

A capstone design project is selected from a wide variety of areas related to Computer Science and Information Systems. Students use a systems project approach to design the preparation of specifications, scheduling, modeling, simulations, and technological, financial and environmental aspects. Multi-disciplinary teamwork is emphasized. A final report documentation and a power point presentation of the selected project is required. Prerequisite: Senior Standing

Prerequisite: Senior Standing.

### **IS 5103 - Object-Oriented Programming in Java (3)**

Throughout this course, students will explore object-oriented programming concepts using the Java programming language. Topics included in this course are collection classes, searching and sorting, threads, GUI, and Java Database Connectivity. Students will develop applications using Java through the use of structured and object-based programming techniques. Java 7 and Eclipse IDE are also used in this course.

Prerequisite: None.

### **IS 5113 - Data Mining & Data Visualization (3)**

Throughout this course, students will learn how to conduct data mining processes and techniques to implement data visualization. Students will examine data analytic tools including how to prepare, clean, arrange, and visualize the information for the end users. Students will create visual information using dashboards, software, and code. Additionally, students will evaluate analytic tools to prepare data for import into data visualization tools.

Prerequisite: None.

### **IS 5203 - Network Management (3)**

Throughout this course, students will explore the information systems infrastructure. This course will focus on data communications and networks. Students will examine layered network architectures, communication hardware, and protocols associated with networking. Emerging technologies such as mobility, cloud computing, Big Data, tools for data analytics, and artificial intelligence (AI) will also be covered.

### **IS 5213 - Data Science & Big Data (3)**

Throughout this course, students will learn the field of Data Science through the use of data analytics tools. Concepts of Big Data and how it enhances the decision-making process used by businesses in today's industry will be covered in this course. Students will utilize data analysis tools to decipher the abundance of information in Big Data. Students will work with open-source software to discover the benefits of Big Data as it pertains to industry.

Prerequisite: None.

### **IS 5303 - Information Systems Development & Design (3)**

This course is a survey and overview of creating software solutions using professional programming practice including a study of systems analysis and design, using selected engineering and management science techniques and practices. Topics include requirements determination, modeling, decision making, and proposal development. The System Development Life Cycle Model, including system implementation and post implementation activities, is examined. Research and project assignments related to information systems analysis design, implementation, and/or project planning and control, require individual and group work. Prerequisite: Graduate standing

Prerequisite: Graduate standing.

### **IS 5403 - Cybersecurity (3)**

This course provides knowledge and practical skills required by any cybersecurity roles. Course assignments will require the use of technologies and tools to identify and address security threats, attacks and vulnerabilities. Emphasis is placed on the latest trends and techniques in risk management, risk mitigation, threat management and intrusion detection. This course also covers principles and foundations of network architecture and design, cryptography and PKI. Prerequisite: IS 5203 Network Management

Prerequisite: IS 5203 Network Management.

### **IS 5803 - Information Studies Capstone (3)**

This course is the capstone for all students in the Information Systems Master's program. The capstone is an integrative approach to the formulation and implementation of organizational strategy and policy. Students will apply the knowledge and skills acquired in their courses to the work environment. This course focuses on organizational performances as it relates to mission goals, and objectives. Students will get practice defining multifaceted problems and their causes; analyzing internal and external environments; reviewing key corporate and business strategies; formulating alternative strategic options; and addressing the challenges of implementation. Prerequisite: Graduate standing, must take last semester of Information Studies program

Prerequisite: Graduate standing, must take last semester of Information Studies program.

## **LAW-Law**

### **LAW 203 - Business Law & Ethics (3)**

This course is an introduction to the American legal system as it relates to business enterprises and society. It includes a survey of courts, torts, ethics and public policy. It involves a study of the constitution, the common law of contracts, including contract formation, performance, breach and remedies, as well as a study of the law of sales under the Uniform Commercial Code.

Prerequisite: none.

### **LAW 303 - Business Law II (3)**

This course is a study of the law of agency, partnerships, corporations, and other business organizations. It includes a study of negotiable instruments, secured transactions, surety ship, bankruptcy, securities regulation, and related legal issues.

Prerequisite: LAW 203

Prerequisite: LAW 203.

### **LAW 313 - Auction Law (3)**

An overview of laws impacting the auctioneering environment. Ethical standards and legal ramifications of actions within the auctioneering profession will be explored and discussed. Prerequisite: LAW 203

Prerequisite: LAW 203.

**LAW 323 - Bankruptcy (3)**

An in-depth study of federal bankruptcy regulations as well as state and local regulation. The impact of bankruptcy on the auctioneering industry will be examined. Prerequisite: LAW 203

Prerequisite: LAW 203.

**LAW 403 - Employment Law (3)**

This course is a survey of the law relating to the employment relationship with emphasis on statutory and case law. The course will discuss various Human Resource Functions and will consider the ethical implications to organizations when applying employment laws. Prerequisites: LAW 203, MGT 313, MGT 363

Prerequisite: LAW 203, MGT 313, MGT 363.

**LAW 413 - International Law (3)**

The legal considerations governing international business transactions. Introduction to the international legal environment including the status of international law, international dispute settlement, conflicts of law. A more detailed study of the international contracting process, international payment mechanisms, carriage contracts, insurance issues, and related subjects. Government regulation of international business will also be addressed. Prerequisites: LAW 203, BA 343

Prerequisite: LAW 203, BA 343 .

**LAW 5003 - Law & the Engineering Professional (3)**

This class will help students develop Intellectual Property and Contract acumen. Students will immerse themselves in practical application, critical reading and the interpretation of modern case law. Course will present: legal guidelines involving owners, design professionals, and contractors; sources of law, forms of association, and agency, including formation, contracts, interpretation, performance problems, disputes, and claims; standards of care and the management of construction claims; duties and obligations of the Engineering professional, the owner, and the contractor. Prerequisite: Graduate standing

Prerequisite: Graduate standing.

**LAW 603 - Advanced Employment Law (3)**

An in-depth study of the legal issues that may arise as a result of the employer-employee relationship. Topics include the establishment of employment and its terms, employer's obligation to employees, and termination of the employee relationship. The course examines federal and state statutory and case law on wage and hour issues, safety, and workplace discrimination, among other important topics. Prerequisite: Must be admitted to the MSCJ Program

Prerequisite: Must be admitted to the MSCJ Program.

**LAW 613 - Advanced Criminal Procedure: Investigation Adjudication (3)**

This course covers pretrial law enforcement investigatory practices from investigation to charging, with an emphasis on constitutional law concerns. Additionally it covers the criminal trial process after police investigation ends and the adjudicative process commences. Areas of emphasis include search and seizure, confessions, right to counsel, right against self-incrimination, pretrial issues, the charging process, pretrial release and discovery, the trial, and post-conviction proceedings including sentencing and appeals. The course involves the study of United States Supreme Court cases to identify the current law on the topics studied as well as to identify the overarching themes in the Court's jurisprudence. Prerequisite: Must be admitted to either the MSCJ Program

Prerequisite: Must be admitted to either the MSCJ Program.

**LAW 623 - Children and the Law (3)**

This course examines the issues, policies, and procedures within the criminal justice system as they pertain to children. Topics include the interrelationship between police, probation, juvenile court, and juvenile corrections system, and how these entities



work together to achieve juvenile justice and rehabilitation of the child. The course further takes an in-depth look at the rights and protections afforded to minors under common law doctrine, federal constitutional principles, and legislative enactments. Prerequisite: Must be admitted to the MSCJ Program

Prerequisite: Must be admitted to the MSCJ Program.

### **LAW 693 - Law Concentration Demonstration Capstone (3)**

An in-depth analysis of the concepts contained within the concentration courses. Conducted under the direction of a criminal justice faculty member, the student will design and implement a capstone project, and then present the results to a committee of at least two full-time or adjunct professors with legal experience. Prerequisite: CRJ 593. Must be taken in the final term of the MSCJ and may be taken with one other MSCJ course

Prerequisite: CRJ 593. Must be taken in the final term of the MSCJ and may be taken with one other MSCJ course.

## **LDR-Leadership**

### **LDR 101 - Leadership Philosophy (1)**

This course introduces the main concepts of organizational leadership. The role of the leader and the skillset needed to be an effective leader within the organization will be explored. The course sets a foundation for future classes in the program.

### **LDR 103 - Introduction to Organization Leadership (3)**

This course introduces the principal frameworks in the field of Organizational Leadership and at the same time, develop skills to explore leadership challenges and opportunities. Individual, group and organizational levels of Organizational Leadership will be considered by utilizing the concepts and practices within the field of Organizational Behavior. Prerequisite: LDR 101

Prerequisite: LDR 101.

### **LDR 203 - Leadership Strengths & Skills (3)**

Throughout this course, students will use strength-based approaches to develop their leadership skills. Utilizing assessments, students will reflect on their personal leadership strengths and use these to develop problem-solving, goal achievement, effective communication, and team management skills. Additionally, students will identify essential leadership principles and theories needed to lead groups and organizations.

Prerequisite: None. Corequisite: None.

### **LDR 303 - Contemporary Leadership Theory & Practice (3)**

This course examines the major theories, principles, and concepts related to the art and practice of leadership. Multiple contexts of leadership will be analyzed, including self-leadership, one-on-one leadership, team leadership and organizational leadership. Readings, case studies, and activities promote the development of a deeper understanding of the historical, political, social, cultural, psychological and organizational contexts in which leadership occurs. Information presented in the course includes methods of social scientific inquiry through which students assess their individual leadership perspectives and competencies and develop a personal leadership philosophy.

### **LDR 313 - Topics in Organizational Leadership (3)**

This course will explore a specific topic area within organizational leadership.

Prerequisite: None.

### **LDR 323 - Leading Effective Teams (3)**

This course introduces best practices for developing a team, generating trust among team players, and resolving conflicts that may arise. Students will identify strategies to produce manageable team goals and strategic processes. The course will equip students with concepts, frameworks, and critical theories to effectively analyze and build complex work groups with employees

from diverse backgrounds, with varying dynamics and strengths, to improve the overall team performance.

### **LDR 333 - Organizational Leadership Development & Change (3)**

The course explores approaches to effective leadership within the context of organizational change. A variety of change opportunities will be identified and explored.

Prerequisite: None.

### **LDR 343 - Conflict Resolution (3)**

Conflict in the workplace is inevitable in industries. In most situations, it is a necessary component of change, development, and growth. Leaders must know how to handle conflict and redirect conflict interaction to collaboration. This course will provide students with the essential skills needed to identify, negotiate, compromise, and ultimately resolve conflict from a leadership perspective.

Prerequisite: None.

### **LDR 403 - Creativity, Innovation, & Influence (3)**

This course empowers leaders to envision and develop new ideas from inception through implementation. Readings and activities engage students in defining and building creativity, critical thinking, and collaboration skills they can use to facilitate innovation in individuals, groups, organizations, and communities.

### **LDR 433 - Leadership Practicum (3)**

This course deepens students' capacity for leadership, in addition to concluding the leadership minor by linking leadership practice to leadership theory. Students assume leadership responsibilities with a Trine University or community organization, program, or project in order to gain direct leadership experience and further the mission and goals of the selected organization. Students will set goals, practice and develop skills, reflect on experiences, evaluate actions, discuss lessons learned, and complete assignments. A well-written synthesis paper and a high-quality portfolio presentation are crafted to integrate students' learning about leadership and to provide a post-graduation plan for life-long leadership development. Current and active involvement in a leadership position is required for students in this class.

### **LDR 453 - Leadership Capstone (3)**

The capstone course provides a synthesis of leadership concepts, competencies and processes within an organizational context. Students will apply advanced leadership knowledge, theory and skills to challenging issues, and problems within organizations. Students will exhibit the knowledge and skills that they have learned throughout the BSOL. Prerequisite: Completion of all leadership core courses (Required for all BSOL students, transfer credits not accepted for this course).

Prerequisite: Completion of all leadership core courses (Required for all BSOL students, transfer credits not accepted for this course).

### **LDR 5003 - Leadership Philosophy (3)**

Throughout this course, students will explore the nature of leadership models and theories. Students will examine these models through broad and diverse viewpoints. Additionally, students will analyze these approaches to leadership, giving special attention to how the models can improve leadership in real-world situations.

### **LDR 5013 - Group Dynamics Within Organizations (3)**

This course will equip students to fully understand the complexities of organizational systems and cultures, the ways in which these forces manifest themselves, and how leaders intentionally impact the shape that these forces take within their organizations. Principles and dynamics of group interaction and the application of various organizational systems will be examined. Students will reflect on how group dynamics are formed, their structures and how to manage attitudes and behavioral patterns of a group.

**LDR 5023 - Decision Making for Leaders (3)**

This course examines the characteristics of strategic leadership. The influence of decision-making on the organization will be studied.

**LDR 5032 - Economics & Accounting Practices for Leaders (2)**

This course will equip students to fully understand the complexities of different economic ways of thinking and understanding diverse economic systems. Explanations of how markets are competitive and how they are regulated will be examined. Accounting practices related to the creation of accounting statements are analyzed and technical skills needed to analyze these financial statements are developed.

**LDR 5043 - Organizational Systems & Cultures (3)**

The complexities of organizational systems and cultures, the ways in which these forces manifest themselves, and the means by which leaders intentionally impact these forces in their organizations will be explored.

**LDR 5053 - Legal Issues in Organizational Leadership (3)**

This course will provide students with information to fully understand the complexities of recognition of legal and ethical issues when making business decisions. Students will gain an enhanced understanding of legal rules and ethical constraints. Introduction of legal systems and legal concepts will be offered.

**LDR 5063 - Organizational Development & Change (3)**

This course prepares students to successfully implement change in organizations. Students will evaluate theories and strategies used to create change in organizations. Students will identify the need for change and recommend a plan for change management. This course will include topics such as the role of leadership, employee acceptance and ethical considerations.

**LDR 5083 - Conflict Resolution for Leaders (3)**

Leaders must respond effectively in conflict situations and should willingly accept the consequences of their conflict responses. This course explores theories, methods, skills, and practices associate with successfully engaging in the dynamics of conflict interactions.

**LDR 5203 - Leadership Ethics (3)**

An ethical leader can have a positive impact on an organization and its culture. The varied facets of ethics development and ethical decision-making will be explored.

**LDR 5223 - Organizational Communication for Leaders (3)**

This course is designed to examine the theoretical and applied literature in the field of organizational communication relevant to organizational leadership.

**LDR 5253 - Technology Topics for Leaders (3)**

With the vast and varied technologies available to leaders, it is no doubt managing these technologies can be challenging. Yet, leaders must have a sense of which technologies will help the organization and its members to be successful. While an organizational leader does not need to be a technology expert, having an awareness of the impact technology has on an organization is important.

**LDR 5333 - Research Methods (3)**

This course explores quantitative, qualitative, and mixed methods approach to research. Students will identify, review, and analyze literature relevant to their organizational leadership interests.

**LDR 6563 - Organizational Leadership Capstone (3)**

The capstone focuses on the leadership competencies that the student has gained throughout the MSOL program. There is an emphasis on the ethical dimensions of problem solving in organizational leadership which will prepare graduates to succeed,

lead and serve.

## LE-Law Enforcement

### **LE 103 - Introduction to Criminal Justice (3)**

This course is an introduction to the criminal justice system that covers the processes, institutions and administration of justice in the United States. The course will concentrate on the purposes and history of the three primary parts of the criminal justice system: law enforcement, courts, and corrections.

### **LE 153 - Juvenile Justice (3)**

A comprehensive review of the nature and etiology of juvenile delinquency. The legal and philosophical basis of the juvenile justice process, procedures, and programs of prevention and rehabilitation.

### **LE 213 - Digital Forensic Science (3)**

This course introduces the student to investigative techniques involving computers and other electronic devices. Topics include investigative procedures, computer hardware, data recovery methods and laws concerning digital devices. This course also covers how computers are used in investigations. (Same as FS 213 and INF 213) Prerequisite: ENG 133, CSIT 103, INF 183

Prerequisite: ENG 133, CSIT 103, INF 183 . Crosslisted as: FS 213 and INF 213.

### **LE 263 - Introduction to Criminal Law & Justice (3)**

A survey of the American criminal justice system, its legal bases, and the interrelationships between local, state and national agencies. Specific attention will be focused on criminal law, criminal liabilities and punishments.

### **LE 273 - Criminal Procedure & Evidence (3)**

An examination of the various aspects of criminal procedures and their bases in the Constitution and in law. Topics include arrest, search and seizure, interrogation, and the exclusionary rule.

### **LE 343 - Crime Scene Investigation I (3)**

Introduction to criminalistics and crime scene investigation. Methods of processing a crime scene: documentation, location, and collection of evidence, proper collection and handling procedures, selection, and presentation for analytical examination, and presentation of the process and findings in court. (Same course as FS 343)

Crosslisted as: FS 343.

### **LE 351 - Criminalistics And Crime Scene Laboratory (1)**

A laboratory course which explores the basic techniques of collecting and analyzing evidence taken from crime scenes. (Same as FS 351) Prerequisite: FS 343 or LE 343

Prerequisite: FS 343 or LE 343. Corequisite: FS 351. Crosslisted as: FS 351.

### **LE 363 - Institutional Corrections & Law (3)**

A detailed review of penology and institutional corrections. A historical and contemporary perspective on jails and prisons. Rehabilitation and incarceration in both the adult and juvenile systems. A critical analysis of legislation and appellate decisions in correctional law for pretrial detainees and convicted and sentenced prisoners. Prerequisite: Junior standing or permission of instructor

Prerequisite: Junior standing or permission of instructor.

### **LE 423 - Criminal Justice Agency Administration (3)**

A detailed examination of the unique blend of criminal justice and business/public administration required in the administration

of law enforcement, judicial and corrections agencies. A pragmatic analysis of public funding and utilization of local, state, and federal grants. Prerequisite: Junior standing or permission of instructor

Prerequisite: Junior standing or permission of instructor.

**LE 433 - Criminal Justice Capstone Demonstration (3)**

This capstone course will provide students the opportunity to integrate and synthesize previous coursework in Criminal Justice. In addition, to the Capstone Demonstration Project, student will be required to take the exit criminal justice academic assessment for Criminal Justice Majors. Prerequisite: All required coursework following Concentration.

Prerequisite: All required coursework following Concentration.

**LE 453 - Topics In Criminal Justice (3)**

Selected topics in the area of criminal justice. (May be taken multiple times.) Prerequisite: Junior standing or permission of instructor

Prerequisite: Junior standing or permission of instructor.

**LE 473 - Law Enforcement Internship I (3)**

Professional internship placement in a criminal justice agency in the students' areas of concentration. Students will participate in agency activity under the supervision of an agency professional. Prerequisite: Junior or senior standing and department approval

Prerequisite: Junior or senior standing and department approval.

**LE 483 - Law Enforcement Internship II (3)**

Students with a double concentration or double major may enroll in a second professional internship placement. Prerequisite: Double concentration in criminal justice or double major, junior/senior standing, and department approval

Prerequisite: Double concentration in criminal justice or double major, junior/senior standing, and department approval.

**LE 4001 - Independent Studies in Criminal Justice (1)**

Original research and/or a review of current, critical research on an approved topic within the student's field of concentration.

Prerequisite: Junior or senior standing and department approval (course may be repeated)

Prerequisite: Junior or senior standing and department approval (course may be repeated).

**LE 4002 - Independent Studies in Criminal Justice (2)**

Original research and/or a review of current, critical research on an approved topic within the student's field of concentration.

Prerequisite: Junior or senior standing and department approval (course may be repeated)

Prerequisite: Junior or senior standing and department approval (course may be repeated).

**LE 4003 - Independent Studies in Criminal Justice (3)**

Original research and/or a review of current, critical research on an approved topic within the student's field of concentration.

Prerequisite: Junior or senior standing and department approval (course may be repeated)

Prerequisite: Junior or senior standing and department approval (course may be repeated).

**LE 4004 - Independent Studies in Criminal Justice (4)**

Original research and/or a review of current, critical research on an approved topic within the student's field of concentration.

Prerequisite: Junior or senior standing and department approval (course may be repeated)

Prerequisite: Junior or senior standing and department approval (course may be repeated).

### **LE 4015 - Basic Police Training (15)**

Attendance and completion of the Basic Police Training Course at the Indiana Law Enforcement Academy. Prerequisite: Junior or senior standing and department approval

Prerequisite: Junior or senior standing and department approval.

### **LE 603 - Theory & Philosophy of Leadership for Law Enforcement (3)**

An exploration of the nature of leadership models and theories, examining these models through broad lens of law enforcement fields. Provides a description and analysis of these approaches to leadership, giving special attention to how the models can improve leadership in law enforcement personnel and organizations.

### **LE 613 - Ethics, Culture & Politics (3)**

This course compares and contrasts the disciplines of leadership with an emphasis on fostering civil servant culture and personal ethics. Topics will include historical and contemporary leadership theories applied across a wide variety of law enforcement context.

### **LE 643 - Budget & Finance for Law Enforcement Leadership (3)**

Students will take an in-depth look at accounting, finance and budgeting practices within the law enforcement field including fundamental concepts of accounting principles. Throughout this course students will gain practical skills for budgeting in law enforcement departments and organizations. These practices will include preparing financial reporting for local, city and or state agencies and officials.

### **LE 693 - Law Enforcement Leadership Demonstration Capstone (3)**

An in-depth application of the concepts contained in the concentration courses. Conducted under the direction of a criminal justice faculty member, the student will design and implement a capstone project, and then present the results to a committee of at least two full-time and/or adjunct professors with law enforcement experience. Prerequisites: Must be admitted to the MSCJ Program. Must be taken in the final term of the MSCJ or Certificate Program, and may be taken with one other MSCJ course.

Prerequisite: Must be admitted to the MSCJ Program. Must be taken in the final term of the MSCJ or Certificate Program, and may be taken with one other MSCJ course.

## **MAE-Mechanical Aero Engineering**

### **MAE 201 - Introduction to Programming in MATLAB (1)**

An introduction to numerical methods of solving engineering problems. Introduction to programming in MATLAB.

### **MAE 202 - Mechanical Engineering Analysis (2)**

An introduction to analytical and numerical methods of solving mechanical engineering problems. An introduction to various topics of mechanical engineering focusing on the interrelationship between mathematics, natural sciences, and engineering design. Prerequisite: MA 134, Corequisite: EGR 143

Prerequisite: MA 134. Corequisite: EGR 143.

### **MAE 241 - Manufacturing Processes & Equipment Laboratory (1)**

Demonstrations of sand molding, metal casting, metal removal processes (turning, milling, drilling, grinding), deformation processing, and welding processes. Prerequisites: ES 233; Corequisite: ES 243, MAE 242

Prerequisite: ES 233. Corequisite: ES 243, MAE 242.

**MAE 242 - Manufacturing Processes & Equipment (2)**

An examination of commonly used engineering materials and the manufacturing processes and machines used in processing these materials. Prerequisites: ES 233; Corequisite: ES 243

Prerequisite: ES 233. Corequisite: ES 243.

**MAE 303 - Mechanics of Machinery (3)**

Topics include: study of the kinematics and dynamics of mechanisms. Fundamentals of displacement, velocity, and acceleration analysis of rigid bodies as a basis for the study of mechanisms. Motion analysis of linkages, cams, and gearing. Static and inertia force in machines. Balancing of rotating and reciprocating masses. Prerequisite: ES 223, MAE 201, MAE 202

Prerequisite: ES 223, MAE 201, MAE 202.

**MAE 323 - Thermodynamics II (3)**

Gas power systems: air-standard cycles, gas turbines. Refrigeration and heat pump systems. Non-reacting ideal gas mixtures and psychometrics. Reacting mixtures and combustion. Compressible flow. Prerequisite: ES 313 and MAE 201

Prerequisite: ES 313 and MAE 201.

**MAE 353 - Machine Component Design (3)**

Topics include: stress analysis of machine parts, combined stresses, working stress, stress concentration, theory of failure for both static and fatigue loadings, design of machine elements. Prerequisites: ES 233, ES 243

Prerequisite: ES 233, ES 243.

**MAE 363 - Introduction to Mechatronics (3)**

A multidisciplinary, hands-on, project-oriented course studying the use of electronics and microprocessors to control mechanical devices. Students complete a design project in mechatronics. Projects may include building an analog to digital converter, using a transistor H-bridge for motor control, construction of digital logic circuits, use of proximity sensors, and creating music using a microprocessor. Prerequisite: ES 253 or ECE 213

Prerequisite: ES 253 or ECE 213.

**MAE 373 - Computer-Aided Machine Design (3)**

Use of computer applications software as a part of the engineering design process. Introduction to the finite element method for stress analysis. Software packages, such as nonlinear solvers, finite element analysis, solid modeling, and kinematic simulation, will be introduced. Design work using these tools will be a major component of the course. Corequisite: MA 313, Prerequisites: EGR 143 and ES 243

Prerequisite: EGR 143 and ES 243. Corequisite: MA 313.

**MAE 383 - Metallurgical Thermodynamics (3)**

Thermodynamic fundamentals and their application to metallurgical processes such as melting, phase transformations, and melt composition control. First and Second Laws in an open system. Property relationships and Maxwell's relations. Physical and chemical equilibrium. Thermodynamic basis of phase diagrams, and metallurgical solution activities. Introduction to statistical thermodynamics. Applications to melt chemistry control and heat treatment processes. Prerequisites: ES 233 and ES 313

Prerequisite: ES 233 and ES 313.

**MAE 393 - Metallurgical Transport Processes (3)**

Topics include: thermal, fluid, and diffusional transport in metallurgical processes, such as cupola melting, AOD vessel operation, electric, and reverberatory furnace chemistry control, steel making, and recovery of secondary aluminum and copper.

Application of mathematical models from fluid mechanics, heat transfer, and mass transport to the fluid, thermal, and diffusional aspects of metallurgical processes. Prerequisite: ES 323 or MAE 3033

Prerequisite: ES 323 or MAE 3033.

### **MAE 3033 - Fluid Dynamics for Mechanical Engineers (3)**

Fundamentals of fluid mechanics. Properties, characteristics, parameters, and governing equations of fluid flow in laminar and turbulent regimes. Prerequisites: ES 223, ES 313, MA 233, MAE 201 and MAE 202

Prerequisite: ES 223, ES 313, MA 233, MAE 201 and MAE 202.

### **MAE 413 - Thermo-Fluid Component Design (3)**

Introduction to components for energy transfer including ducts, valves, pumps, fans, compressors, heat exchangers, and burners. Design of piping systems and fluid networks. Analysis of pumps and design of systems including pumps. Design of duct systems. Analysis of fans, blowers, compressors, and design of systems which use them. Prerequisites: ES 343, MAE 3033

Prerequisite: ES 343, MAE 3033.

### **MAE 443 - Engineering Metallurgy (3)**

Physical metallurgy of practical engineering alloys as it relates to processing and mechanical properties. Ferrous alloys and selected non-ferrous alloys are covered. Property measurements and other characterization techniques and their meanings. Phase diagrams, heat treatment and structure-property processing relationships in practical steels, cast irons, and aluminum alloys. Laboratory measurement of properties and microstructure: tensile strength, optical metallography, impact toughness, statistical nature of strength, plastic strain anisotropy in sheet metal. Prerequisite: ES 233

Prerequisite: ES 233.

### **MAE 453 - Mechanical Vibration (3)**

Introduction to vibration theory and analysis. Undamped, damped, free and forced vibration of single degree-of-freedom mechanical systems. Transient vibration and response to nonperiodic excitation. Vibration of two degree-of-freedom systems without damping. Vibration isolation and vibration absorbers. Prerequisites: MA 233, MAE 303

Prerequisite: MA 233, MAE 303.

### **MAE 463 - Mechanical Measure Laboratory (3)**

Principles of dimensional measurement and the measurement of deflection, stress, strain, and vibration. Transducer theory and signal conditioning. Use of computer data acquisition and signal analysis. Analysis of experimental error and construction of test plans. Laboratory work leading to an experimental project. Prerequisites: ES 253; Corequisite: MA 393

Prerequisite: ES 253. Corequisite: MA 393.

### **MAE 473 - Applied Aerodynamics (3)**

Properties of the atmosphere. Aerodynamic coefficients and their dependence on Reynolds number and Mach number. Aerodynamics of airfoils, wings, and complete aircraft. Performance analysis of aerospace vehicles in atmospheric flight: range, endurance, climb, descent, takeoff, and landing. Prerequisites: ES 223, MAE 3033 and MAE 323

Prerequisite: ES 223, MAE 3033 and MAE 323.

### **MAE 483 - Vehicle Structures (3)**

Introduction to the design of minimum weight structures. Design of members in tension, bending, or torsion. Design of compression members. The concept of shear flow and its use in analyzing monocoque and semi-monocoque structures. Prerequisites: MAE 353



Prerequisite: MAE 353.

**MAE 493 - Aerodynamics Laboratory (3)**

Introduction to subsonic and supersonic wind tunnel testing. Wind tunnel characteristics and data acquisition systems. Measurements of lift, drag, moments, with corresponding data reduction and aerodynamic coefficients. Turbulence factor, Reynolds and Strouhal number calculations. Airfoil, aircraft, and vehicle investigations. Supersonic measurements, including total and static pressures, Mach number, and shock angles. Engineering laboratory reports are required for each investigation. Team wind tunnel project and report is required. Prerequisite: MAE 473 or Permission of Department Chair

Prerequisite: MAE 473 or Permission of Department Chair.

**MAE 4001 - Special Problems in Mechanical Engineering (1)**

Independent study of special topics of particular interest in mechanical engineering. Course may be taken more than once with a maximum of six credit hours. Prerequisite: Permission of Department Chair

Prerequisite: Permission of Department Chair.

**MAE 4002 - Special Problems in Mechanical Engineering (2)**

Independent study of special topics of particular interest in mechanical engineering. Course may be taken more than once with a maximum of six credit hours. Prerequisite: Permission of Department Chair

Prerequisite: Permission of Department Chair.

**MAE 4003 - Special Problems in Mechanical Engineering (3)**

Independent study of special topics of particular interest in mechanical engineering. Course may be taken more than once with a maximum of six credit hours. Prerequisite: Permission of Department Chair

Prerequisite: Permission of Department Chair.

**MAE 4004 - Special Problems in Mechanical Engineering (4)**

Independent study of special topics of particular interest in mechanical engineering. Course may be taken more than once with a maximum of six credit hours. Prerequisite: Permission of Department Chair

Prerequisite: Permission of Department Chair.

**MAE 4005 - Special Problems in Mechanical Engineering (5)**

Independent study of special topics of particular interest in mechanical engineering. Course may be taken more than once with a maximum of six credit hours. Prerequisite: Permission of Department Chair

Prerequisite: Permission of Department Chair.

**MAE 4006 - Special Problems in Mechanical Engineering (6)**

Independent study of special topics of particular interest in mechanical engineering. Course may be taken more than once with a maximum of six credit hours. Prerequisite: Permission of Department Chair

Prerequisite: Permission of Department Chair.

**MAE 4023 - System Dynamics & Controls (3)**

Analysis of dynamic systems using free body diagrams, equation of motion, differential equations, and transfer functions. Introduction to Laplace transforms and solving for time history of dynamic systems. Experimental verification of analytical solutions. Analysis of hydraulic, thermal, and electrical systems. Analysis of first, second, and higher order systems, and analysis of effect of proportional, integral and derivative controls. Experimental verification of PID control analysis, time permitting. Prerequisites: ES 223, MA 233

Prerequisite: ES 223, MA 233.

### **MAE 4053 - Mechanical Engineering Design I (3)**

Introduction to design methodology and practice. Product specifications. Concept generation and selection. Product design. Design for manufacturing. Economics of product development. Prototyping. Teams of students work on a design project in the area of mechanical engineering. Design project work will continue in MAE 4063. Prerequisites: MAE 303, MAE 353, MAE 3033, ES 313, (MAE 373 or CO-050)

Prerequisite: MAE 303, MAE 353, MAE 3033, ES 313, (MAE 373 or CO 050).

### **MAE 4063 - Mechanical Engineering Design II (3)**

Conclusion of mechanical engineering design project. Preparation of a formal written design report and oral presentation of the design. Course must be taken the semester immediately following MAE 4053. Prerequisite: MAE 4053

Prerequisite: MAE 4053.

### **MAE 4123 - Power Generation (3)**

Topics include: design of a power plant to meet specified energy demand. Selection and/or synthesis of principal components and pollution control equipment. Performance optimization, instrumentation, and control. Prerequisite: MAE 323

Prerequisite: MAE 323.

### **MAE 4133 - Internal Combustion Engines (3)**

Introduction to internal combustion engines. A study of gas cycles and combustion thermodynamics. Analysis of overall engine performance characteristics, heat and mass transfer, friction, and emissions. Prerequisite: MAE 323, MAE 333 or MAE 3033, ES 343

Prerequisite: MAE 323, MAE 333 or MAE 3033, ES 343 .

### **MAE 4143 - Physical Metallurgy (3)**

Course explores the underlying structure-property relationships of metals. Topics include: thermodynamics and kinetics of phase transformations, diffusion, dislocation behavior, strengthening mechanisms, fracture mechanisms, crystallography, creep, and fatigue behavior. Laboratory work in fractography, scanning electron microscopy, fracture, tensile properties, and metallography. Prerequisite: MAE 443 or grade of "C" or better in ES 233

Prerequisite: MAE 443 or grade of "C" or better in ES 233.

### **MAE 4163 - Introduction to Rocket Propulsion (3)**

This course introduces the analysis of rocket propulsion motors and engines. The basics of mission analysis, trajectory analysis and nozzle performance will be discussed. Moreover, combustion and heat transfer will be applied in a rocket context. The performance of solid motors, liquid engines, and hybrid engines will be explored including solid and hybrid rocket internal ballistics and liquid rocket engine cycle analysis. Prerequisite: MAE 323

Prerequisite: MAE 323.

### **MAE 4173 - Gas Turbines (3)**

Topics include: basic theory of gas turbine engines. Study of the aerothermodynamics of propulsion, component characteristics, overall engine performance, and introduction to engine design. Prerequisites: MAE 3033 and MAE 323

Prerequisite: MAE 3033 and MAE 323.

### **MAE 4183 - Aircraft Stability & Control (3)**

The linearized equations of motion for atmospheric flight are developed. Longitudinal and lateral motions of the airplane are

studied with particular emphasis on the phugoid, short-period, dutch-roll, and spiral motions. Static stability and control requirements for airplane design are considered. Prerequisite: MA 233, MAE 473, MAE 4023

Prerequisite: MA 233, MAE 473, MAE 4023.

### **MAE 4193 - Metal Casting (3)**

This course covers the casting process from the perspective of engineering design. Tooling design for casting processes, melt quality control, heat transfer and fluid mechanics applications in casting, dynamics of mold interaction with the cast metal. Commercial software applications are included in solidification modeling and melt chemistry control. Prerequisite: MAE 242 or consent of instructor

Prerequisite: MAE 242 or consent of instructor.

## **MA-Mathematics**

### **MA 033 - Elementary Algebra (3)**

Topics include: basic Algebra, signed numbers, polynomial rational expressions, factoring, linear equations, graphs, linear systems. This is a non-credit, preparatory class.

### **MA 043 - Intermediate Algebra (3)**

Topics include: rational algebraic expressions, exponents, radicals, linear systems, functional notation, graphs. This is a non-credit, preparatory class. Prerequisite: Adequate SAT/ACT Mathematics score.

Prerequisite: Adequate SAT/ACT Mathematics score.

### **MA 0304 - Individualized Algebra I (4)**

(For non-traditional students.) This is a non-credit, preparatory class.

### **MA 113 - College Algebra (3)**

Topics include: solving equations, complex numbers, interval notation, graphing functions, transformations of functions, combining functions, composite functions, inverse functions, and systems of equations in two variables.

### **MA 123 - Trigonometry (3)**

Topics include: Trigonometric functions, identities, inverses, unit circle, solutions of triangles, trigonometric equations, complex numbers, radian measure, angular velocity. Prerequisite: Adequate SAT/ACT Mathematics score or approval from mathematics Department Chair.

Prerequisite: Adequate SAT/ACT Mathematics score or approval from mathematics Department Chair.

### **MA 124 - Precalculus (4)**

Topics include: review of algebraic expressions, linear systems, partial fractions, synthetic division, matrices, slope, fractional exponents, exponential and logarithmic relations, Trigonometric functions, identities, inverses, vectors, polar coordinates, conic sections, summation notation, and elementary series. Prerequisite: Three years of high school mathematics and adequate SAT/ACT Mathematics score or approval from mathematics Department Chair.

Prerequisite: Three years of high school mathematics and adequate SAT/ACT Mathematics score or approval from mathematics Department Chair.

### **MA 133 - Quantitative Reasoning (3)**

A survey of skills for understanding quantitative data in modern life and making decisions based upon quantitative information. This course focuses on: problem-solving and the application of mathematical concepts (such as measurement, geometry, statistics, and algebra) in various contexts. Interpretation (and misinterpretation) of percentages, probabilities and statistics in

contemporary decision-making; understanding of survey and experimental results as reported in context; and making logical and persuasive quantitative arguments. Examples incorporating mathematical arguments will be taken from a wide variety of fields. Prerequisite: adequate SAT/ACT Mathematics score or approval from mathematics Department Chair.

Prerequisite: adequate SAT/ACT Mathematics score or approval from mathematics Department Chair.

#### **MA 134 - Calculus I (4)**

Topics include: limits, continuity, differentiation, applications, definition of the integral, and fundamental theorem of integral calculus.

Prerequisite: Three years of high school mathematics, including trigonometry, and adequate SAT/ACT Mathematics score or approval from Mathematics Department Chair.

#### **MA 143 - Discrete Mathematics (3)**

A survey of mathematical topics not related to calculus. Topics include set, logic, combinatorics, matrices and discrete probability; make applications in each of these areas.

#### **MA 153 - Finite Math (3)**

Topics include: set operations, introduction to logic, mathematics of finance, introduction to probability and statistics. Not open to engineering/science majors. Prerequisite: Two years of high school mathematics

Prerequisite: Two years of high school mathematics.

#### **MA 163 - Applied Math w/Business Concepts (3)**

The course provides students with further knowledge of algebraic applications, building on concepts learned in earlier courses. The course will enable students to make sound personal and business financial decisions and will address financial management issues in both realms. Topics include calculating percentages, compound interest, annuities, amortization, and other topics in business.

Prerequisite: MA 113 – College Algebra with a C or better.

#### **MA 164 - Calculus II (4)**

Topics include: integration evaluation techniques, improper integrals, applications of integration, infinite sequences and series, parametric equations, polar coordinates.

Prerequisite: "C" or better in MA 134 or equivalent.

#### **MA 173 - Essential Calculus (3)**

Topics include: limits, introduction to differential and integral calculus with applications, and fundamental theorem of integral calculus with applications. Prerequisite: MA 113

Prerequisite: MA 113.

#### **MA 184 - Mathematics for Elementary Teachers I (4)**

Topics include: numeration systems, set theoretic development of whole number system, decimals, percents, ratios, elementary number theory, elementary algebra, and problem solving techniques. Designed specifically for elementary and middle school curricula emphasizing NCTM standards.

#### **MA 194 - Mathematics for Elementary Teachers II (4)**

Topics include: linear, angular, area, and volume measure. Metric system, congruence, and similarity in geometric figures, probability, and statistics. Designed specifically for elementary and middle school curricula emphasizing NCTM standards. Prerequisite: MA 184

Prerequisite: MA 184.

**MA 203 - Discrete Math for Information Sciences (3)**

An introduction to methods of analytical, abstract and critical thinking, deductive reasoning, and logical and mathematical tools used in information sciences. The topics include propositional and predicate logic, natural deduction proof system, sets, functions and relations, proof methods in mathematics, mathematical induction and finite state machines. Prerequisites: MA 113

Prerequisite: MA 113.

**MA 213 - Calculus III (3)**

Topics include: Calculus of several variables, algebra and calculus of vectors, partial differentiation, directional derivative, multiple integrals, applications. Uses symbolic algebra software.

Prerequisite: "C" or better in MA 164 or equivalent.

**MA 233 - Differential Equations (3)**

Topics include: methods of solution for first and higher order differential equations, systems of ordinary differential equations, Laplace transforms, series solutions.

Prerequisite: C or better for MA 213 or equivalent.

**MA 253 - Statistics (3)**

Topics include: laws of probability, frequency distributions, sampling, expectation and variance, normal and sampling distributions, hypothesis testing, least squares, point, and interval estimates of parameters. Not open to engineering/ science majors. Prerequisites: MA 113

Prerequisite: MA 113.

**MA 273 - Cryptography & Compression (3)**

This course provides an introduction to the fundamental components and mathematical concepts of encryption and compression. Topics include public key and private key systems, hashing, digital signatures, and common compression algorithms for image, audio, and video formats. Prerequisites: MA 173, MA 203, and MA 253

Prerequisite: MA 173, MA 203, and MA 253.

**MA 303 - College Geometry (3)**

Topics include: the construction of various types of mathematical proofs, analysis of the properties of geometric objects in Euclidean and neutral geometry, compass and straightedge constructions.

Prerequisite: C or better in MA 164 or equivalent.

**MA 312 - Historical Aspects of Mathematics (2)**

Topics include: chronologically explore significant results in mathematics. Perspective from different cultures considered. Selected topics vary from numeration systems to algebra, geometry, probability, and calculus. Prerequisite: MA 213

Prerequisite: MA 213.

**MA 313 - Introduction to Linear Algebra (3)**

Topics include: vectors, matrices, solving systems of linear equations with matrices, computing determinants, the Invertible Matrix Theorem, subspaces, basis, dimension, and computing eigenvectors/eigenvalues.

Prerequisite: C or better in MA 213 or equivalent.

**MA 323 - Operations Research (3)**

Topics include: computer solution of mathematical models for decision making. Linear, dynamic and integer programming, critical path scheduling, queuing theory, game theory, resource allocation. Prerequisites: MA 253 or MA 393

Prerequisite: MA 253 or MA 393.

**MA 333 - Number Theory (3)**

Topics include: divisibility, prime numbers, Euclid's algorithm, linear congruences, quadratic residues, numerical functions, factorization, Diophantine equations, applications, and puzzles. Potential applications include hash functions, random number generation, and encryption.

Prerequisite: C or better in MA 164 Calculus II.

**MA 343 - Introduction to Proofs (3)**

Topics include: logic, the construction of various types of mathematical proofs, sets, functions and relations, cardinality, and the study of the real number line. Prerequisite: C or better for MA 213 or equivalent or senior standing or Department Chair approval.

Prerequisite: C or better for MA 213 or equivalent or senior standing or Department Chair approval.

**MA 353 - Vector Analysis (3)**

Topics include: algebra and calculus of vectors, dot and cross products, Green's and Stokes' Theorems, gradient, divergence, and curl of a vector field. Prerequisite: MA 213

Prerequisite: MA 213.

**MA 363 - Advanced Differential Equations (3)**

Topics include: Bessel and Legendre equations, eigenvalue problems, Sturm-Liouville theory, existence and uniqueness theorems for linear and nonlinear equations, stability considerations. Prerequisite: MA 233

Prerequisite: MA 233.

**MA 373 - Abstract Algebra (3)**

A study of fundamental algebraic structures. Topics include: groups, rings, integral domains, and fields, and morphisms between these objects.

Prerequisite: C or better in MA 343 or MA 303 or equivalent or senior standing.

**MA 383 - Computer Solutions to Differential Equations (3)**

Numerical techniques for solving both ordinary and partial differential equations. Initial value and boundary valued conditions (Uses Computer.) Prerequisite: MA 233 and high level programming language

Prerequisite: MA 233 and high level programming language.

**MA 393 - Probability & Statistics (3)**

Topics include: finite probability, distributions, data analysis, sampling and sampling distributions, hypothesis tests, regression and correlation analysis, analysis of variance, design of experiments. Prerequisite: MA 213

Prerequisite: MA 213.

**MA 3001 - Topics in Mathematics (1)**

This would be the addition of a 300-level topics course, for instructors to use when 400-level is not appropriate. Prerequisite:

MA 213 or approval of instructor. The instructor may also set a higher prerequisite if needed.

Prerequisite: MA 213 or approval of instructor. The instructor may also set a higher prerequisite if needed.

**MA 3002 - Topics in Mathematics (2)**

This would be the addition of a 300-level topics course, for instructors to use when 400-level is not appropriate. Prerequisite: MA 213 or approval of instructor. The instructor may also set a higher prerequisite if needed.

Prerequisite: MA 213 or approval of instructor. The instructor may also set a higher prerequisite if needed.

**MA 3003 - Topics in Mathematics (3)**

This would be the addition of a 300-level topics course, for instructors to use when 400-level is not appropriate. Prerequisite: MA 213 or approval of instructor. The instructor may also set a higher prerequisite if needed.

Prerequisite: MA 213 or approval of instructor. The instructor may also set a higher prerequisite if needed.

**MA 3093 - Probability (3)**

Basic concepts of probability, including counting arguments based on combinations and permutations; discrete random variables; continuous random; moment generating functions; joint, marginal and conditional densities; expected value operators; and special distributions. Prerequisite: MA 164

Prerequisite: MA 164.

**MA 3193 - Financial Mathematics (3)**

Fundamental concepts of financial mathematics, and how those concepts are applied in calculating present and accumulated values for various streams of cash flows as a basis for future use in: reserving, valuation, pricing, asset/liability management, investment income, capital budgeting and valuing contingent cash flows. Prerequisite: MA 164

Prerequisite: MA 164.

**MA 3293 - Advanced Probability & Statistics (3)**

This course may be thought of as a continuation of both MA 193 and MA 393. Topics include time series analysis, discrete random process, including discrete time Markov chains and Poisson processes, and continuous random process including Brownian motion. Applications will be made to finance and insurance. Prerequisite: MA 393 and MA 3093

Prerequisite: MA 393 & MA 3093.

**MA 403 - Real Analysis (3)**

A modern topological approach to real analysis. Selected concepts include bounded, open, closed sets, connectedness, completeness and compactness, functions, sequences, limits, continuity, series, differentiation, and integration. Prerequisite: 'C' or better in MA 343 or MA 303 or senior standing

Prerequisite: C or better in MA 343 or MA 303 or senior standing.

**MA 404 - Individualized Intermediate Algebra (4)**

(For non-traditional students.) This is a non-credit, preparatory class. Prerequisite: Equivalent of high school Algebra I

Prerequisite: Equivalent of high school Algebra I.

**MA 413 - Advanced Linear Algebra (3)**

Topics include: vector spaces and subspaces over a field, special subgroups of matrix groups, basis, dimension, rank, nullity, linear transformations, the determinant function, basic module theory, and the Cayley-Hamilton Theorem.

Prerequisite: "C" or better in MA 343 and MA 313 or equivalent.

### **MA 423 - Complex Variables (3)**

Topics include: complex numbers and functions, analytic functions, Cauchy-Riemann equations, Cauchy theory, Taylor and Laurent series, contour integration, and calculus of residues.

Prerequisite: C or better in MA 233 or equivalent.

### **MA 433 - Introduction to Mathematical Cryptography (3)**

An introduction to modern cryptography emphasizes the mathematics behind the theory of public key cryptosystems and digital signature schemes. The course focuses on these key topics while developing the mathematical tools needed for the construction and security analysis of diverse cryptosystems. Prerequisite: 'C' or higher in MA 333

Prerequisite: 'C' or higher in MA 333.

### **MA 443 - Numerical Analysis (3)**

Topics include: numerical solution of algebraic and transcendental equations, numerical differentiation and integration, linear systems, eigenvalues, curve fitting and two dimensional problems. (Uses computer.) Prerequisite: MA 213

Prerequisite: MA 213.

### **MA 453 - Point-Set Topology (3)**

Topics include: construction of various topologies, separation axioms, continuity and homeomorphisms, connectedness, compactness, countability axioms, Urysohn's Lemma and Tychonoff's Theorem.

Prerequisite: "C" or better for MA 343 or equivalent.

### **MA 473 - Graph Theory & Combinatorics (3)**

A study of discrete mathematics with special emphasis on construction and analysis of mathematical models using combinatorics, graph theory, and other discrete methods with application in a wide variety of areas. Incorporates mandatory group research projects.

Prerequisite: C or better in MA 213 or equivalent.

### **MA 483 - Mathematics Capstone I (3)**

An introduction to mathematical research. Students will explore myriad depositories of mathematical writing, and write a literature review for what will be the topic for their MA 493 (Capstone II) project.

Prerequisite: Junior or Senior standing and declared major in mathematics.

### **MA 493 - Mathematics Capstone II (3)**

The culminating project of a mathematics major or minor. Students will research a topic in mathematics and write significant paper about a topic beyond the scope of the undergraduate curriculum. The paper may be either expository or an original work. Student must present their research in a public forum.

Prerequisite: MA483 Capstone I.

### **MA 4001 - Special Problems in Mathematics (1)**

Selected topics may include, but not limited to, advanced differential equations, modern algebra, boundary-values problems, probability and statistics, topology, transform calculus. Arranged with permission of Department Chair. Prerequisite: Senior standing (See Department Chair for independent study policy)

Prerequisite: Senior standing (See Department Chair for independent study policy).



### **MA 4002 - Special Problems in Mathematics (2)**

Selected topics may include, but not limited to, advanced differential equations, modern algebra, boundary-values problems, probability and statistics, topology, transform calculus. Arranged with permission of Department Chair. Prerequisite: Senior standing (See Department Chair for independent study policy)

Prerequisite: Senior standing (See Department Chair for independent study policy).

### **MA 4003 - Special Problems in Mathematics (3)**

Selected topics may include, but not limited to, advanced differential equations, modern algebra, boundary-values problems, probability and statistics, topology, transform calculus. Arranged with permission of Department Chair. Prerequisite: Senior standing (See Department Chair for independent study policy)

Prerequisite: Senior standing (See Department Chair for independent study policy).

### **MA 4093 - Actuarial Modeling (3)**

A study of financial models through insurance and investments. Topics includes investment portfolios, mortality tables and life, home and automobile insurance. Prerequisites: MA 3193 and MA 3293

Prerequisite: MA 3193 and MA 3293.

## **MGT-Management**

### **MGT 303 - Risk Management (3)**

This course overviews key organizational risk and crisis management issues by focusing on organizational and risk fundamentals, enterprise risk management, project management, crisis management and regulatory issues. Incorporating the concepts of effective decision making to align organizational goals with performance and crisis response.

### **MGT 313 - Human Resource Management (3)**

This course includes a discussion of policies, objectives, principles and organizational structure as they pertain to personnel work. The major functions of human resources management such as staffing, performance management, human resource development, safety and health, and employee and labor relations are examined. There will be an additional focus on the impact of government laws and regulations on the human resource functions. Corequisite: MGT 363

Corequisite: MGT 363.

### **MGT 323 - Leadership (3)**

This course examines leadership, influence, and power across a variety of disciplines, with a strong emphasis on ethics. This course focuses on a Transformational based approach to leadership and leadership development as well as the skills necessary for facilitating positive change in groups, organizations, and communities. Active learning opportunities to understand and practice essential skills such as continual learning, powerful communication, problem solving, managing process, goal achievement, conflict resolution, win-win negotiating, and empowering stewardship are woven throughout the course. Effective leadership practice through emphasis on strengths development is the goal of this class. Historical, literary, and contemporary examples of successful leaderships provide a framework for examining the theories and practice of leadership and power.

Prerequisite: PSY 113 or SM 393

Prerequisite: PSY 113 or SM 393.

### **MGT 333 - Supervision (3)**

This course is intended for people who are, or plan to be, first line supervisors. Its purpose is to present basic principles that will assist in developing the talent needed to direct other people. Skill building cases and incidents are part of the course content. Prerequisite: BA 123 or PSY 113

Prerequisite: BA 123 or PSY 113.

### **MGT 343 - Human Resource Development (3)**

This course is a study of processes, methods, theories, and current practices in training and staff development in business and organizational settings. The course focuses on practices that facilitate learning and change to achieve organizational objectives.

Prerequisite: MGT 313

Prerequisite: MGT 313.

### **MGT 353 - Designing Operations (3)**

This course examines the central concepts of designing operations in both manufacturing and service enterprises. Topics include process strategy, location and layout strategy, job design, quality management, planning, productivity, and the design of goods and services. Prerequisites: MA 173

Prerequisite: MA 173.

### **MGT 363 - Organizational Behavior (3)**

This course examines the manager's role in dealing with behavior at all organizational levels. It emphasizes the need for interpersonal and group skills. Applications of behavioral science concepts and findings to organizational situations are included. Topics include motivation, communications, leadership, conflict, and change. Prerequisite: BA 123 or PSY 113

Prerequisite: BA 123 or PSY 113.

### **MGT 373 - Facility Management (3)**

This course will expose students to the key concepts of facility management. Topics include identifying core versus non-core business activities, budgeting and resource allocation, short and long term facility maintenance, facility supervision, workplace design, spatial management, energy conservation, construction structures and materials, and building services (sewer/water, gas, energy distribution, heating, ventilation, air conditioning). Students will be exposed to different types of facilities and the specific considerations for each type of facility. Prerequisite: BA 123 or PSY 113

Prerequisite: BA 123 or PSY 113.

### **MGT 383 - Principles of Project Management (3)**

This course will expose students to the key concepts of project management. Topics include project planning, implementation and controlling, time management, budgeting, resource allocation, quality, human resource considerations, negotiations, scheduling, and auditing. Students will also be exposed to project management software, tools, and methods used by project managers, and event management issues. (Same as HR 403) Prerequisite: BA 123

Prerequisite: BA 123. Crosslisted as: HR 403.

### **MGT 403 - Principles of Hospitality Management (3)**

This course will expose students to the many facets of the hospitality and tourism industry. Topics to be included will be the policies, procedures, marketing, promoting, pricing, and planning of the wide range of operations. This class will incorporate both classroom and field experiences so that the student understands what is required to be successful in this very diverse industry. Prerequisite: BA 123, MK 203, and ENG 143 or ENG 133

Prerequisite: BA 123, MK 203, and ENG 143 or ENG 133.

### **MGT 413 - Management Of Quality (3)**

This course examines principles of quality management and continuous improvement in manufacturing and services enterprises. The focus is on using key quality tools, including statistical process control, pareto charts, flow charts, cause-effect diagrams, etc. Prerequisites: MA 253 and MGT 353

Prerequisite: MA 253 and MGT 353.

**MGT 423 - Supply Chain Management (3)**

This course examines the strategic framework of supply chain management. Students are exposed to the key factors of building and maintaining global supply chains for competitive advantage. Topics covered include aggregate planning, inventory, warehousing, distribution, pricing, sourcing, risk, sustainability and information management. It integrates these areas through analysis of case studies and topical readings. Prerequisites: MGT 353 or MGT 373

Prerequisite: MGT 353 or MGT 373.

**MGT 443 - Managing Operations (3)**

This course examines contemporary operations management principles and practices. Topics include project management, inventory management, aggregate planning, supply chain management, materials requirement planning, lean manufacturing, and just-in-time principles. Prerequisites: MA 253 and MGT 353

Prerequisite: MA 253 and MGT 353.

**MGT 453 - Strategic Management (3)**

This course requires a knowledge of all functional areas of business. It integrates these areas through analysis of case histories and related readings. Class discussion, presentations and written reports are used extensively. This course is the capstone business course and should be taken the last semester before graduation. Prerequisite: Senior standing (last two semesters of school)

Prerequisite: Senior standing (last two semesters of school).

**MGT 463 - Small Business Management (3)**

This course examines the preparatory steps necessary to launch a small business enterprise, as well as manage the everyday complexities of cash flow, marketing, staffing, pricing, purchasing, and advertising. Its purpose is to present the many competencies needed to operate a small business successfully in the competitive environment of the 21st century. Case analysis and personal interviews are the primary integral components of the course content. Prerequisites: FIN 303 and MGT 353

Prerequisite: FIN 303 and MGT 353.

**MGT 473 - Capsim Business Simulation (3)**

This course through competitive simulations, will teach the importance of team work, strategic planning and the impact of decision- making within a business entity. Small teams will manage a business entity throughout the course. Teams will make and submit decisions regarding functional areas of the entity, including research and development, production, marketing, finance, and human resources. The decisions will then be analyzed and feedback given on how the decisions would have impacted the entity. Teams will be competing with other teams across the globe, and they will see immediately how their decisions position their given entity in the global business arena. Prerequisites: Completion of all business core courses or permission of the Dean of the College of Graduate and Professional Studies.

Prerequisite: Completion of all business core courses or permission of the Dean of the College of Graduate and Professional Studies.

**MGT 483 - Capstone (3)**

This course will require the student to integrate and synthesize previous course work in the business core to complete a comprehensive final project, which demonstrates mastery of pedagogy and knowledge. As the culminating final project of a business program, it will assess the student's mastery of the business program outcomes.

Prerequisite: Completion of all business core courses or permission of the Dean of the College of Graduate and Professional Studies.

**MGT 493 - Select Topics (3)**

Offered to treat specific or current business or management issues in depth.

**MGT 543 - Operations Strategy & Management (3)**

Throughout this course, students will examine the central role of operations in both manufacturing and service enterprises. Additionally, this course will cover quality management, design of goods and services, layout, scheduling, project management, inventory management, supply chain management, and purchasing activities within the firm.

Prerequisite: None.

**MGT 5013 - Advanced Plant Management (3)**

Systems and methods associated with planning and monitoring in the manufacturing environment including forecasting, master production scheduling, materials requirement planning, and shop floor engagement. Integrated aspects of manufacturing resource planning and enterprise resource planning as well as the effects of just-in-time administration and the theory of constraints. Prerequisite: Graduate standing

Prerequisite: Graduate standing.

**MGT 5093 - Business Strategy & Decision Making (3)**

This course is to improve business decision-making skills and to provide strategies for development as a manager or executive. Topics covered include how individuals and groups make decisions and solve problems, individually and in organizations. By the end of the course, students will understand their own decision styles and personal dispositions and make decisions more deliberately. Students will be able to use decision analysis techniques and group processes as well as integrate their values into their decisions. Prerequisite: Must be completed in final term of graduate program. This course is to improve business decision-making skills and to provide strategies for development as a manager or executive. Topics covered include how individuals and groups make decisions and solve problems, individually and in organizations. By the end of the course, students will understand their own decision styles and personal dispositions and make decisions more deliberately. Students will be able to use decision analysis techniques and group processes as well as integrate their values into their decisions. Prerequisite: Must be completed in final term of graduate program.

Prerequisite: Must be completed in final term of graduate program.

**MK-Marketing****MK 203 - Marketing (3)**

The marketing activities necessary to provide goods and services to target customers are examined, as well as the role marketing plays in the social and economic system. The marketing variables of product, promotion, placement, and price are considered in the context of strategic planning, implementation, and control. Prerequisites: BA 123

Prerequisite: BA 123.

**MK 313 - Retail Management (3)**

This is the study of the role of retailing in the domestic and international marketing process. A functional approach is taken in the study of retailing topics of placement, promotion, pricing, inventory control. Also examined are the consumer purchasing behavior and lifestyle profiles to understand growth of nontraditional channels. Prerequisite: MK 203

Prerequisite: MK 203.

**MK 323 - Integrated Marketing Communication (3)**

The integrated approach to marketing communications is emphasized. Advertising, sales promotion, database/direct marketing, public relations, sponsorship/event marketing, support media, trade promotions, internet marketing, personal selling, and their coordination through a common brand and theme are investigated. Prerequisites: MK 203, SP 203 or COM 163

Prerequisite: MK 203, SP 203 or COM 163.

**MK 343 - International Marketing (3)**

This course provides a detailed examination into the principles and practices of international marketing as it applies to today's global economy. In-depth studies and analysis will be made of trade and commercial policies and practices, as well as international product adaptation, promotion, distribution, and pricing strategies. The student will examine the international marketing manager's role in the development of an export marketing program. Prerequisites: BA 343, MK 203

Prerequisite: BA 343, MK 203 .

**MK 353 - The Global Consumer (3)**

This course provides a detailed examination into the principles and practices of international marketing as it applies to today's global economy. In-depth studies and analysis will be made of trade and commercial policies and practices, as well as international product adaptation, promotion, distribution, and pricing strategies. The student will examine the international marketing manager's role in the development of an export marketing program. Prerequisites: BA 343, MK 203

Prerequisite: BA 343, MK 203.

**MK 363 - Commerce and Consumer Behavior (3)**

Studies in this course include consumer and organizational buying behavior, as well as determinants of this behavior. Consumer characteristics, including attitudes and behaviors, processing of information, as well as consumer cultural, psychological and communication theories are also studied. Course also examines organizational efforts to use consumer behavior in the marketspace and marketplace to promote products and services.

Prerequisite: MK 203. Crosslisted as: PSY 3063.

**MK 373 - Graphic Design Fundamentals (3)**

Students will gain design theory, knowledge and experience applying the design process, design principles and design elements to plan and implement ideas and experiences with visual and textual content into industry-quality graphic design projects.

Prerequisite: Junior standing

Prerequisite: Junior standing.

**MK 423 - Professional Selling (3)**

This course examines the impact of professional selling in today's competitive marketplace. Topics examined are analyzing buyer needs, planning effective presentations, developing a professional selling process, human motivation, account relationship, employee compensation and economic incentives along with ethical decision-making. Prerequisite: MK 203, SP 203

Prerequisite: MK 203, SP 203.

**MK 433 - Marketing Strategy (3)**

Content will explore the processes and methods for identifying and selecting marketing strategies that build brand equity. Course will utilize marketing concepts, consumer behavior theories, and marketing research data as well as explore the changing environments and systems. Prerequisite: MK 203 and MK 363

Prerequisite: MK 203 and MK 363.

**MK 453 - Strategic Digital Marketing Certification (3)**

Throughout this course, students will examine a number of digital marketing tools and the complexity of today's customers. Students will learn the skills needed to design, analyze, and evaluate email, content, social and search strategies for marketers' success. In this course, students will complete a suite of market-leading digital marketing and social media certification programs and use their acquired skills to make data-rich, strategic decisions about marketing strategy development and

implementation. Prerequisite: MK 203

Prerequisite: MK 203. Corequisite: None.

### **MK 463 - Marketing Research (3)**

This is the study of techniques and approaches associated with researching marketing topics. It includes consumer research, market analysis, product research, advertising research, and sales analysis. Prerequisites: MA 253 and MK 203

Prerequisite: MA 253 and MK 203.

### **MK 473 - Digital Advertising (SEM/SEO) (3)**

Electronic technologies are applied to the functions of marketing which are product, price, placement, and promotion. E-marketing transforms traditional business using new models that add customer value and increase profitability. The outcome of the course will be the creation of an E-marketing plan. Prerequisite: MK 203

Prerequisite: MK 203.

### **MK 483 - Senior Seminar in Marketing (3)**

This is an integrative capstone course which brings together all the functional areas of marketing. The focus is on decision-making and problems in marketing strategy. Students will study marketing considerations and responses to changes in the customer, legal, trade, technological and regulatory environments. This course includes the preparation and organization of a comprehensive marketing plan. Prerequisite: MK 203, MK 463, and Senior standing (last two semesters of school)

Prerequisite: MK 203, MK 463, and Senior standing (last two semesters of school).

### **MK 493 - Selected Topics in Marketing (3)**

This class will utilize lectures, discussions, exercises and group projects to explore current marketing topics in order to strengthen observation, analytical, research and communication skills. Prerequisites: MK 203

Prerequisite: MK 203.

### **MK 6513 - Services Marketing (3)**

This course will examine how services dominate the US economy and are becoming critical for competitive advantage in companies across the globe and in all industry sectors. Students will determine the unique service approaches to marketing, management, operations, and strategy required to be successful. Students will discuss the development and execution of these strategies. This course is designed to prepare students to function as effective executives in a service economy.

Prerequisite: None. Corequisite: None. Crosslisted as: None.

### **MK 6523 - Sales Management (3)**

In today's dynamic world, the goal of Sales Management is to examine the elements of an effective sales force as a key strategic component of an organization's total marketing program. This course will cover all facets of sales management, including analyzing the sales process; ethical sales management decision making; sales force structure selection; sales forecasting; territory management; selecting, training, motivating, supervising and compensating the sales force; and potential solutions towards typical sales management problems.

Prerequisite: None. Corequisite: None. Crosslisted as: None.

### **MK 6943 - Strategic Marketing Management (3)**

This course examines the collective marketing activities (pricing, promotion, placement, and product) as they relate to the target market. The strategic planning process and how it relates to the overall profitability of the marketing department and a corporate structure will be studied. Prerequisite: Graduate standing

Prerequisite: Graduate standing.

## MRE-Mechatronics Robotics Engr

### **MRE 262 - Robotics Lab & Introduction to Programmable Logic Controllers (2)**

Experimental and project based introduction to Programmable Logic Controllers, electrical measurement, power and signals, Boolean logic, characterization of passive circuits, and measurements of time/frequency response. Corequisite: ECE 213

Corequisite: ECE 213.

### **MRE 313 - Fluid Power Systems & Design (3)**

Using principles of fluid motion and fluid statics to design machines, which perform motion/work to specifications. Design of system for particular task performance under constraints. Prerequisites: ES 213

Prerequisite: ES 213.

### **MRE 323 - Robotic Kinematics & Kinetics (3)**

Forward and inverse kinematics. Design trajectory for robotic arm/end-effector and kinetic requirements for robotic joints.

Prerequisite: MAE 303

Prerequisite: MAE 303.

### **MRE 403 - Machine Communications (3)**

Control and Protocols used in communication between modern networked machines (or components of them). Examples are Modbus/HART. Discussion of standards. This course builds on Microcontrollers and Mechatronics. Prerequisite: ECE 273

Prerequisite: ECE 273.

### **MRE 463 - Advanced Mechatronics (3)**

Discrete sensors (principles and applications). Advanced topics and current technology, SLAM (simultaneous localization and mapping), Vision systems, HMIs, IOT, and AI. Prerequisite: MRE 323

Prerequisite: MRE 323.

### **MRE 4023 - System Dynamics & Controls (3)**

The development of linear models in terms of state-variable equations, input-output differential equations, and transfer functions. The introduction of both time-domain solutions and Laplace transforms. Development of time constants, damping ratios, and transfer functions. Poles and zeros, and frequency-response. The application of feedback modeling and design tools including: root-locus diagrams, bode plots and PID control. Prerequisites: ES 223 and MA 233

Prerequisite: ES 223 and MA 233. Corequisite: Lab Required.

### **MRE 4053 - Mechatronics & Robotics Engineering Design I (3)**

Introduction to design methodology and practice. Product specifications. Concept generation and selection. Product design. Design for manufacturing. Economics of product development. Prototyping. Teams of students work on a design project in the area of mechatronics and robotics engineering. Design project work will continue in MRE 4063. Prerequisites: MRE 262, MRE 313, MRE 323

Prerequisite: MRE 262, MRE 313, MRE 323 .

### **MRE 4063 - Mechatronics & Robotics Engineering Design II (3)**

Conclusion of mechatronics and robotics engineering design project. Preparation of a formal, written design report and oral

presentation of the design. Course must be taken the semester immediately following MRE 4053. Prerequisite: MRE 4053

Prerequisite: MRE 4053.

## MT-Manufacturing Technology

### **MT 113 - Manufacturing Processes & Materials (3)**

A study of commonly used manufacturing processes (machining, casting, extrusion, forging and others) with emphasis on important engineering materials used in production. Materials studied include metals, plastics, ceramics, and composites.

Prerequisites: ETD 173

Prerequisite: ETD 173.

### **MT 123 - Introduction to AutoCAD Design (3)**

An introductory course which studies the concept of solid modeling and its application in industry. In this course students will learn the fundamentals of 2D and Solid Modeling utilizing AutoCAD software which includes the study of detail drawing creation. Prerequisites: ETD 173

Prerequisite: ETD 173.

### **MT 133 - Geometric Dimensioning & Tolerancing for Manufacturing Technology (3)**

Introduction to Geometric Dimensioning and Tolerancing for Manufacturing Technology including advanced applications of dimensioning principles, tolerances, and precision dimensioning for engineering drawing. Introduction to how geometric dimensioning and tolerancing techniques are used on engineering drawings as it relates to manufacturing. Prerequisite: ETD 103

Prerequisite: ETD 103.

### **MT 253 - Basic Dimensional Metrology (3)**

Emphasis on methods and principles of measuring basic physical dimensions for inspection and quality assurance/control with an emphasis on manufacturing technology. Also covered are the basics of gaging and coordinate measuring systems.

Prerequisites: ETD 113 and ETD 173

Prerequisite: ETD 113 and ETD 173.

### **MT 313 - Design for Manufacture & Assembly (3)**

Principles and methodologies for designing parts and products for: ease and efficiency of manufacture and assemble; maintenance and usability during the service life, along with disposal and recycling at the end of service life. Students will be able to apply DFM and quality assurance principles to lower the cost of designing, commissioning, and using new products.

Prerequisites: MT 113 and MT 253

Prerequisite: MT 113 and MT 253.

### **MT 323 - Use SolidWorks to Generate Working Drawings (3)**

The emphasis in this course is on being able to turn mechanically produced drawings, CAD solid models, prototypes, or sketches into working drawings. These drawings are used to manufacture components/parts into viable and economically produced products. Prerequisites: ETD 173 and ETD 113

Prerequisite: ETD 173 and ETD 113.

### **MT 403 - Quality Assurance for Manufacturing Technology (3)**

This course examines the critical nature of quality assurance for producing high reliability and economically produced products. The emphasis is on how quality techniques (especially SPC) can be integrated into manufacturing processes such that



products are produced reliably to exacting manufacturing specifications, with minimal scrap and downtime being created. The statistical nature of manufacturing processes is closely examined along with concepts of six-sigma and ISO 9000. Prerequisites: MA 253, MT 113, and MT 313

Prerequisite: MA 253, MT 113, and MT 313.

### **MT 413 - Manufacturing Technology Capstone Proposal (3)**

Introduction to manufacturing process design and project management. Integration of previous work into a complete manufacturing process plan proposal and explore how product designs are turned into successful manufactured products.

Prerequisites: Senior standing

Prerequisite: Senior standing.

### **MT 423 - Manufacturing Technology Capstone Project (3)**

In this course, students will complete a comprehensive research project. Students will integrate and synthesize previous coursework and best practices into designing and manufacturing for this project. Prerequisite: MT 413.

Prerequisite: MT 413. Corequisite: none.

## **MUS-Music**

### **MUS 101 - Sight Singing/Ear Training I (1)**

A study and application of sight singing techniques, dictation, chord recognition, error detection, and related activities.

Corequisite: MUS 113

Corequisite: MUS 113.

### **MUS 103 - Introduction to Theory (3)**

Music Theory is a study of basic music theory concepts including notation of pitch, rhythm and meter, scales, keys, and key signatures, intervals, triads, and seventh chords.

### **MUS 112 - Piano Lab (2)**

Designed to provide students with little or no piano background fundamentals of keyboard and musicianship on the piano.

### **MUS 113 - Music Theory I (3)**

A study of basic music theory concepts including notation of pitch, rhythm and meter, scales, keys and key signatures, intervals, triads and seventh chords.

### **MUS 123 - Music History I (3)**

The study of composers, styles and literature and their influence on music in western culture from the Medieval period through the Baroque period.

### **MUS 1010 - Applied Studies (no credit) (0)**

Designed to provide the students with private instruction on his or her principal instrument, voice or secondary instrument. The student will develop greater facility and technique along with enhanced musicianship and a better understanding of performing at a high level of competency.

### **MUS 1010Z - Applied Studies (0.5)**

Designed to provide the students with private instruction on his or her principal instrument, voice or secondary instrument. The student will develop greater facility and technique along with enhanced musicianship and a better understanding of performing at a high level of competency.

**MUS 1011 - Applied Studies (1)**

Designed to provide the students with private instruction on his or her principal instrument, voice or secondary instrument. The student will develop greater facility and technique along with enhanced musicianship and a better understanding of performing at a high level of competency.

**MUS 1011Z - Applied Studies (0.5)**

Designed to provide the students with private instruction on his or her principal instrument, voice or secondary instrument. The student will develop greater facility and technique along with enhanced musicianship and a better understanding of performing at a high level of competency.

**MUS 1110 - Percussion Ensemble (no credit) (0)**

Percussion Ensemble is for musicians who are interested in improving their skills in percussion performances and performing in an ensemble designed specifically for percussion instruments. This ensemble is open to all students regardless of experience in percussion performance.

**MUS 1111 - Percussion Ensemble (1)**

Percussion Ensemble is for musicians who are interested in improving their skills in percussion performances and performing in an ensemble designed specifically for percussion instruments. This ensemble is open to all students regardless of experience in percussion performance.

**MUS 1120 - Brass Ensemble (no credit) (0)**

Brass Ensemble is open to all students and community members who play brass wind instruments. The ensemble will perform a variety of music and can accommodate diverse brass instrumentation. Prerequisite: Players must have prior playing experience on their instrument and at least moderate music reading skills. Players of small brass instruments must provide their own instrument in good working order. Larger instruments may be available from the University.

Prerequisite: Players must have prior playing experience on their instrument and at least moderate music reading skills. Players of small brass instruments must provide their own instrument in good working order. Larger instruments may be available from the University.

**MUS 1121 - Brass Ensemble (1)**

Brass Ensemble is open to all students and community members who play brass wind instruments. The ensemble will perform a variety of music and can accommodate diverse brass instrumentation. Prerequisite: Players must have prior playing experience on their instrument and at least moderate music reading skills. Players of small brass instruments must provide their own instrument in good working order. Larger instruments may be available from the University.

Prerequisite: Players must have prior playing experience on their instrument and at least moderate music reading skills. Players of small brass instruments must provide their own instrument in good working order. Larger instruments may be available from the University.

**MUS 1130 - Choral Concourse (no credit) (0)**

The Choral Concourse is a large, mixed, vocal ensemble that will meet one evening a week and consist of Trine University students and community members. This ensemble will perform a variety of music and provide students and community members a secular vocal ensemble that rehearses in the evening. Prerequisite: General knowledge of reading music and singing ability.

Prerequisite: General knowledge of reading music and singing ability.

**MUS 1131 - Choral Concourse (1)**

The Choral Concourse is a large, mixed, vocal ensemble that will meet one evening a week and consist of Trine University students and community members. This ensemble will perform a variety of music and provide students and community

members a secular vocal ensemble that rehearses in the evening. Prerequisite: General knowledge of reading music and singing ability.

Prerequisite: General knowledge of reading music and singing ability.

**MUS 1140 - Chamber Orchestra (no credit) (0)**

The Chamber Orchestra is a performance ensemble designed for in-depth study, preparation and performance of all types of chamber orchestra literature. The Chamber Orchestra will play a mixture of string orchestra and full orchestra music. The ensemble performs at concerts and special events. Open to all university students. Prerequisite: Previous experience in an instrumental ensemble is preferred.

Prerequisite: Previous experience in an instrumental ensemble is preferred.

**MUS 1141 - Chamber Orchestra (1)**

The Chamber Orchestra is a performance ensemble designed for in-depth study, preparation and performance of all types of chamber orchestra literature. The Chamber Orchestra will play a mixture of string orchestra and full orchestra music. The ensemble performs at concerts and special events. Open to all university students. Prerequisite: Previous experience in an instrumental ensemble is preferred.

Prerequisite: Previous experience in an instrumental ensemble is preferred.

**MUS 1150 - Marching Band (no credit) (0)**

The Marching Band is a performing ensemble designed to bring excitement and enthusiasm to Thunder football games and other special events and to offer the students of Trine University the opportunity to perform in a collegiate marching band with all of its spectacle and showmanship. Prerequisite: Previous experience in an instrumental ensemble is preferred.

Prerequisite: Previous experience in an instrumental ensemble is preferred.

**MUS 1151 - Marching Band (1)**

The Marching Band is a performing ensemble designed to bring excitement and enthusiasm to Thunder football games and other special events and to offer the students of Trine University the opportunity to perform in a collegiate marching band with all of its spectacle and showmanship. Prerequisite: Previous experience in an instrumental ensemble is preferred.

Prerequisite: Previous experience in an instrumental ensemble is preferred.

**MUS 1160 - Wind Ensemble/Pep Band (no credit) (0)**

Wind Ensemble/Pep Band is a performance ensemble designed for in-depth study, preparation and performance of all types of standard band literature. The ensemble performs at concerts and athletic events. Open to all university students. Prerequisite: Previous experience in an instrumental ensemble is preferred.

Prerequisite: Previous experience in an instrumental ensemble is preferred.

**MUS 1161 - Wind Ensemble/Pep Band (1)**

Wind Ensemble/Pep Band is a performance ensemble designed for in-depth study, preparation and performance of all types of standard band literature. The ensemble performs at concerts and athletic events. Open to all university students. Prerequisite: Previous experience in an instrumental ensemble is preferred.

Prerequisite: Previous experience in an instrumental ensemble is preferred.

**MUS 1170 - University Choir (no credit) (0)**

University Choir is a performance ensemble which offers students the opportunity to sing the finest choral music. Open to all university students. Prerequisite: General knowledge of reading music and singing ability.

Prerequisite: General knowledge of reading music and singing ability.

**MUS 1171 - University Choir (1)**

University Choir is a performance ensemble which offers students the opportunity to sing the finest choral music. Open to all university students. Prerequisite: General knowledge of reading music and singing ability.

Prerequisite: General knowledge of reading music and singing ability.

**MUS 1180 - Jazz Band (no credit) (0)**

Jazz Band is a performance ensemble, designed for in-depth study, preparation and performance of all types of jazz band literature from swing to Latin, rock, fusion, etc. The ensemble performs at concerts and special events. Open to all university students. (May be taken multiple times.)

**MUS 1181 - Jazz Band (1)**

Jazz Band is a performance ensemble, designed for in-depth study, preparation and performance of all types of jazz band literature from swing to Latin, rock, fusion, etc. The ensemble performs at concerts and special events. Open to all university students. (May be taken multiple times.)

**MUS 1190 - Jazz/Show Choir (no credit) (0)**

The Jazz/Show Choir is a small audition vocal ensemble for experienced vocal musicians with good skills in sight reading, part reading, movement, and vocal production. As the name indicates, this ensemble performs music in the jazz and show genre.

Prerequisite: Students must audition with class instructor and other music faculty

Prerequisite: Students must audition with class instructor and other music faculty.

**MUS 1191 - Jazz/Show Choir (1)**

The Jazz/Show Choir is a small audition vocal ensemble for experienced vocal musicians with good skills in sight reading, part reading, movement, and vocal production. As the name indicates, this ensemble performs music in the jazz and show genre.

Prerequisite: Students must audition with class instructor and other music faculty

Prerequisite: Students must audition with class instructor and other music faculty.

**MUS 1200 - Musical Theatre/Opera Ensemble (no credit) (0)**

This auditioned ensemble allows the singer to not only improve musical skills but also to develop sound stage movement and performance. This small ensemble uses mainstream musicals and operas as the primary source of literature and performs key scenes from the works.

**MUS 1201 - Musical Theatre/Opera Ensemble (1)**

This auditioned ensemble allows the singer to not only improve musical skills but also to develop sound stage movement and performance. This small ensemble uses mainstream musicals and operas as the primary source of literature and performs key scenes from the works.

**MUS 201 - Sight Singing/Ear Training II (1)**

The continued study of ear training and sight singing utilizing diatonic materials. Course content includes the recognition of chords and dictation of melodic, harmonic and rhythmic material reinforcing concepts presented in MUS 101. Prerequisite: MUS 101

Prerequisite: MUS 101.

**MUS 213 - Music Theory II (3)**

The study of music theory and concepts including advanced four part writing, analysis, score study, and listening. Prerequisite: MUS 113

Prerequisite: MUS 113.

**MUS 223 - Music History II (3)**

The study of composers, styles, an overview of compositions, and their influence on music in Western culture from the Classic period through the Contemporary period.

**MUS 253 - Techniques of Conducting (3)**

The principals of baton technique. The student will develop a fluent and expressive beat style and rhythmic and aural facilities essential to successful instrumental and choral direction.

**MUS 272 - Music Appreciation (2)**

An introduction to the heritage of music culture of the Western world, including musical styles of the past and styles and forms of contemporary music literature. Previous music training not a prerequisite.

**MUS 273 - Music & Culture (3)**

An introduction to the music of the western world, including musical styles of the past and styles and forms of contemporary music literature. Previous music training not a prerequisite. This course explores how people define, create, value, and use music in cultures around the world. The basic musical elements of rhythm, melody, timbre, texture harmony, and form are explored through this multicultural approach to music appreciation.

**MUS 323 - Music Literature I (3)**

Music Literature I is a survey of masterworks, styles and forms of music from 1450 to 1900.

## NRS-Nursing

**NRS 303 - Professional Nursing Role (3)**

This course provides the foundation for advancing into the role of the professional Baccalaureate-prepared nurse. Concepts, trends, and challenges are examined from the perspective of a professional nurse. Theories are discussed and applied to issues regarding healthcare access, quality, and services. Prerequisite: Admission into the RN-BSN program

Prerequisite: Admission into the RN-BSN program.

**NRS 313 - Transcultural Nursing (3)**

This course provides the practicing nurse with theoretical knowledge that informs delivery of culturally-appropriate nursing care to individuals, families, and groups. Affords opportunity to increase cultural awareness and decrease health disparities. Economic and social factors impacting access to health care for various cultural groups are examined and discussed.

Prerequisite: NRS 303

Prerequisite: NRS 303.

**NRS 323 - Complementary & Alt Therapies (3)**

This course examines nontraditional healing modalities and therapies. Analysis of the efficacy of various treatments are investigated. Pharmacological interactions and general contraindications of complementary and alternative therapies are explored. Prerequisite: NRS 303

Prerequisite: NRS 303.

**NRS 333 - Nursing Ethics (3)**

This course focuses on ethical theories and the ethical decision-making process that informs nursing practice. Appraisal of clinical dilemmas provide an opportunity to develop moral reasoning skills. Prerequisite: NRS 303

Prerequisite: NRS 303.

### **NRS 343 - Nursing Informatics (3)**

This course investigates effective information management and utilization in healthcare settings. Emphasis is placed on trends and issues in clinical technology. Theoretical concepts from information science, computer science, and nursing science are incorporated into decision-making activities. Prerequisite: NRS 303

Prerequisite: NRS 303.

### **NRS 353 - Health Promotion Over Lifespan (3)**

This course explores concepts in health promotion for individuals and families from birth to death. Environmental, sociocultural, and spiritual influences on health are explored. Students utilize the nursing process and develop treatment plans for individuals and families across the life span. Emphasis is placed on holistic promotion. Prerequisite: NRS 303

Prerequisite: NRS 303.

### **NRS 414 - Community-Public Health Nursing (4)**

This course examines the health needs of populations within the community. Factors influencing the health of communities are investigated. Students appraise the role and core competencies of community health nurses in the prevention of disease and promotion of health. A practicum experience will focus on planning care for a selected population in the community.

Prerequisite: NRS 303

Prerequisite: NRS 303.

### **NRS 423 - Biostatistics & Epidemiology (3)**

This course examines basic concepts and principles of epidemiology, biostatistics, and preventative medicine related to public health practice. Epidemiological data measures and surveillance are examined. Students will identify statistical tests necessary to answer clinical questions. Principles of primary, secondary, and tertiary prevention are evaluated for appropriateness and efficacy. Prerequisite: NRS 303

Prerequisite: NRS 303.

### **NRS 433 - Foundations of Research (3)**

This course provides an introduction to the research process as it relates to evidence-based nursing practice and prepares nursing students to critically evaluate evidence. Basic components of research design, ethics, sampling, data collection, analysis, and evidence-based practice are discussed. Students critique research for its application to the practice of professional nursing. Prerequisite: NRS 303

Prerequisite: NRS 303.

### **NRS 443 - Global Health (3)**

This course provides an overview of global health issues. Roles of national and global healthcare agencies and the development of policy are examined. Strategies for population health equity and the utilization of resources for promoting health for populations, communities, and societies are identified. Effectiveness of nursing practice is explored in relation to problems, priorities, attitudes, and culture. Prerequisite: NRS 303

Prerequisite: NRS 303.

### **NRS 453 - Nursing Leadership & Management (3)**

This course provides a foundation for the development of leadership and management skills in nursing practice. Several theories in leadership and management relevant to professional practice are explored. Ethical, political, organizational, and regulatory influences on leading and managing in a clinical setting are discussed. Prerequisite: NRS 303

Prerequisite: NRS 303.

**NRS 484 - Professional Capstone Project (4)**

This course provides students with the opportunity to synthesize and apply acquired knowledge from core RN-BSN courses. A practicum is a required component of this course. All students will complete a capstone project reflecting mastery of RN-BSN student learning outcomes. Prerequisite: Completion of all RN-BSN courses. May take NRS 453 in the same term.

Prerequisite: This course must be taken in final semester of program.

**NRS 5101 - Transition to Graduate Nursing (1)**

This course assists the BSN prepared registered nurse transition to graduate-level academic expectations and promotes personal, professional, and leadership development. Provides an understanding of the professional graduate nurse, including collaboration, interprofessional relationships, critical thinking and decision-making. The course will introduce the development of a professional portfolio in the final capstone course.

Prerequisite: Admission to MSN program.

**NRS 5202 - Theoretical Foundations in NRS (2)**

This course analyzes the history and evolution of nursing philosophies, conceptual models, and theories. Emphasis is on the critique and evaluation of nursing and other theories relevant to nursing practice. This course explores the relationship between research, theory, and nursing practice.

Prerequisite: NRS 5101. Corequisite: NRS 5101.

**NRS 5303 - Research for Evidence-based Prac (3)**

This course builds upon previous knowledge of nursing research and evidence-based practice in order to develop proficiency in the research methods and process. Focus on critiquing, generating, and translating research findings into practice as well as ethical aspects of scholarly inquiry.

Prerequisite: NRS 5101.

**NRS 5313 - Statistics for Nursing Research (3)**

Principles and applications of scientific measurement, sampling, and statistical analysis. Focus on promoting understanding of statistical methods used in nursing studies and conducting selected statistical analysis for nursing data.

Corequisite: NRS 5101.

**NRS 5314 - Advanced Care Coordination (4)**

This course is designed to prepare registered nurses to collaborate and lead members of the healthcare team in the delivery of safe, high quality, culturally relevant, interprofessional care to diverse populations of patients in a variety of healthcare settings. Examination of political, financial, and social constructs affecting healthcare, patient access, equity, and outcomes with care coordination as the focus of the patient experience. Includes a 175-hour practicum.

Prerequisite: NRS 5101.

**NRS 5324 - Advanced Nursing Assessment (4)**

This course examines advanced pathophysiology, pharmacology, and physical assessment as well as educational theory and methods relative for nurse educators. Utilization of a program containing clinically based interactive patient encounters is designed to strengthen assessment skills and clinical competency. Learning activities include a health history, completion of a focused physical assessment, and development of a plan of care related to the patient's condition. Students awarded 175 practicum hours.

Prerequisite: NRS 5101.

**NRS 6203 - Advanced Nursing Assessment (3)**

This course examines advanced pathophysiology, pharmacology, and physical assessment for nurse educators. Utilization of a program containing clinically based interactive patient encounters is designed to strengthen assessment skills and clinical competency. Learning activities include a health history, completion of a focused physical assessment, and development of a plan of care related to the patient's condition. Students awarded 30 practicum hours. Prerequisites: NRS 5101

Prerequisite: 5101.

**NRS 6213 - Curriculum Design in Nursing (3)**

This course focuses on the process of curriculum and program development and implementation that aligns with professional nursing standards, institutional missions, and theoretical frameworks used in nursing education. Exploration of traditional and innovative program designs as applied in various educational environments.

Prerequisite: NRS 5101 or approval from the Program Director.

**NRS 6223 - Nursing Course Development (3)**

This course prepares the nurse educator to develop innovative courses within a nursing curriculum that facilitate student learning and program effectiveness. Examines the roles that internal and external stakeholders have on the process.

Prerequisite: NRS 5101 or permission from the Program Director.

**NRS 6233 - Teaching Strategies in Nursing (3)**

This course explores the teaching and learning process in nursing education. Emphasis is placed on learning theories and evidence-based teaching strategies applicable in a variety of nursing education settings. Nurse educator roles and expectations are examined.

Prerequisite: NRS 5101 or permission from the Program Director.

**NRS 6243 - Assessment & Evaluation (3)**

This course examines assessment and evaluation strategies of learning in academic, clinical, and online nursing education. Students explore the differences between assessment and evaluation; formative and summative; test construction, item analysis, and rubrics; and evaluation of clinical performance using reliable and valid methods.

Prerequisite: NRS 5101 or permission of Program Director.

**NRS 6254 - Nurse Educator Practicum (4)**

This course provides the opportunity to function in the nurse educator role and apply acquired knowledge and skills in diverse educational settings under the guidance of an experienced preceptor. Emphasis is placed on an authentic demonstration of prior learning by designing, implementing, and evaluating lesson plans or courses. Includes 150 practicum hours.

Prerequisite: NRS 5101 or permission of Program Director.

**NRS 6403 - Organizational Leadership in NRS (3)**

This course examines leadership skills that include communication, problem-solving, decision-making, teamwork, collaboration, professionalism and strategic management as applied in contemporary healthcare environments. Specific areas of concentration include: organizational theory and behavior, best practice strategies for implementing change, effective team building and functioning, and application of the strategic planning process.

Prerequisite: NRS 5101 or permission from Program Director.

**NRS 6413 - Healthcare Finance (3)**

This course provides a high-level understanding of financial management and concepts of healthcare systems at the executive



level. Facilitates development of skills necessary to analyze costs for healthcare budgets and apply principles of business, economics, and finance.

Prerequisite: NRS 5101 or permission from the Program Director.

### **NRS 6423 - Healthcare Quality Improvement (3)**

This course examines the relationship between healthcare quality, leadership, and the interprofessional healthcare team. Theories, models, and approaches to quality improvement are evaluated within the context of nursing. In-depth analysis of factors impacting quality improvement: Ethics, standards, regulations, accreditation, and law.

Prerequisite: NRS 5101 or permission from Program Director.

### **NRS 6433 - Human Resources for Healthcare (3)**

This course explores human resource management practices in the healthcare setting with a focus on developing skills required of nurse leaders. Employment law, labor relations, recruitment, hiring, performance evaluation, compensation, staff development, and maintaining a positive work culture will be examined.

Prerequisite: NRS 5101 or permission of Program Director.

### **NRS 6443 - Strategic Planning for Nursing (3)**

This course examines the theory of strategic planning and principles of strategic management. In-depth analysis and application of the strategic planning process includes: assessment, creation of objectives and measurements, operational strategies, and development of mission and goals. Prerequisites: NRS 5101 or approval from Program Director

Prerequisite: NRS 5101 or approval from Program Director.

### **NRS 6454 - Nurse Leader Practicum (4)**

This course emphasizes the synthesis of acquired knowledge and skill and provides an opportunity to collaborate with a nurse manager or administrator for the development of a leadership project. This course includes 150 practicum hours.

Prerequisite: NRS 5101 or permission of Program Director.

### **NRS 6902 - Graduate Nurse Capstone (2)**

This course provides master's level nurses to demonstrate a deeper understanding of the nursing profession, research and evidence-based practice, lifelong learning, and professional development as evidenced by mastery of graduate learning outcomes. Presentation of research or evidence-based project and completion of a professional portfolio that exhibits advanced nursing knowledge, clinical judgement, and competencies.

Prerequisite: This course is taken in the final semester/term of the MSN program.

## **PAS-Physician Assistant Studies**

### **PAS 5001 - Clinical Genetics (1)**

This course will focus on the clinically relevant genetics and genomics necessary for clinical practice. This survey course covers introductory genetics, inheritable patterns disease, specific hereditary diseases and clinical applications of genetics/genomics. Prerequisite: Matriculation into the PA program.

Prerequisite: Matriculation into the PA program.

### **PAS 5002 - Diagnostic Techniques - Laboratory Medicine (2)**

This first of a series of three lecture course with a minimal laboratory component in which students acquire and practice a variety of diagnostic techniques. In this course the student will be introduced to laboratory medicine and the interpretation and performance of these studies.

**PAS 5002 - Diagnostic Techniques - Laboratory Medicine (2)**

This course is one of a series of three lecture and lab courses in which students acquire and practice various diagnostic clinical skills. In this course, students will be introduced to the interpretation and application of common clinical laboratory tests.

Prerequisite: Matriculation into the PA program. Corequisite: none. Crosslisted as: none.

**PAS 5003 - Clinical Physiology (3)**

This lecture and lab course is a graduate level survey of clinically relevant human physiology. Prerequisite: Matriculation into the PA program.

Prerequisite: Matriculation into the PA program.

**PAS 5004 - Clinical Anatomy (4)**

This lecture and lab course consists of an in-depth study of gross human anatomy along with applications to a clinical setting. The course consists of a mixture of techniques, including lecture, discussion, and examination of cadaveric specimens. This lecture and lab course is a graduate level survey of clinically relevant human physiology. Prerequisite: Matriculation into the PA program.

Prerequisite: Matriculation into the PA program.

**PAS 5012 - Clinical Skills I: Medical Documentation & Interviewing (2)**

This is the first of a series of four lecture and lab courses in which students acquire and practice various diagnostic and therapeutic clinical skills. In this course, the emphasis will be on the art of communication in medicine, the medical interview, and the proper documentation of medical encounters.

**PAS 5022 - Physician Assistant Professional Practice (2)**

In this course, students learn about issues pertinent to the PA profession. The course covers the profession's history and future directions, roles and responsibilities, and organizations. The course also includes an introduction to the psychosocial aspects of medical care and medical ethics. Prerequisite: Matriculation into the PA Program. (Pass/Fail).

Prerequisite: Matriculation into the PA Program.

**PAS 5052 - Clinical Application & Reflection Experience I (2)**

This is the first in a series of four courses where students work in teams to practice and refine skills, employ problem-solving, participate in reflective experiences, and assume professional roles. Students are expected to retain and apply knowledge from concurrent and previous coursework. Examples of experiences include simulation/standardized patients, interprofessional education opportunities, preclinical patient exposures, and case studies. Professional development areas include professional communications and behaviors, conflict resolution, and stress management. Prerequisite: Matriculation into the PA Program. (Pass/Fail)

Prerequisite: Matriculation into the PA Program.

**PAS 5102 - Clinical Skills II: Physical Exam & Documentation (2)**

This is a second series of four lecture and lab courses in which students acquire and practice various diagnostic and therapeutic clinical skills, such as performance of health histories and physical exams, and proper documentation. In this course, the emphasis is on the performance and documentation of a complete (head to toe) physical examination. Prerequisite: Successful completion of previous PA Program semester courses.

Prerequisite: Successful completion of previous PA Program semester courses.

**PAS 5110 - Clinical Medicine & Therapeutics I (10)**

This is the first in a series of three courses for the study of the diagnosis and management of common acute, emergent,

rehabilitative, and chronic medical disorders across the lifespan. The relevant anatomy, physiology, and pathophysiology of disease states are discussed, followed by incidence/prevalence, associated risk factors, signs and symptoms, clinical findings, diagnostic criteria, diagnostic tests and procedures, pharmacologic and non-pharmacologic therapeutic options, prevention, patient education, follow-up care, course, and prognosis. This 3-series course series collectively covers disorders categorized under the following organ systems: cardiovascular, dermatology, ophthalmology, EENT, endocrine, GI/Nutritional, GU, hematology, infectious disease, musculoskeletal/rheumatology, neurological, psychiatry/behavioral medicine, pulmonary, and reproductive. Prerequisite: Successful completion of the Fall PA Curriculum.

Prerequisite: Successful completion of the Fall PA Curriculum.

### **PAS 5112 - Diagnostic Techniques - EKG (2)**

This course is one of a series of three lecture and lab courses in which students acquire and practice various diagnostic clinical skills.

In this course the student will learn interpretation of electrocardiograms and some associated clinical syndromes and diagnoses as well as therapeutic interventions for common dysrhythmias and syndromes.

Prerequisite: Matriculation into the PA Program and successful completion of previous semesters. Corequisite: None. Crosslisted as: None.

### **PAS 5152 - Clinical Application & Reflection Experience II (2)**

This is the second in a series of four courses where students work in teams to practice and refine skills, employ problem-solving, participate in reflective experiences, and assume professional roles. Students are expected to retain and apply knowledge from concurrent and previous coursework. Examples of experiences include simulation/standardized patients, interprofessional education opportunities, preclinical patient exposures, and case studies. Professional development areas include professional communication and behavior, conflict resolution, and stress management. Prerequisite: PAS 5052. (Pass/Fail)

Prerequisite: PAS 5052.

### **PAS 5161 - Clinical Pharmacology I (1)**

This course is the first in a series of three courses for the study of clinical pharmacology appropriate to the professional physician assistant role. The basic principles of pharmacology, pharmacodynamics and pharmacokinetics are discussed. This 3-series course collectively provides an introduction to the pharmacologic processes in the care and promotion of wellness across the lifespan, including the medications commonly used to treat human disorders, their classification, mechanisms of actions, indications, contraindications/cautions, formulations, routes of metabolism and excretion, adverse reactions, and drug interactions. Prerequisite: Matriculation into the PA Program.

Prerequisite: Matriculation into the PA Program.

### **PAS 5171 - Evidence Based Practice I (1)**

In this two-course series, students are taught evidence-based methodologies to evaluate clinical questions related to diagnosis, therapy, harm, and prognosis. This includes how to effectively search the literature, as well as principles of research and statistical analysis for the critical appraisal of published research and for conducting future research or clinical quality improvement projects. Topics include research ethics, study designs, sampling methods, design validity, descriptive and inferential statistics, selecting the appropriate statistical test, and hypothesis testing. During these courses, students initiate a group research project that will be continued in the Graduate Project I, II, and III courses with the identification of a research problem, formulation of a research question, and the drafting of a literature review and study proposal. Prerequisite: Successful completion of the Fall PA Curriculum. (Pass/Fail)

Prerequisite: Successful completion of the Fall PA Curriculum.

**PAS 5205 - Clinical Medicine & Therapeutics II (5)**

This is the second in a series of three courses for the study of the diagnosis and management of common acute, emergent, rehabilitative, and chronic medical disorders across the lifespan. The relevant anatomy, physiology, and pathophysiology of disease states are discussed, followed by incidence/prevalence, associated risk factors, signs and symptoms, clinical findings, diagnostic criteria, diagnostic tests and procedures, pharmacologic and non-pharmacologic therapeutic options, prevention, patient education, follow-up care, course, and prognosis. This 3-series course series collectively covers disorders categorized under the following organ systems: cardiovascular, dermatology, ophthalmology, EENT, endocrine, GI/Nutritional, GU, hematology, infectious disease, musculoskeletal, neurological, psychiatry/behavioral medicine, pulmonary, and reproductive. Prerequisite: PAS 5110.

Prerequisite: PAS 5110.

**PAS 5212 - Clinical Skills III - Special Populations (2)**

This is the third of a series of four lecture and lab courses in which students acquire and practice various diagnostic and therapeutic clinical skills, such as performance of health histories and physical exams, interpretation of laboratory, electrocardiographic, and imaging studies, the performance and interpretation of diagnostic and therapeutic procedures, and training in basic and advanced cardiac life support. In this lab course, the emphasis is on the performance and documentation of problem-faced medical interviews and physical examinations, and an introduction to specialty-focused medical interviews and physical examinations across the lifespan. Prerequisite: PAS 5115; Corequisite: PAS 5213

Prerequisite: PAS 5115. Corequisite: PAS 5213.

**PAS 5213 - Diagnostic Techniques - Imaging & PFT (3)**

This course is one of a series of three lecture and lab courses in which students acquire and practice various diagnostic clinical skills. This course will focus on diagnostic imaging (Radiography, Computer Tomography, Magnetic Resonance Imaging, Ultrasound, etc.). An introduction to Pulmonary Function Testing to correlate with chest and lung imaging studies is included.

Prerequisite: Matriculation into the PA Program. Corequisite: none. Crosslisted as: none.

**PAS 5252 - Clinical Application & Reflection Experience III (2)**

This is the third in a series of four courses where students work in teams to practice and refine skills, employ problem-solving, participate in reflective experiences, and assume professional roles. Students are expected to retain and apply knowledge from concurrent and previous coursework. Examples of experiences include simulation/standardized patients, interprofessional education opportunities, preclinical patient exposures, and case studies. Professional development areas include professional communication and behavior, conflict resolution, and stress management. Prerequisite: PAS 5152. (Pass/Fail)

Prerequisite: PAS 5152.

**PAS 5261 - Clinical Pharmacology II (1)**

This course will be the second in a series of three courses for the study of clinical pharmacology appropriate to the professional physician assistant role. The basic principles of pharmacology, pharmacodynamics and pharmacokinetics are applied to generate pharmacologic management plans for the diseases/disorders based upon current clinical practice guidelines and other evidence-based resources. This 3-series Clinical Pharmacology Course collectively provides an introduction to the pharmacologic processes in the care and promotion of wellness across the lifespan, including the medications commonly used to treat human disorders, their classification, mechanisms of actions, indications, contraindications/cautions, formulations, routes of metabolism and excretion, adverse reactions, and drug interactions. Prerequisite: PAS 5161

Prerequisite: PAS 5161.

### **PAS 5310 - Clinical Medicine & Therapeutics III (10)**

This is the third in a series of three courses for the study of the diagnosis and management of common acute, emergent, rehabilitative, and chronic medical disorders across the lifespan. The relevant anatomy, physiology, and pathophysiology of disease states will be discussed, followed by incidence/prevalence, associated risk factors, signs and symptoms, clinical findings, diagnostic criteria, diagnostic tests and procedures, pharmacologic and non-pharmacologic therapeutic options, prevention, patient education, follow-up care, course, and prognosis. This 3-series course series collectively covers disorders categorized under the following organ systems: cardiovascular, dermatology, ophthalmology, EENT, endocrine, GI/Nutritional, GU, hematology, infectious disease, musculoskeletal, neurological, psychiatry/behavioral medicine, pulmonary, and reproductive. Prerequisite: PAS 5205.

Prerequisite: PAS 5205.

### **PAS 5315 - Clinical Skills IV - Procedures (5)**

This is the fourth of a series of four lecture and lab courses in which students acquire and practice various diagnostic and therapeutic clinical skills, such as performance of health histories and physical exams, interpretation of laboratory, electrocardiographic, and imaging studies, the performance and interpretation of diagnostic and therapeutic procedures, and training in basic and advanced cardiac life support. In this course, the emphasis is on performance and interpretation of common diagnostic and therapeutic procedures including an orientation to the operating room, completion of advanced cardiac life support training, as well as the continuation of specialty-focused medical interviews and physical examinations across the lifespan from pediatrics to geriatrics, including the unique healthcare needs for women, diverse patient populations, and patients with disabilities. Prerequisite: PAS 5212 and PAS 5213

Prerequisite: PAS 5212 and PAS 5213.

### **PAS 5352 - Clinical Application & Reflection Experience IV (2)**

This is the fourth in a series of four courses where students work in teams to practice and refine skills, employ problem-solving, participate in reflective experiences, and assume professional roles. Students are expected to retain and apply knowledge from concurrent and previous coursework. Examples of experiences include simulation/standardized patients, interprofessional education opportunities, preclinical patient exposures, and case studies. Professional development areas include professional communication and behavior, conflict resolution, and stress management. Prerequisite: PAS 5252. (Pass/Fail)

Prerequisite: PAS 5252.

### **PAS 5361 - Clinical Pharmacology III (1)**

This course will be the third in a series of three courses for the study of clinical pharmacology appropriate to the professional physician assistant role. The basic principles of pharmacology, pharmacodynamics and pharmacokinetics are applied to generate pharmacologic management plans for the diseases/disorders based upon current clinical practice guidelines and other evidence-based resources. This 3-series Clinical Pharmacology Course collectively provides an introduction to the pharmacologic processes in the care and promotion of wellness across the lifespan, including the medications commonly used to treat human disorders, their classification, mechanisms of actions, indications, contraindications/cautions, formulations, routes of metabolism and excretion, adverse reactions, and drug interactions. Prerequisite: PAS 5161 and PAS 5261

Prerequisite: PAS 5161 and PAS 5261.

### **PAS 5371 - Evidence Based Practice II (1)**

This is a continuation of the Evidence Based Practice I course. Prerequisite: PAS 5171. (Pass/Fail)

Prerequisite: PAS 5171.

### **PAS 6015 - Clinical Practicum I (5)**

In the experiential phase, students are assigned into a series of rotations in a variety of settings. The Clinical Practicum are divided into 9 periods of approximately 5 weeks each. Required 5 week rotations include Family Medicine, Internal Medicine,

Emergency Medicine and General Surgery. Experiences in Women's Health, Pediatrics and Behavioral Health are also required but tend to be briefer experiences that may be integrated throughout the clinical experiences. Elective rotations are available in a variety of clinical practice areas, pending preceptor availability. The Program reserves the right to assign rotations or supplemental activities to ensure that students meet all experiential phase Program requirements. Prerequisites: Successful completion of all didactic phase courses.

Prerequisite: Successful completion of all didactic phase courses.

#### **PAS 6025 - Clinical Practicum II (5)**

In the experiential phase, students are assigned into a series of rotations in a variety of settings. The Clinical Practicum are divided into 9 periods of approximately 5 weeks each. Required 5 week rotations include Family Medicine, Internal Medicine, Emergency Medicine and General Surgery. Experiences in Women's Health, Pediatrics and Behavioral Health are also required but tend to be briefer experiences that may be integrated throughout the clinical experiences. Elective rotations are available in a variety of clinical practice areas, pending preceptor availability. The Program reserves the right to assign rotations or supplemental activities to ensure that students meet all experiential phase Program requirements. Prerequisites: Successful completion of all didactic phase courses.

Prerequisite: Successful completion of all didactic phase courses.

#### **PAS 6035 - Clinical Practicum III (5)**

In the experiential phase, students are assigned into a series of rotations in a variety of settings. The Clinical Practicum are divided into 9 periods of approximately 5 weeks each. Required 5 week rotations include Family Medicine, Internal Medicine, Emergency Medicine and General Surgery. Experiences in Women's Health, Pediatrics and Behavioral Health are also required but tend to be briefer experiences that may be integrated throughout the clinical experiences. Elective rotations are available in a variety of clinical practice areas, pending preceptor availability. The Program reserves the right to assign rotations or supplemental activities to ensure that students meet all experiential phase Program requirements. Prerequisites: Successful completion of all didactic phase courses.

Prerequisite: Successful completion of all didactic phase courses.

#### **PAS 6045 - Clinical Practicum IV (5)**

In the experiential phase, students are assigned into a series of rotations in a variety of settings. The Clinical Practicum are divided into 9 periods of approximately 5 weeks each. Required 5 week rotations include Family Medicine, Internal Medicine, Emergency Medicine and General Surgery. Experiences in Women's Health, Pediatrics and Behavioral Health are also required but tend to be briefer experiences that may be integrated throughout the clinical experiences. Elective rotations are available in a variety of clinical practice areas, pending preceptor availability. The Program reserves the right to assign rotations or supplemental activities to ensure that students meet all experiential phase Program requirements. Prerequisites: Successful completion of all didactic phase courses.

Prerequisite: Successful completion of all didactic phase courses.

#### **PAS 6055 - Clinical Practicum V (5)**

In the experiential phase, students are assigned into a series of rotations in a variety of settings. The Clinical Practicum are divided into 9 periods of approximately 5 weeks each. Required 5 week rotations include Family Medicine, Internal Medicine, Emergency Medicine and General Surgery. Experiences in Women's Health, Pediatrics and Behavioral Health are also required but tend to be briefer experiences that may be integrated throughout the clinical experiences. Elective rotations are available in a variety of clinical practice areas, pending preceptor availability. The Program reserves the right to assign rotations or supplemental activities to ensure that students meet all experiential phase Program requirements. Prerequisites: Successful completion of all didactic phase courses.

Prerequisite: Successful completion of all didactic phase courses.

### **PAS 6065 - Clinical Practicum VI (5)**

In the experiential phase, students are assigned into a series of rotations in a variety of settings. The Clinical Practicum are divided into 9 periods of approximately 5 weeks each. Required 5 week rotations include Family Medicine, Internal Medicine, Emergency Medicine and General Surgery. Experiences in Women's Health, Pediatrics and Behavioral Health are also required but tend to be briefer experiences that may be integrated throughout the clinical experiences. Elective rotations are available in a variety of clinical practice areas, pending preceptor availability. The Program reserves the right to assign rotations or supplemental activities to ensure that students meet all experiential phase Program requirements. Prerequisites: Successful completion of all didactic phase courses.

Prerequisite: Successful completion of all didactic phase courses.

### **PAS 6075 - Clinical Practicum VII (5)**

In the experiential phase, students are assigned into a series of rotations in a variety of settings. The Clinical Practicum are divided into 9 periods of approximately 5 weeks each. Required 5 week rotations include Family Medicine, Internal Medicine, Emergency Medicine and General Surgery. Experiences in Women's Health, Pediatrics and Behavioral Health are also required but tend to be briefer experiences that may be integrated throughout the clinical experiences. Elective rotations are available in a variety of clinical practice areas, pending preceptor availability. The Program reserves the right to assign rotations or supplemental activities to ensure that students meet all experiential phase Program requirements. Prerequisites: Successful completion of all didactic phase courses.

Prerequisite: Successful completion of all didactic phase courses.

### **PAS 6085 - Clinical Practicum VIII (5)**

In the experiential phase, students are assigned into a series of rotations in a variety of settings. The Clinical Practicum are divided into 9 periods of approximately 5 weeks each. Required 5 week rotations include Family Medicine, Internal Medicine, Emergency Medicine and General Surgery. Experiences in Women's Health, Pediatrics and Behavioral Health are also required but tend to be briefer experiences that may be integrated throughout the clinical experiences. Elective rotations are available in a variety of clinical practice areas, pending preceptor availability. The Program reserves the right to assign rotations or supplemental activities to ensure that students meet all experiential phase Program requirements. Prerequisites: Successful completion of all didactic phase courses.

Prerequisite: Successful completion of all didactic phase courses.

### **PAS 6095 - Clinical Practicum VIII (5)**

In the experiential phase, students are assigned into a series of rotations in a variety of settings. The Clinical Practicum are divided into 9 periods of approximately 5 weeks each. Required 5 week rotations include Family Medicine, Internal Medicine, Emergency Medicine and General Surgery. Experiences in Women's Health, Pediatrics and Behavioral Health are also required but tend to be briefer experiences that may be integrated throughout the clinical experiences. Elective rotations are available in a variety of clinical practice areas, pending preceptor availability. The Program reserves the right to assign rotations or supplemental activities to ensure that students meet all experiential phase Program requirements. Prerequisites: Successful completion of all didactic phase courses.

Prerequisite: Successful completion of all didactic phase courses.

### **PAS 6141 - Senior Seminar I (1)**

This is the first of three Senior Seminar courses intertwined with the experiential phase of the PA Program. Over this course series, students will be exposed to a wide variety of topics pertinent to medical practice, including: healthcare policy and systems issues, medicolegal aspects of clinical practice, reimbursement issues, PA employment issues, patient safety and error reduction measures, and public health issues (e.g., mandatory reporting requirements, public health disease control measures). In addition, students will give case presentations of interesting patients they cared for on clinical practicums, and participate in activities designed to prepare them for the end-of-program summative exam and PANCE. Prerequisite: Successful completion of all didactic phase courses. (Pass/Fail)

Prerequisite: Successful completion of all didactic phase courses.

### **PAS 6171 - Graduate Project I (1)**

This is the first in a series of three courses designed to build upon the previous Evidence Based Practice courses and provide students with experience in planning and implementing a graduate project. In these courses, students apply the concepts of evidence-based medicine to answer a question relevant to clinical practice or devise a clinical practice improvement proposal.

Prerequisite: Successful completion of the program's didactic curriculum (Pass/Fail)

Prerequisite: Successful completion of the program's didactic curriculum.

### **PAS 6241 - Senior Seminar 2 (1)**

This is a continuation of the three-course series of Senior Seminar. Prerequisite: PAS 6141. (Pass/Fail)

Prerequisite: PAS 6141.

### **PAS 6271 - Graduate Project 2 (1)**

This is the second in a series of three Graduate Project courses. By the conclusion of the Graduate Project II course, students are expected to finalize data collection and begin the data analysis and interpretation sections of their scholarly project.

Prerequisite: PAS 6171. (Pass/Fail)

Prerequisite: PAS 6171.

### **PAS 6341 - Senior Seminar 3 (1)**

This is a continuation of the three-course series of Senior Seminar. Prerequisite: PAS 6241. (Pass/Fail)

Prerequisite: PAS 6241.

### **PAS 6371 - Graduate Project 3 (1)**

This is the third in a series of three Graduate Project courses. By the conclusion of the Graduate Project III course, students are expected to complete their scholarly project and present and defend their findings before program faculty. Prerequisite: PAS 6271. (Pass/Fail)

Prerequisite: PAS 6271.

## **PET-Plastics Engineering Tech**

### **PET 101 - Introduction to Plastics Engineering Technology (1)**

This course is required for all freshman engineering technology students. Its purpose is to improve student success, to make the college experience more relevant to career goals, and to help students obtain as much assistance from the university as possible while working toward their degree. The course will cover community building, academic goals, effective learning methods, university orientation, and personal and professional development.

### **PET 113 - Plastics Product Manufacturing Processes (3)**

An introduction of the physical and mechanical properties of polymers, Polymers and production processes are quantitatively discussed in relation to modern industrial use. Processes include injection molding, vacuum forming, blow molding, extrusion, and testing methods applied to various polymeric materials.

### **PET 223 - Polymer Structures, Properties & Applications (3)**

A study of the structure and properties of plastics materials. Mechanical properties are emphasized, electrical properties, thermal properties, and environmental interactions are addressed as they apply to the design of products for the plastics industry.



### **PET 224 - Plastics Processing & Testing (4)**

This course introduces the procedures used in evaluating plastics materials, test samples, and molded parts and the standard testing methods used for evaluation of plastics materials, in particular ASTM and ISO. Interpretation of testing results with respect to raw materials selection, processing parameters, and part design considerations as well as the basic quality control and quality assurance techniques related to plastic testing will also be covered. Corequisite: PET 223 or equivalent polymer science course.

Corequisite: PET 223 or equivalent polymer science course.

### **PET 233 - Introduction to Injection Molding (3)**

An introduction to injection molding and specifics related to this industrial process. Hands-on operation and setup of injection molding machines, and materials used with them, will be specifically covered in order to provide a solid engineering process foundation to assist in developing a manufacturable product design for this process. Prerequisite: PET 113

Prerequisite: PET 113.

### **PET 323 - Plastics Product Design (3)**

This course introduces the concepts of part design beginning with defining the customer and end-use requirements and moving through the entire design cycle and product application. The following areas are focused on: Material selection, prototyping and solid modeling, product drawing, review of basic design rules, form, fit and function in product application, part quality, relationship of tool design to part design, advanced tooling concepts, part costing and design to cost, end-use factors, and mechanical design with plastics will also be covered. Prerequisite: PET 223 or equivalent polymer science course; ETD 173 or EGR 143

Prerequisite: PET 223 or equivalent polymer science course; ETD 173 or EGR 143.

### **PET 333 - Plastics Mold Engineering & Design (3)**

This course introduces the concepts of mold design and details involved in the creation of single and multiple cavity plastic injection molds and products using solid modeling software. Analysis of mold cavity fill, gate location(s)-size, runner size, and balance will be evaluated with computer aided mold fill programs. Instruction on the theory, application and practices of: plastic materials, forming and molding methods/machines, mold: bases, venting, cooling, ejectors, materials, heat treatments, fabrication, and finishing practices will also be covered. Prerequisites: PET 223 or equivalent polymer science course; ETD 173 or EGR 143; and ETD 433

Prerequisite: PET 223 or equivalent polymer science course; ETD 173 or EGR 143; and ETD 433.

### **PET 353 - Thermodynamics & Heat Transfer for Engineering Technology (3)**

This course explores the basic properties of substances and ideal gasses through the use of tables and an overview of thermodynamic concepts of systems, control volumes, heat, work, and internal energy. The introductory study of heat transfer analysis and the primary modes of heat transfer: conduction, convection, and radiation will also be covered. Prerequisite: ETD 263 and PH 164 or equivalent

Prerequisite: ETD 263 and PH 164 or equivalent.

### **PET 413 - Design for Additive Manufacturing (3)**

An advanced course that presents the various additive manufacturing processes and describes their value to current industry. Additive manufacturing equipment will be utilized to create products designed with 3D modeling software. Prerequisite: ETD 263

Prerequisite: ETD 263.

## PHL-Philosophy

### **PHL 203 - Introduction To Philosophy (3)**

A study of the perennial problems of philosophy, such as the nature of knowledge, the role of the self, the existence of God, and the function of science. The contributions of the great thinkers of history to these problems are presented so that the student may find aid in forming his or her own philosophy.

### **PHL 213 - Theories & Philosophies of Social Innovation (3)**

Students are introduced to the altruistic and philanthropic drivers of social innovation, specifically focusing on how the desire to accrue value for society is becoming more influential than profit motive. The course asks students to examine (through a number of lenses) the emergence of the humanistic element in what have traditionally been capitalistic and technological fields. (Same as SI 213) Prerequisites: ENG 143, PSY 113

Prerequisite: ENG 143 and PSY 113. Crosslisted as: SI 213.

### **PHL 251 - Ancient Greece from the Persian Through Peloponnesian Wars (1)**

An examination of the culture of Athens and Sparta during the 5th century B.C., concentrating on the Persian and Peloponnesian wars and their lasting effects on Western Civilization. (Same as HIS 251)

Crosslisted as: HIS 251.

### **PHL 313 - Ethics (3)**

A study of ethical language, methods of justifying ethical decisions, and types of ethical value systems, with emphasis on practical applications in terms of personal and social morality. Prerequisite: Junior standing or permission of instructor

Prerequisite: Junior standing or permission of instructor.

### **PHL 323 - Philosophy of Religion (3)**

An inquiry into the nature of religious experience, activity and belief. An examination of the concepts of God, freedom, and immortality as well as the relationship of religious knowledge to artistic and scientific knowledge. Prerequisite: Junior standing or permission of instructor

Prerequisite: Junior standing or permission of instructor.

### **PHL 333 - Art, Society & Technology (3)**

An interdisciplinary effort to place modern technology within a social, cultural, and historical context. (Same as SOC 333) Prerequisite: ENG 113 or ENG 133

Prerequisite: ENG 133. Crosslisted as: SOC 333.

### **PHL 343 - Logic (3)**

An examination of the function of language and the nature of meanings. Valid and invalid reasoning, deductive and inductive methods. Particular emphasis will be given to the application of formal techniques to the evaluation of arguments in everyday settings. The course is argument and language oriented. Prerequisite: Junior standing or permission of instructor

Prerequisite: Junior standing or permission of instructor.

### **PHL 353 - Ethical Issues in Medical Care (3)**

Ethical challenges routinely confront healthcare administrators and medical providers. This class will investigate medical system ethical issues which arise in the administration of medical treatment. Both business related and clinical issues will be addressed in the course.

## PH-Physics

### **PH 104 - Physical Science (4)**

A development of basic concepts and theories in the physical sciences and physics. Conceptual view of mechanics, thermodynamics, sound waves, electricity, magnetism, and optics

Corequisite: Lab Required.

### **PH 154 - College Physics I (4)**

An algebra-based introduction to the concepts and application of Newton's Law, linear and rotational motion, work, energy, and momentum, solids and fluids, and heat. Experimental investigation of selected topics. Prerequisites: MA 113, MA 123

Prerequisite: MA 113 and MA 123. Corequisite: Lab Required.

### **PH 164 - College Physics II (4)**

An algebra-based introduction to the concepts and application of vibrations, waves and sound, Coulomb's Law, capacitance, DC electric circuits, magnetism, electromagnetic induction, optics and optical instruments. Experimental investigation of selected topics. Prerequisite: PH 154

Prerequisite: PH 154. Corequisite: Lab Required.

### **PH 224 - University Physics I (4)**

Underlying principles of measurement, vectors, translatory, rotary, uniform, circular, and harmonic motion, work, power, energy, and physical properties of liquids, solids, gases, and statics. Also the fundamentals of heat: thermometry, expansion of liquids, solids and gases, calorimetry, heat transfer, elementary thermodynamics, and fluids. Experimental investigation of selected topics. Prerequisite: MA 134

Prerequisite: MA 134. Corequisite: Lab Required.

### **PH 224H - Honors University Physics I (4)**

Topics covered include measurement, kinematics and dynamics of translational motion, kinematics and dynamics of rotational motion, momentum, work, mechanical energy, power, statics, properties of solids, and thermodynamics. Emphasis is on collaborative learning and inquiry as opposed to traditional lecture. Assignments include additional analysis, research methods. Students complete a research project. Experimental investigation of selected topics. Prerequisites: MA 134 and admission to the Honors Program or permission of the instructor.

Prerequisite: MA 134 and admission to the Honors Program or permission of the instructor. Corequisite: Lab Required.

### **PH 234 - University Physics II (4)**

Study of vibrations and wave motion: different types of simple harmonic motion, sound. Also the fundamentals of electric fields, Gauss's Law, electric potential, capacitance, magnetism, direct, and alternating currents and circuits. Electromagnetic wave propagation and optics. Experimental investigation of selected topics. Prerequisites: MA 164, PH 224

Prerequisite: MA 164 and PH 224. Corequisite: Lab Required.

### **PH 234H - Honors University Physics II (4)**

Topics covered include oscillatory motion, wave motion, electrostatics, DC and AC circuits, magnetostatics, electromagnetism, and optics. Emphasis is on collaborative learning and inquiry as opposed to traditional lecture. Assignments include additional analysis, research methods. Students complete a research project. Experimental investigation of selected topics. Prerequisites: PH 224, MA 164 and admission to the Honors Program or permission of the instructor.

Prerequisite: PH 224, MA 164 and admission to the Honors Program or permission of the instructor. . Corequisite: Lab

Required.

**PH 303 - Introduction to Modern Physics (3)**

Introduction to contemporary atomic and nuclear physics: special theory of relativity, particle properties of waves, wave properties of particles, atomic structure, first ideas of quantum mechanics. Prerequisites: MA 233, PH 234

Prerequisite: MA 233 and PH 234.

**PH 323 - Electromagnetism (3)**

A study of electrostatics, special techniques for calculating potentials, electrostatic fields in matter, magneto static fields in matter, and Maxwell's equations. Prerequisites: MA 233, PH 224, PH 234

Prerequisite: MA 233, PH 224, PH 234.

**PH 333 - Mechanics (3)**

The topics will be chosen based on the students' backgrounds from the following: fundamental laws of mechanics of particles and rigid body including vibrations and Lagrangian mechanics. Prerequisites: MA 233, PH 234

Prerequisite: MA 233 and PH 234.

**PH 343 - Special Topics in Physics (3)**

Emphasis on physics applications from the following topics: partial differential equations of mathematical physics. Orthogonal functions. Fourier series. Prerequisites: MA 233, PH 234

Prerequisite: MA 233 and PH 234.

**PH 4001 - Special Topics in Physics (1)**

Selected fields of physics chosen for their mathematical, philosophical or technological interest. May be repeated with the approval of the Department Chair for a maximum of 6 credit hours. Prerequisite: Permission of Department Chair

Prerequisite: Permission of Department Chair.

**PH 4002 - Special Topics in Physics (2)**

Selected fields of physics chosen for their mathematical, philosophical or technological interest. May be repeated with the approval of the Department Chair for a maximum of 6 credit hours. Prerequisite: Permission of Department Chair

Prerequisite: Permission of Department Chair.

**PH 4003 - Special Topics in Physics (3)**

Selected fields of physics chosen for their mathematical, philosophical or technological interest. May be repeated with the approval of the Department Chair for a maximum of 6 credit hours. Prerequisite: Permission of Department Chair

Prerequisite: Permission of Department Chair.

**PH 4004 - Special Topics in Physics (4)**

Selected fields of physics chosen for their mathematical, philosophical or technological interest. May be repeated with the approval of the Department Chair for a maximum of 6 credit hours. Prerequisite: Permission of Department Chair

Prerequisite: Permission of Department Chair.

**PH 4005 - Special Topics in Physics (5)**

Selected fields of physics chosen for their mathematical, philosophical or technological interest. May be repeated with the approval of the Department Chair for a maximum of 6 credit hours. Prerequisite: Permission of Department Chair

Prerequisite: Permission of Department Chair.

**PH 4006 - Special Topics in Physics (6)**

Selected fields of physics chosen for their mathematical, philosophical or technological interest. May be repeated with the approval of the Department Chair for a maximum of 6 credit hours. Prerequisite: Permission of Department Chair

Prerequisite: Permission of Department Chair.

## PL-Pre-legal

**PL 4003 - Legal Capstone Experience (3)**

The legal capstone experience will provide the opportunity to utilize the skills and knowledge the student has attained in their previous coursework in a concerted effort to prepare for and gain law school admission. Prerequisite: Junior standing or permission of instructor

Prerequisite: Junior standing or permission of instructor.

## POLS-Political Science

**POLS 113 - Introduction to Government (3)**

An examination of the origins and operations of the national political machinery; the development, functions and philosophy of political parties; the problems and tasks of leading governmental agencies.

**POLS 313 - Comparative Governments (3)**

A comparison of the systems, philosophies and functions of the governments of England, France, the United States, Germany and the countries of the former Soviet Union. Prerequisite: POLS 113

Prerequisite: POLS 113.

**POLS 323 - The Contemporary World (3)**

An analysis of current global issues from a historical perspective with an emphasis on developing an awareness of cultural diversity and an understanding of the role of international governmental and nongovernmental organizations. (Same as HIS 323) Prerequisites: POLS 113 or HIS 113

Prerequisite: POLS 113 or HIS 113. Crosslisted as: HIS 323.

**POLS 333 - State & Local Government (3)**

The general relationship between the states and the federal government; organization, functions, and divisions of authority between the executive, legislative and judicial. The functions, powers, and forms of county and municipal governments.

Prerequisite: POLS 113

Prerequisite: POLS 113.

**POLS 343 - American Political Thought (3)**

A survey and analysis of significant political ideas from colonial times to present. Some of the ideas discussed in the survey include the philosophies of liberalism, conservatism, and pragmatism, as well as the political thinking of such men as Alexander Hamilton, Thomas Jefferson, John C. Calhoun, Henry Thoreau, Herbert Spencer and Lester Ward. (Same as HIS 343) Prerequisite: POLS 113

Prerequisite: POLS 113. Crosslisted as: HIS 343.

**POLS 363 - United States Foreign Policy (3)**

A history of United States involvement in world affairs from the War for Independence to the present; the close relationship between the foreign policy and domestic concerns is emphasized; an analysis of the policy-making bureaucracy. (Same as HIS 363) Prerequisites: HIS 113

Prerequisite: HIS 113. Crosslisted as: HIS 363.

**POLS 373 - Political Psychology (3)**

An examination of the role of group dynamics and personality variables in contemporary political issues, including leadership and power, political attitudes, current social movements, conflict resolution, coalition formation, cross-cultural comparison of political attitudes and other issues. (Same as PSY 373) Prerequisite: PSY 113 or POLS 113

Prerequisite: PSY 113 or POLS 113. Crosslisted as: PSY 373.

**POLS 403 - American Constitutional Development (3)**

A study of the historical and judicial developments of the Constitution of the United States by analyzing court decisions and the philosophies of the justices of the Supreme Court. Emphasis on the court's role in the development of national economic policy, with a focus on the court's position on civil rights and liberties, political freedom and social equality. (Same as HIS 403)

Prerequisites: POLS 113

Prerequisite: POLS 113. Crosslisted as: HIS 403.

**POLS 423 - The United States as a World Power (3)**

A study of social, economic, intellectual, and political developments within the United States from approximately 1939 to the present. Emphasis is placed on relating America's developments to its role in international affairs. (Same as HIS 423)

Prerequisite: POLS 113

Prerequisite: POLS 113 . Crosslisted as: HIS 423.

## PSY-Psychology

**PSY 113 - Principles of Psychology (3)**

Introduction to the scientific study of human and animal behavior. Course covers all of the major areas within psychology, including development, learning, intelligence, personality, attitudes, altered states of consciousness, abnormal behavior, and psychotherapy.

**PSY 113H - Honors Principles of Psychology (3)**

Introduction to the scientific study of human and animal behavior. Course covers all of the major areas within psychology, including development, learning, intelligence, personality, attitudes, altered states of consciousness, abnormal behavior, and psychotherapy. The course will involve more in-depth analysis of selected topics as well as more classroom activities than usually covered. Prerequisite: Admission into the Honors Program or permission of the instructor

Prerequisite: Admission into the Honors Program or permission of the instructor.

**PSY 223 - Life Span Developmental Psychology (3)**

An investigation into the developmental stages within the entire lifespan of a human being, from birth through adult development and old age, with emphasis on the origin of personality and factors related to intellectual growth. Prerequisite: PSY 113

Prerequisite: PSY 113.

**PSY 303 - Research Methods in Psychology (3)**

An introduction to research methods employed in psychology, with special emphasis on experimental design. Topics include between and within-subjects designs, quasi-experimental designs, as well as research ethics and procedures for controlling extraneous variables. Prerequisite: PSY 113

Prerequisite: PSY 113.

**PSY 313 - Topics in Psychology (3)**

Survey, in detail, of one of the major areas of study within psychology. The course changes each semester with the specific topic of study announced in the class schedule. Prerequisite: PSY 113

Prerequisite: PSY 113.

**PSY 323 - Abnormal Psychology (3)**

Survey of abnormal psychology, including such topics as clinical assessment, anxiety disorders, schizophrenia, personality disorders, age-related problems, depression, sexual dysfunctions, psychotherapy, and related legal and ethical questions arising within clinical psychology. Prerequisite: PSY 113

Prerequisite: PSY 113.

**PSY 333 - Psychology of Personality (3)**

An introductory survey of problems, methods, and theories; personality development and motivation, with emphasis on the normal contemporary theories of adjustment and idiodynamics. Prerequisite: PSY 113

Prerequisite: PSY 113.

**PSY 343 - Social Psychology (3)**

An introduction to the measurement and principles of human interaction and group behavior including attitude change, prejudice, attraction, love, altruism, aggression, conformity, group dynamics, crowding, and other current social issues. (Same as SOC 343) Prerequisite: PSY 113

Prerequisite: PSY 113. Crosslisted as: SOC 343.

**PSY 353 - Child & Adolescent Psychology (3)**

An investigation into the development stages within the life of a human being, from birth through adolescence, with emphasis on the origin of personality and factors related to intellectual growth. Prerequisite: PSY 113

Prerequisite: PSY 113.

**PSY 363 - Human Behavior & Counseling (3)**

Examines the theory and practice of counseling with a corporate or social service setting. Exposure to a variety of therapeutic techniques. Experience first-hand the complexities of the human mind through a case-study approach. Direct versus indirect forms of interventions are explored. (Same as SOC 363) Prerequisite: PSY 113

Prerequisite: PSY 113. Corequisite: MK 363. Crosslisted as: SOC 363.

**PSY 373 - Political Psychology (3)**

An examination of the role of group dynamics and personality variables in contemporary political issues, including leadership and power, political attitudes, current social movements, conflict resolution, coalition formation, cross-cultural comparisons of political attitudes, and other issues. (Same as POLS 373) Prerequisites: POLS 113 or PSY 113

Prerequisite: POLS 113 or PSY 113. Crosslisted as: POLS 373.

**PSY 383 - Forensic Psychology (3)**

A pragmatic review of the psychological and sociological theories and practices which seek to evaluate and analyze deviant human behavior and environments which precipitate criminal conduct. An introduction into the profiling and prediction of criminals and criminal behavior. Prerequisite: PSY 113

Prerequisite: PSY 113.

**PSY 3013 - Health Psychology (3)**

Health Psychology is a course to examine how biological, psychological and social factors interact and affect the efforts individuals make in preventing illness and promoting good health. How individuals can effectively cope with and reduce stress while also looking at the role that stress has on illness. Prerequisite: PSY 113

Prerequisite: PSY 113.

**PSY 3023 - Cross-Cultural Psychology (3)**

This course will examine a variety of content about culture and psychology from theory to application, research, methodology, critical thinking, cognition and behavioral development within the field. Throughout the semester, we will explore cultural influences within our own lives and the lives of others from different ethnic backgrounds by examining universal qualities and its cultural variations. By the end of the course, students should have a strong understanding of what cross-cultural psychology is as well as the major theories in the field and how they are applied to contemporary research. Prerequisite: PSY 113

Prerequisite: PSY 113.

**PSY 3063 - Buyer Behavior (3)**

Studies in this course include consumer and organizational buying behavior, as well as determinants of this behavior. Consumer characteristics, including attitudes and behaviors, processing of information, as well as consumer cultural, psychological and communication theories are also studied. Course also examines industrial perspectives; the unique aspects of organizational markets and how they differ from individual consumer behavior. Prerequisite: (Same as MK 363) MK 203

Prerequisite: MK 203. Crosslisted as: MK 363.

**PSY 403 - Human Sexuality (3)**

A survey of the historical, cultural, and psychological origins of sex differences as they relate to sex role identity, stereotyping, and related behavior. Prerequisite: PSY 113

Prerequisite: PSY 113.

**PSY 413 - The Psychology of Addiction (3)**

A study of the psychological and sociological factors relating to the problems of addiction. Special attention will be given to the effects which alcohol and other drugs have upon fetuses, children, adults, families, and communities. Prerequisite: PSY 113

Prerequisite: PSY 113.

**PSY 423 - Counseling Theories & Practices (3)**

A thorough review of contemporary approaches to counseling. This course examines the major current theories and practices in psychotherapy in detail. Prerequisite: PSY 113

Prerequisite: PSY 113.

**PSY 433 - Issues of Substance Abuse in Family Systems (3)**

This course is required/needed for students who wish to sit for Licensed Addiction Counselor Exam, through Behavior Health and Human Service Licensing Board of Indiana. Prerequisite: PSY 113



Prerequisite: PSY 113.

**PSY 443 - Advanced Forensic Psychology (3)**

An in-depth study of the etiology of criminal behavior. A critical analysis of mentally disordered, psychopathic, and sexually disordered offenders. Students acquire profiling and prediction skills. Prerequisites: PSY 383

Prerequisite: PSY 383.

**PSY 453 - Clinical Internship I (3)**

Field experience in psychology related occupations such as local mental health centers, work with local counselors, or school psychologists. May be taken concurrently with PSY 463. Prerequisites: Psychology major, senior standing and permission of the instructor

Prerequisite: Psychology major, senior standing and permission of the instructor .

**PSY 463 - Clinical Internship II (3)**

A continuation of PSY 453. May be taken concurrently with PSY 453. Prerequisite: Psychology major, senior standing and permission of the instructor

Prerequisite: Psychology major, senior standing and permission of the instructor .

**PSY 473 - Psychology Capstone Demonstration (3)**

This capstone will provide students the opportunities to integrate and synthesize previous coursework in psychology.

Prerequisite: All required coursework in Psychology core

Prerequisite: All required coursework in Psychology core.

**PSY 483 - Counseling Issues in Substance Abuse (3)**

An examination of the special issues, populations, and treatment modalities specific to substance abuse counseling. Course can be used toward NAADAC certification for Addiction Professional in Training. Prerequisite: PSY 113

Prerequisite: PSY 113.

**PSY 493 - Issues & Ethics in Psychology & Counseling (3)**

Advanced level course provides an overview of legal and ethical aspects in the field of psychology and counseling with implications for the individual within the fields. Includes topics such as confidentiality, rights of clients, client records, equal protection for staff and clients, and discrimination. The American Psychological Association (APA) code of ethics and related codes are covered with an overview of ethical dimensions of practice. Prerequisite: PSY 113

Prerequisite: PSY 113.

**PSY 4001 - Independent Studies in Psychology (1)**

Credit earned through directed reading, independent study, research, or supervised field work. Maximum four hours credit.

Prerequisite: Permission of Department Chair

Prerequisite: Permission of Department Chair.

**PSY 4002 - Independent Studies in Psychology (2)**

Credit earned through directed reading, independent study, research, or supervised field work. Maximum four hours credit.

Prerequisite: Permission of Department Chair

Prerequisite: Permission of Department Chair.

**PSY 4003 - Independent Studies in Psychology (3)**

Credit earned through directed reading, independent study, research, or supervised field work. Maximum four hours credit.  
Prerequisite: Permission of Department Chair

Prerequisite: Permission of Department Chair.

**PSY 4004 - Independent Studies in Psychology (4)**

Credit earned through directed reading, independent study, research, or supervised field work. Maximum four hours credit.  
Prerequisite: Permission of Department Chair

Prerequisite: Permission of Department Chair.

## SA-Study Abroad

**SA 2000 - Study Abroad Semester (0)**

Trine offers three separate study abroad programs. You can enroll in semester, year-long, or summer programs through our partner providers. While enrolled in this course, a student is considered a full-time Trine University student.

**SA 2012 - Study Abroad Experience (12)**

Trine offers three separate study abroad programs. You can enroll in semester, year-long, or summer programs through our partner providers. While enrolled in this course, a student is considered a full-time Trine University student.

## SCI-Science

**SCI 121 - Introduction to Health Professions (1)**

This course is designed to help students interested in pre-health professional studies learn about various requirements and processes involved in the health profession of their choice. It will also highlight various services offered by Trine University to assist students as they pursue their professional goals. This course is intended for freshmen level students.

**SCI 412 - Senior Research Seminar (2)**

Project selection, initial preparation, and preliminary data collection for a major science research project that integrates several scientific disciplines, methods of analysis, the reporting of conclusions and communication skills. To be taken Spring of Junior year, course continues in SCI 422. Prerequisite: BIO 302 or CH 302

Prerequisite: BIO 302 or CH 302.

**SCI 422 - Science Research Project (2)**

An integrated research project that incorporates the basic and advanced sciences, mathematics and communication skills. This course must be taken the semester immediately following SCI 412. Prerequisite: SCI 412

Prerequisite: SCI 412.

**SCI 434 - Science Internship (4)**

An extended professional work experience in an area related to the student's major. The work experience consists of 200 documented work hours. Prerequisite: Permission of the Department Chair

Prerequisite: Permission of the Department Chair.

**SCI 4001 - Independent Studies in Science (1)**

Credit earned through directed reading, independent study, research, or supervised field work. Prerequisite: Permission of the Department Chair

Prerequisite: Permission of the Department Chair.

### **SCI 4002 - Independent Studies in Science (2)**

Credit earned through directed reading, independent study, research, or supervised field work. Prerequisite: Permission of the Department Chair

Prerequisite: Permission of the Department Chair.

### **SCI 4004 - Independent Studies in Science (4)**

Credit earned through directed reading, independent study, research, or supervised field work. Prerequisite: Permission of the Department Chair

Prerequisite: Permission of the Department Chair.

## **SE-Software Engineering**

### **SE 153 - Client-side Databases (3)**

An introduction to the implementation and theory of databases. Students will be able to implement a SQL/relational database; employ data model and entity-relationship models; analyze and correct redundancy; apply relational algebra; analyze a system or situation with respect to data integrity; explain and manipulate semi-structured data (e.g. XML). Prerequisite: One application-programming course; Corequisite: MA 113 College Algebra or higher.

Prerequisite: One application-programming course. Corequisite: MA 113 College Algebra or higher.

### **SE 221 - Introduction to Game Design (1)**

This course introduces students to the practice and processes needed in game design. Students are familiarized with methods, theory and techniques of the design process in the Windows API environment. The game loop, graphics and animation, sound, collision detection, device input, game engines, and scripting are covered. A playable game that uses the concepts covered will be created in the final project.

### **SE 233 - Systems Programming (3)**

Students learn to write C programs that utilize Linux systems calls which interact with the operating system. Students will be able to proficiently use the Linux command line; write simple Make files; write programs

which use Linux systems calls; write programs which can fork new processes or start new threads; write C programs which set up interprocess communication through, for example, the use of signals or pipes.

Prerequisite: CS 1123 or ECE 273

Prerequisite: ECE 273 or CS 1123.

### **SE 303 - Server-Side Databases (3)**

Internet applications often use databases on remote serves. These are sometimes distributed, large, and non-relational, and they pose some difficulties. Students will develop and test a database with multiple serves, using PHP or similar tool to offer good data; will assure access security; identify and justify methods of backup/recovery; explain consistency, availability, and partitioning, and the limits of these; exploit a non-relational database; develop a database that operates effectively without assurance of consistency. Prerequisite: SE 153, SE 233

Prerequisite: SE 153, SE 233.

### **SE 353 - Software Engineering (3)**

Is an introduction to software engineering from requirements definitions, through system modeling, specification and design, to verification and validation. Students will: explain project management issues including software cost estimation; determine

applicable SDLC models; explain Agile methods (XP and Scrum); gather requirements; design architecture of a software system; create tests to assure quality of software; design and implement an effective graphical user interface. (Same as CS 2503) Prerequisite: CS 1123

Prerequisite: CS 1123. Crosslisted as: CS 2503.

### **SE 383 - Computer Security (3)**

Covers issues and solutions in the area of computer security with emphasis on secure software development. Students will: discuss various attacks and vulnerabilities in a computer system (malware, denial of service, XSS, SQL injection, etc.) and choose corresponding solutions; compare cryptographic algorithms and security protocols; incorporate authentication and security protocols in applications; discuss internet privacy and ethical issues; apply security concepts, technologies and best practices to develop secure applications. Prerequisite: CS 1123

Prerequisite: CS 1123.

### **SE 393 - Software Patterns & Team Development (3)**

This is a project-oriented course that teaches the code development process to students who can use an object-oriented computer language. Students will: identify activities of software project engineering; write a formal requirements document; perform object-oriented analysis of client requirements; use UML class and sequence diagrams to support object-oriented design; apply some software design patterns; implement designed software in a team supported by a version-control tool; use a professional-caliber GUI library to advantage; and follow coding standards. Prerequisite: CS 2503 or SE 353

Prerequisite: CS 2503 or SE 353.

### **SE 4001 - Contemporary Issues for Engineering (1)**

This is a seminar-based weekly course covering global perspectives on business and engineering, and the effects and responsibilities of engineers in society. Students will: understand sustainability and diversity and develop a broader perspective necessary to understand the impact of engineering solutions in an environmental and societal context; understand the complex global economy. (Same as ECE 4001) Prerequisite: Senior standing

Prerequisite: Senior standing. Crosslisted as: ECE 4001.

### **SE 4002 - Project Management (2)**

Students will: work with a team to identify or elicit details of end-user needs; produce and present a project proposal; identify and assign responsibilities to team members based on an accepted proposal; work across disciplines to deliver a product or service to a client; explain both highly-structured and more agile engineering design processes. (Same as ECE 4002)

Prerequisite: Advisor's consent

Prerequisite: Advisor's consent. Crosslisted as: ECE 4001.

### **SE 4003 - Design Project (3)**

Students will: design and prototype a product; work with team members from other disciplines to collectively solve engineering problems; obtain and utilize information sources to solve engineering problems; consider the perspective of stakeholders as an integral part of the design process; incorporate appropriate engineering standards; identify economic, environmental, social, ethical, and safety implications of the design; demonstrate communication skills necessary for successful teamwork; write a formal report that documents the entire design-cycle, from the initial concept to a functioning prototype; and give an oral report presenting the final product. (Same as ECE 4003) Prerequisite: EE Majors: ECE 4002, ECE 243, ECE 483; CPE Majors: ECE 4002, ECE 243, ECE 373; SE Majors: ECE 4002, CS 2103, CS 2503 or SE 353

Prerequisite: EE Majors: ECE 4002, ECE 243, ECE 483; CPE Majors: ECE 4002, ECE 243, ECE 373; SE Majors: ECE 4002, CS 2103, CS 2503 or SE 353 . Crosslisted as: ECE 4003.

## SI-Social Innovation

### **SI 213 - Theories & Philosophies of Social Innovation (3)**

Students are introduced to the altruistic and philanthropic drivers of social innovation, specifically focusing on how the desire to accrue value for society is becoming more influential than profit motive. The course asks students to examine (through a number of lenses) the emergence of the humanistic element in what have traditionally been capitalistic and technological fields. (Same as PHL 213) Prerequisites: ENG 143, PSY 113

Prerequisite: ENG 143, PSY 113. Crosslisted as: PHL 213.

### **SI 403 - Social Innovation Practicum (3)**

Students will learn and apply the steps that social entrepreneurs work through to operationalize social innovations and create social change: identifying a problem to address, developing a strategy to address the social need, fundraising, growing the organization, tracking results and maximizing impact. Students will develop a Theory of Change, Logic Model and Social Venture Plan for self-selected problem OR engage in a semester-long exploration of a social challenge or operational social innovation, with which they will actively engage during an Alternative Break Program (ABP) during Thanksgiving or Spring Break. Prerequisites: SI/PHL 213, LDR 403, and pursuit of Social Innovation minor approved by academic advisor or permission of instructor.

Prerequisite: SI 213, LDR 403, and pursuit of Social Innovation minor approved by academic advisor or permission of instructor. .

## SLP - Speech Language Pathology

### **SLP 5113 - Articulation and Phonology Disorders (3)**

Students will differentiate normal and disordered speech sound development. Assessment and intervention theories are discussed with analysis and comparison expected for all theories and approaches provided. Application of this information in the evaluation and intervention of speech sound disorders in children and adults will be demonstrated through simulated experiences.

Prerequisite: Enrollment in the MS-SLP program.

### **SLP 5122 - Fluency Disorders (2)**

The focus of this course is to provide a comparison of developmental and acquired fluency disorders, with an overview characteristics of fluency disorders in children and adults. Assessment, diagnosis and treatment of dysfluency across the lifespan are student objectives of this course. Students will consider the experience of fluency and dysfluency/stuttering from the viewpoint of the person who stutters. Course will also focus on prevention and management of stuttering in clinical practice.

Prerequisite: Enrollment in the MS-SLP program.

### **SLP 5133 - Developmental Language Disorders (3)**

This course will provide a theoretical and practical orientation to the area of child language disorders with an overview of potential etiologies and characteristics of language disorders in children from infancy through adolescence. An emphasis is given to evaluation, diagnosis, and intervention of children with specific language impairments, autism spectrum disorders, and cognitively based language impairments as well as the relationship between language, learning, and literacy. A variety of assessment and treatment procedures for use with a diverse clinical population will be discussed.

Prerequisite: Enrollment in the MS-SLP program.

### **SLP 5143 - Clinical Methods (3)**

Students are introduced to basic clinical methods, and provided with knowledge and fundamental skills required for beginning

a supervised clinical practicum. Ethical practice guidelines from the American Speech Language Hearing Association (ASHA), HIPAA, client confidentiality, scope of practice, clinical procedures, clinical documentation, data collection, evidence-based practice, ways of adapting procedures for assessment, intervention and collaboration with individuals that are culturally and linguistically diverse, as well as, professional behavior are discussed. Students will practice administration, scoring, and interpretation of a variety of standardized assessments. Students will prepare and practice intervention during this course on a variety of disorder types through simulations.

Prerequisite: Enrollment in the MS-SLP program.

### **SLP 5153 - Practicum I (3)**

Students will participate in this 8-week, 10 hours per week supervised clinical experience at an affiliate practicum placement site. This introduction clinical provides exposure to communication and or swallowing impairments across the lifespan. Focus is for students to discover and apply evaluation, diagnosis, intervention, interaction, professional, and documentation skills with clinical educator supervision. Amount of direct contact will be at clinical educators' discretion and with supervision. Students will earn clock hours with communication and/or swallowing impairments given the amount of direct time in the provision of service.

Prerequisite: Enrollment in the MS-SLP program.

### **SLP 5213 - Augmentative Alternative Communication (AAC) (3)**

The focus of this course is to provide an overview of AAC types, the continuum of AAC language and systems, use strategies, and an overview of evaluation and intervention approaches with AAC. Students will identify potential candidates for AAC, etiologies that use AAC, practice implementation of a communication system or device, and review issues of funding and advocacy. Students will complete a case study providing intervention strategies for individuals requiring AAC.

Prerequisite: Enrollment in the MS-SLP program.

### **SLP 5222 - Voice and Resonance (2)**

In this course etiologies and characteristics, as well as, evaluation, diagnosis, intervention, and management approaches are discussed. Students will develop skills to assess, make differential diagnoses, and determine management course for congenital, acquired, and non-organic disorders of phonation. Emphasis also on role of speech language pathologist, integration of normative data, and use of research in clinical practice.

Prerequisite: Enrollment in the MS-SLP program.

### **SLP 5233 - Acquired Language Disorders and Cognitive Rehab (3)**

The effects of damage to a normal language and cognitive system due to brain injury are discussed. Emphasis on evaluation, diagnosis, intervention, and prognosis associated with a variety of neurologic disorders. Students will demonstrate ability to apply research to treatment of aphasia, right hemisphere syndrome, traumatic brain injury, and dementia. Students will also focus on role of speech language pathologist on the clinical team.

Prerequisite: Enrollment in the MS-SLP program.

### **SLP 5243 - Motor Speech Disorders (3)**

This course provides a life span approach to apraxia and dysarthria through discussion of the etiology, diagnosis, and intervention. Pediatric disorders, such as childhood apraxia of speech and dysarthria, are discussed. Acquired apraxia and dysarthria, given the impact on the subsystems of respiration, phonation, prosody articulation and resonance are of focus. Students are expected to differentially diagnose, complete research reviews, and develop a plan of care given a case study simulation.

Prerequisite: Enrollment in the MS-SLP program.

**SLP 5253 - Practicum II (3)**

Students will participate this 8-week, 15-hours per week supervised clinical practice at an affiliate practicum site with individuals presenting with speech, voice, fluency, language, cognitive, motor speech, and/or swallowing impairments. Focus is for students to move from discovery to application of evaluation, diagnosis, intervention, interaction, professional, and documentation skills. Increased client contact time is expected during this practicum. Placement site will direct the student's exposure to team meetings, interprofessional collaboration, and the full scope of services provided by speech language pathologists. Students will earn clock hours with communication and/or swallowing impairments given the amount of direct time in the provision of service. Prerequisite: SLP 5153

Prerequisite: SLP 5153 Practicum I.

**SLP 6313 - Research Methods (3)**

Students will evaluate research articles from current professional journals, including analysis of research design, sampling techniques, measures, and interpretation of findings. Focus includes research ethics, incorporation of research evidence into practice, and instilling critical thinking. Students will be expected to complete a research review paper.

Prerequisite: Enrollment in the MS-SLP program.

**SLP 6322 - Dysphagia (2)**

Students will review the anatomy and physiology of swallowing and discuss evaluation and rehabilitation of swallowing disorders. Emphasis on recognition of clinical and videofluoroscopic swallow study/radiographic signs and symptoms of dysphagia, with selection of rehabilitation and management of skills. Swallowing disorders in various populations across the age span are discussed. Ethical considerations in clinical cases are presented for student discussion.

Prerequisite: Enrollment in the MS-SLP program.

**SLP 6323 - Practicum III (3)**

Students will participate this 12-week, 20 hour per week supervised clinical practice at an affiliate practicum site with individuals presenting with speech, voice, fluency, language, cognitive, motor speech, and/or swallowing impairments. Students are to further develop evaluation, diagnosis, intervention, interaction, professional and documentation skills. Increased client contact hours are expected during this practicum. Placement site will direct the student's exposure to team meetings, interprofessional collaboration, and the full scope of services provided by speech language pathologists. Students will earn clock hours with communication and/or swallowing impairments given the amount of direct time in the provision of service.

Prerequisite: SLP 5253 Practicum II.

**SLP 6415 - Capstone (5)**

Students will synthesize information from a case study of a previous client and provide an evidence-based evaluation, diagnosis, objectives, intervention plan, interprofessional collaboration and professional resources. A scholarly paper will be written regarding the client. Students will present their client for discussion as a grand round with a team of peers. Students will defend their plan of care to the class through an oral presentation. HIPAA and client confidentiality will be maintained. Students will create a professional leadership plan through self-reflection and critical assessment of their professional SLP leadership abilities.

Prerequisite: Successful completion of all previous semesters.

**SLP 6426 - Practicum IV (6)**

Students will participate this 12- week, 30 hour per week advanced clinical practice at an affiliate practicum site with individuals presenting with speech, voice, fluency, language, cognitive, motor speech, and/or swallowing impairments.

Students will continue to develop evaluation, diagnosis, intervention, interaction, professional and documentation skills. Increased client contact hours are expected during this practicum. Placement site will direct the student's exposure to team meetings, interprofessional collaboration, and the full scope of services provided by speech language pathologists. Students will earn clock hours with communication and/or swallowing impairments given the amount of direct time in the provision of service.

Prerequisite: SLP 6323 Practicum III.

### **SLP 6516 - Externship (6)**

During this full-time, 40-hours per week for 15 weeks clinical, students will participate in an advanced, supervised practice at an affiliate placement with individuals presenting with speech voice, fluency, language, cognitive, motor speech, and/or swallowing impairments. Students will be expected to integrate all course work and clinical experiences to provide evaluation, diagnosis, intervention, and documentation that is expected of the affiliate site. Students are expected to make clinical judgements, with supervisor approval, and collaborate with team members, such as other therapy disciplines, social services, and/or billing. Students will earn clock hours with communication and/or swallowing impairments given the amount of direct time in the provision of service.

Prerequisite: SLP 6426 Practicum IV.

## **SM-Sport Management**

### **SM 133 - Contemporary Issues in Sport (3)**

Discussion of the problems and issues facing sport managers today. Analysis of the relationship between sport and culture. Topics may include commercialization, amateurism and socialization in sports.

### **SM 223 - History of Physical Education & Sport (3)**

The significance of physical education and sport from the ancient Greeks through modern times. The development of physical education as a broad-based academic discipline and sport management as a natural outgrowth of the field.

### **SM 313 - Principles of Sport & Recreation Management (3)**

A study of the management, marketing, financial and legal principles within a sports and recreation operation and the primary components and support structures of the industry. The purpose is to examine and gain an understanding of all facets of running a team or sporting organization. A significant research project will be due at the end of the course.

### **SM 333 - Sports Law and Ethics (3)**

This course examines legal concepts and cases and ethical issues related to sport, recreation, and physical activity. Students will analyze complex legal and ethical issues facing leagues, teams, event organizers, participants, fans, and the sport community as a whole. Topics to be addressed include law and management in sport; human resource management in sport including labor relations and the law of agency; strategic management and governance of sport organizations at both the amateur and professional levels; operating venues and event management including liability, contract, and accessibility issues; and marketing management.

Prerequisite: none.

### **SM 393 - Sport Psychology (3)**

Study of the underlying mechanisms that coordinate individuals' thoughts, feelings and behavior, and how these processes are impacted by the sport setting. Psychological factors to be discussed include motivation and aggression.

### **SM 403 - Internship Sport Management (3)**

Observation of and participation in a field-related experience under the direction of a field supervisor and a University supervisor. Must have the approval of the Department Chair



Prerequisite: Must have the approval of the Department Chair.

**SM 412 - Business Planning in Sport & Recreation (2)**

The creation of a business plan for a sport/recreation operation. Prerequisite: MGT 303

Prerequisite: MGT 303.

**SM 413 - Organization & Administration of Physical Education & Athletics (3)**

Theories establishing the procedures for facility, curriculum and faculty development in physical education and athletics are examined.

**SM 416 - Internship in Sport Management (6)**

Observation of and participation in a field-related experience under the direction of a field supervisor and a University supervisor. Must have the approval of the Department Chair

Prerequisite: Must have the approval of the Department Chair.

**SM 423 - Capstone Experience in Sport Management (3)**

The culminating final project of a Sport Management major. With the guidance of a professor, the student will participate in a project-based learning opportunity with significant work expected outside of class. Students will apply lessons in marketing, sales, and event operations to a real-life sporting event. Weekly assignments, a reflective paper, and a presentation are required components of the class.

Prerequisite: none. Corequisite: none. Crosslisted as: none.

**SM 453 - Facility Planning (3)**

The purpose of this class is to examine all the variables an administrator must consider when building or remodeling a sport or fitness facility. Cost, construction, materials, legal issues, and handicap accessibility are a few of the topics to be discussed. Field trips to local sport facilities and arena's will be scheduled. The design of a new facility is one of the class projects.

## SOC-Sociology

**SOC 103 - Principles of Sociology (3)**

A presentation of the basic concepts and principles of sociology, designed to develop a system of thought about the nature of society and major special issues, such as ethnic patterns, social stratification, youth, educational, and religious institutions.

**SOC 313 - Topics in Sociology (3)**

Selected topics in sociological content such as criminology, minority groups, urbanization, and the like. Topics will vary from semester to semester. Prerequisite: SOC 103

Prerequisite: SOC 103.

**SOC 323 - The Family (3)**

An analysis of problems and relationships in the family setting: divorce, mobility, generation differences, changing role of women and youth, delinquency, cross cultural patterns. Prerequisite: PSY 113 or SOC 103

Prerequisite: PSY 113 or SOC 103.

**SOC 333 - Art, Society & Technology (3)**

An interdisciplinary effort to place modern technology within a social, cultural and historical context. (Same as PHL 333)  
Prerequisite: ENG 133

Prerequisite: ENG 133. Crosslisted as: PHL 333.

### **SOC 343 - Social Psychology (3)**

An introduction to the measurement and principles of human interaction and group behavior, including attitude change, prejudice, attraction, love, altruism, aggression, conformity, group dynamics, crowding, and other current social issues. (Same as PSY 343) Prerequisite: PSY 113

Prerequisite: PSY 113. Crosslisted as: PSY 343.

### **SOC 363 - Human Behavior & Counseling (3)**

Examines the theory and practice of counseling with a corporate of social service setting Exposure to a variety of therapeutic techniques. Experience first-hand the complexities of the human mind through a case-study approach. Direct versus indirect forms of interventions are explored. (Same as PSY 363) Prerequisite: PSY 113

Prerequisite: PSY 113. Crosslisted as: PSY 363.

## **SPN-Spanish**

### **SPN 103 - Spanish Conversation I (non-native speakers) (3)**

An introduction to the Spanish language with an emphasis on functional conversation skills. Vocabulary development and pronunciation within communicative contexts are stressed. No previous study of Spanish is required. NATIVE SPEAKERS OF SPANISH MAY NOT REGISTER FOR SPN 103

### **SPN 113 - Spanish Reading & Writing I (3)**

An introduction to the Spanish language that includes vocabulary development and the basics of grammar structure with an emphasis on reading and writing, as well as developing cultural insight into Hispanic countries. No previous study of Spanish is required.

### **SPN 123 - Spanish II (3)**

A continuation of the first semester of language (SPN 113), the focus of this second semester of beginning Spanish is to continue the development of listening, speaking, reading, and writing skills. Latin American and Spanish cultures are covered to provide a cultural insight in the target language. Prerequisite: SPN 113 or by placement

Prerequisite: SPN 113 or by placement.

### **SPN 203 - Spanish III (3)**

An intermediate Spanish class with an emphasis on reading and writing skills which includes vocabulary and grammar instruction. Students explore Hispanic cultures with readings and videos based on historical, as well as current events to develop an understanding of the Hispanic world. Students analyze authentic literary selections with an expanded working vocabulary and write Spanish compositions with improved creative expression. Communicative skills are also emphasized through personal reflections and discussions with peers. Prerequisite: SPN 123 or by placement

Prerequisite: SPN 123 or by placement.

### **SPN 213 - Spanish IV (3)**

A continuation of Spanish III, with an emphasis on reading comprehension of more complex texts, such as prose, fiction and articles. In addition, students will improve writing fluency and accuracy in essays in Spanish. The difficulty level of the reading selections increases in this course. Prerequisite: SPN 203

Prerequisite: SPN 203.

### **SPN 303 - Spanish Language (3)**

Review of vocabulary and Spanish grammar essentials with analysis and discussion of literary texts and videos through extensive reading and writing activities as well as oral presentations and class discussions. Prerequisites: SPN 213

Prerequisite: SPN 213.

### **SPN 313 - Spanish Writing & Composition (3)**

This course emphasizes the development of writing skills and critical reading with Spanish compositions in comparative essay, the argumentative essay as well as academic and research papers. Prerequisite: SPN 213

Prerequisite: SPN 213.

### **SPN 323 - Spanish Culture (3)**

Introduction to popular culture and diversity in the Spanish-speaking world and the historical, political, economic and social aspects through interdisciplinary readings, videos, as well as material published on the internet to develop critical understanding and appreciation of a variety of Hispanic cultures. Prerequisites: SPN 213

Prerequisite: SPN 213.

## **SP-Speech**

### **SP 203 - Effective Speaking (3)**

Throughout this course, students will learn communication principles to improve public speaking and listening skills. Through application, students will develop confidence in the delivery of oral presentations. Additionally, students will learn how to organize, outline, research, and conduct audience analysis to prepare for effective speaking.

Prerequisite: none. Corequisite: none.

## **SR-Sport Recreation**

### **SR 343 - Internship in Sport & Recreation I (3)**

Observation of and participation in a field related experience under the direction of a field supervisor and a University supervisor. Internship opportunities are limited to Sport and Recreation majors only and must have the approval of the Department Chair. Prerequisites: Permission of the Department Chair and written description of internship duties.

Prerequisite: Permission of the Department Chair and written description of internship duties.

### **SR 353 - Internship in Sport & Recreation II (3)**

Continuation of observation of and participation in a field related experience under the direction of a field supervisor and a University supervisor. Internship opportunities are limited to Sport and Recreation majors only and must have the approval of the Department Chair. Prerequisites: Permission of the Department Chair and written description of internship duties.

Prerequisite: Permission of the Department Chair and written description of internship duties.

## **SUR-Surgical Technology**

### **SUR 104 - Introduction to Surgical Technology (4)**

This course prepares students to apply knowledge of the surgical technologist roles and responsibilities, professional relationships, and the psychological needs of the surgical patient; emphasis is placed on the operating environment. This course prepares the students to apply knowledge of safety in the workplace and basic safety techniques; including how to create and maintain a safe working environment. This course teaches aseptic procedures with emphasis placed on safety and division of

duties when establishing a sterile field, scrubbing and donning of surgical attire, and gowning and gloving other team members. This course prepares students to apply knowledge of anatomy and physiology, surgical instruments, sutures, needles, sponges, drugs used during surgery, and dressings. Prepares students to apply knowledge of drainage systems and tubing, syringes and hypodermic needles, sponges and instruments counts.

#### **SUR 114 - Clinical Experience I (4)**

This course provides with knowledge of basic principles and practices involving hazards, laws, and ethics related to the field of surgical technology. It teaches laws and regulations, documentation and consents, and identifies potential hazards and safety precautions utilized in the operative environment. In addition, quality and end of life ethical issues are presented with emphasis on the biopsychosocial needs of the patient. This course also provides the surgical technology student with an overview of surgical services and various associated departments with observation and hands-on experience relevant to the surgical patients' care.

#### **SUR 124 - Clinical Experience II (4)**

This course provides students with actual on-the-job learning opportunities. It is conducted in surgical facilities and provides students a clinical experience with a variety of pre-, intra-, and post-operative assignments. Students will have opportunities to observe and assist in associated departments (L&D, endoscopy, and SPD). IN the operating room, the course will consist of the student in the observation role with transition to the second scrub and first scrub roles. Prerequisites: SUR 104, SUR 114 and HS 104

Prerequisite: SUR 104, SUR 114 and HS 104.

#### **SUR 134 - Surgical Procedure I (4)**

This course prepares students to think about procedures in a style similar to that of the surgeon. It is constructed in such a way as to teach basic surgical anatomy, instrumentation and procedural steps. The course introduces students to diagnostic procedures, endoscopic surgery and robotics, general obstetrics and gynecology, and genitourinary surgeries. Prerequisite: SUR 104, SUR 114, HS 104

Prerequisite: SUR 104, SUR 114 and HS 104.

#### **SUR 218 - Clinical Experience III (Other)**

This course provides students with actual on-the-job learning opportunities. It is conducted in a surgical facility and provides students with a clinical experience with a variety of pre-, intra-, and post-operative assignments. Students will have opportunities to observe and assist in associated departments (L&D, OB, endoscopy, interventional radiology, SPD). The course will consist of second scrubbing with the transition to first scrubbing. Prerequisite: SUR 124, SUR 134 and HS 114

Prerequisite: SUR 124, SUR 134, HS 114.

#### **SUR 223 - Capstone for the Surgical Technologist (3)**

This course is designed to provide a comprehensive review and knowledge assessment in preparation for taking a national credentialing exam. The course will also include an opportunity for the evaluation of skills, professional development, and critical thinking skills through case studies reflecting experiences often encountered during surgical technology clinical experience and in the surgical work environment. Prerequisite: SUR 218 and SUR 234

Prerequisite: SUR 218 and SUR 234.

#### **SUR 228 - Clinical Experience IV (8)**

This course provides students with actual on-the-job learning opportunities. It is conducted in a surgical facility and provides students a clinical experience with a variety of pre-, intra-, and post-operative assignments. Emphasis is placed on the scrub and circulating roles of the surgical technologist including aseptic technique and basic surgical procedures while working as a member of the surgical team. Prerequisites: SUR 218 and SUR 234

Prerequisite: SUR 218 and SUR 234.

### **SUR 234 - Surgical Procedures II (4)**

This course prepares students to think about procedures in a style similar to that of the surgeon. It is constructed in such a way as to teach basic surgical anatomy, instrumentation and procedural steps. The course introduces students to general surgical techniques involved during orthopedic, cardiothoracic, peripheral vascular, and neurosurgeries. Prerequisites: SUR 124, SUR 134 and HS 114

Prerequisite: SUR 124, SUR 134 and HS 114.

### **SUR 244 - Surgical Procedures III (4)**

This course prepares students to think about procedures in a style similar to that of the surgeon. It is constructed in such a way as to teach basic surgical anatomy, instrumentation and procedural steps. The course introduces students to otorhinolaryngologic surgeries, ophthalmic surgeries, oral and maxillofacial, and plastics and reconstruction surgeries.

Prerequisites: SUR 218 and SUR 234

Prerequisite: SUR 218 and SUR 234.

## **THE-Theatre**

### **THE 100 - Theatre Production (no credit) (0)**

Improvement of skills in theatrical production in conjunction with Trine University's Drama Club, including but not limited to acting, directing, technical theatre, or front-of-house experiences. This course is open to all students. This course is graded on a satisfactory/unsatisfactory basis.

### **THE 101 - Theatre Production (1)**

Improvement of skills in theatrical production in conjunction with Trine University's Drama Club, including but not limited to acting, directing, technical theatre, or front-of-house experiences. This course is open to all students. This course is graded on a satisfactory/unsatisfactory basis.

### **THE 103 - Introduction to Theatre (3)**

Understanding the roles of playwrights, actors, directors, designers, and audiences within the "living art" of theater. Demonstrates the relationship between art and culture through the study of, participation in, and viewing of theater.

## **UEI-University Exper-International**

### **UEI 141 - Paralinguistics of English Conversation (1)**

This course helps non-native English-speaking students improve and build confidence in their English-speaking skills. Students gain the ability to engage fully in academic discussion and informal conversations through focused pronunciation practice and active participation in structured conversation activities. Students analyze the verbal and non-verbal tools as well as the cultural cues utilized in American English discourse.

Corequisite: Lab Required.

### **UEI 191 - Adjusting to US Campus Life (1)**

First-year international students learn about subjective cultural aspects of American university campuses, such as the American work ethic, the concept of time, and how to make a good first impression. In turn, students present their own cultures to other students and professors. They actively participate in conversations about other cultural values, campus life, and aspects of being a student here at Trine University. They learn about rules, laws, and policies, both on campus and in the local community, and they practice reacting to various emergency situations. They internalize important vocabulary to assist them in adjusting to life on an American university campus, and they learn to recognize the stages of culture shock and some strategies of coping with it. This course requires a lab portion that must be taken concurrently.

Corequisite: Lab Required.

### **UEI 500 - Intl Grad Learning Orientation (0)**

Throughout this course, international graduate students will discover Trine University's academic policies and graduate procedures. Students will learn how to utilize the appropriate campus resources to make timely and effective educational decisions. Additionally, students will develop strategies to be successful graduate students. This course will be graded as satisfactory/unsatisfactory.

## **UE-University Experience**

### **UE 012 - Academic Foundations (2)**

This course helps students develop the proficiency needed to be successful in other college courses. The focus is on preparing students to do college level reading and writing and learning by building on each student's academic skills. This is a non-credit, preparatory class.

### **UE 101 - University Experience (1)**

This course offers resources for success in learning for students new to Trine University. This course will assist students in becoming more proficient learners, understanding self and others, and learning personal life skills. This course will present information about Trine University offices and services to familiarize students with resources and procedures.

### **UE 103 - College Success Skills (3)**

Upon completion of this course, students will be able to apply Trine's academic policies and procedures and utilize the appropriate resources to make timely and effective educational decisions. Students will be able to develop a system and set of strategies to apply college success skills.

Prerequisite: Must be recommended by Trine's Academic Success Center.

### **UE 111 - Online Learning Orientation (1)**

This course offers resources for success in learning for students new to Trine University. This course will assist new students in becoming acclimated to the university, and identifying the expectations of a Trine University student while providing them to opportunity to become familiar with the course management system (Moodle). This course will also present information about Trine University offices and services to familiarize students with resources and procedures. This is a four week course.

### **UE 121 - International Learning Orientation (1)**

(PASS/FAIL grading system) This course offers resources for success in learning for international students new to Trine University. This course will assist new international students in becoming acclimated to the university, and understanding expectations as a Trine University learner while allowing them to become familiar with the course management system (Moodle). This course will also present information about Trine University offices and services to familiarize students with resources and procedures. This is a four week course.

### **UE 200 - Academic Coaching (0)**

(PASS/FAIL grading system) This course provides an opportunity to build and reflect on college success skills with the assistance of an academic coach. It is required for students on academic probation.

## **WS-Womens Studies**

### **WS 103 - Introduction to Womens Studies (3)**

Introduction to Women's Studies offers an interdisciplinary exploration of the psycho-sociological construction of a woman's gender identity. It analyzes the historical progression of gender roles and feminist theory through a confluence of social, cultural, economic, political, geographic, and institutional pressures. The course examines how these components intersect in order to define what it is to be a woman in contemporary times. Prerequisite: ENG 143

Prerequisite: ENG 143.

# Board of Trustees

Year in parentheses denotes when affiliation with board began.

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B.S.B.A. (Tri-State University); Hon. DBA (Trine University);

Chairman/CEO, Metal Technologies, Inc., Auburn, Indiana

Jack Shaw (2010) *Vice Chair*

Coldwater, Michigan

B.S.E.E. (Purdue University)

President and CEO (ret.) Hughes Electronics Corp., Coldwater, Michigan

Lynn A. Brooks (2007) *Secretary*

Auburn, Indiana

B.S.B.A. (Tri-State University)

President and CEO (ret.), Rieke Corporation, Auburn, Indiana

## Members:

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*Chair Emeritus Board of Trustees*

Westfield Center, Ohio

B.S.M.E., Hon. D.E. (Tri-State University)

President, Conduit Space Recovery Systems, LLC

Sarasota, Florida

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Kendallville, Indiana

B.A. (Wabash College); M.B.A. (Vanderbilt University)

CFA, Founder and President, AMI Investment Management Inc.

James D. Bock (2003)

Elkhart, Indiana

B.S.M.E. (Tri-State University);

President/Owner (ret.) Bock Engineering Co., Elkhart, Indiana

Keith E. Busse (2003)

Fort Wayne, Indiana

B.S.B.A. (University of Saint Francis); M.B.A. (Indiana-Purdue University Fort Wayne);

Hon. DBA (University of Saint Francis); Hon. DBA (Trine University)

Chairman, Board of Directors Steel Dynamics, Inc., Fort Wayne, Indiana

Michael J. Eikenberry (2014)

Fort Wayne, Indiana

B.S.B.A. (Ball State University) (Retired),

President (ret.) PNC Bank, Fort Wayne, Indiana

James P. Fabiani (2001)

*Vice Chair Emeritus Board of Trustees*

McLean, Virginia



B.S. (Harvard); M.Ed. (University of Massachusetts);  
Chair and CEO, Fabiani & Company, Washington, DC

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*Chair Emeritus Board of Trustees*  
Sturgis, Michigan  
B.S.M.E., Hon. D.E. (Tri-State University)  
President (ret.) Burr Oak Tool, Inc., Sturgis, Michigan

Tomas Furth (1997)  
New York, New York  
B.S.M.E., B.S.Ch.E., Hon. D.E. (Tri-State University)  
President, Sudamtex Holding, Caracas, Venezuela

William A. Gettig (1984)  
*Chair Emeritus Board of Trustees*  
Spring Mills, Pennsylvania  
B.S.M.E., Hon. D.E. (Tri-State University); Hon. Doctor of Laws,  
(Susquehanna University)  
President and C.E.O., Gettig Technologies Inc, Spring Mills, Pennsylvania

Timothy J. Haffner (2016)  
Fort Wayne, Indiana  
B.A. (Wabash College)  
J.D. (Indiana University Maurer School of Law)  
Partner, The Law Firm of Faegre Baker Daniels, Fort Wayne, Indiana

Rick Henvey (2017)  
Fort Wayne, Indiana  
B.S.B.A., M.S. (Southern Nazarene University)  
Chief Operating Officer, Parkview Health, Fort Wayne, Indiana

Senator Dennis Kruse (2010)  
Auburn, Indiana  
B.S., GRI and CAI (Indiana University)  
Indiana State Senator, Indianapolis, Indiana

Stephen R. LaHood (2004-2010, 2014)  
Sarasota Florida  
B.S.B.A. (Tri-State University)  
President/Owner (ret.) Senior Vice-President, Operations PartyLite, Sarasota Florida

Richard L. Oeder (1995)  
Morrow, Ohio  
B.S.C.E. (Tri-State University)  
Area Manager (ret.), Columbia Gas of Ohio, Springfield, Ohio

Derek S. Reiners (2017)  
Tulsa, Oklahoma  
B.S.B.A., M.Acc. (Oklahoma State University)  
Senior Vice President, Finance and Treasurer, ONEOK, Inc., Tulsa, Oklahoma

Larry E. Reiners (2009)  
Tulsa, Oklahoma  
B.S.C.E. (Tri-State University)

Manager, ISTI Plant Services, Catoosa, Oklahoma

Mitchel E. Rhoads (2006)  
 Longboat Key, Florida  
 B.S.B.A. (Tri-State University)  
 Chairman, Rhoads Holding, Ltd., Longboat Key, Florida

Elizabeth F. Rooney (2014)  
 New York, New York  
 B.A.S. (Boston College)  
 Product Marketing Manager, Google Inc., New York, New York

Jason Stechsulte (2019)  
 Findlay, Ohio  
 B.S.C.E. (Tri-State University)  
 Business Development Manager, Marathon Petroleum Corporation, Findlay, Ohio

Marlin Stutzman (2019)  
 Middlebury, Indiana  
 Applied Management (Tri-State University)  
 Managing Partner, Osmium Holdings, LLC., Howe, Iowa  
 CEO, Stutzman Power Equipment, Inc., Shipshewana, Inc.

Jeffrey L. Turner (2019)  
 Auburn, Indiana  
 B.S. (Ball State University)  
 J.D. (Indiana University School of Law)  
 Attorney at Law  
 Senior VP Administration & Corp. Sect. (ret.), Metal Technologies, Inc., Auburn, Indiana

Keith M. Turner (2014)  
 Angola, Indiana  
 B.S.M.E. (Tri-State University); M.S.B.A. (Indiana University)  
 Cofounder (ret.) Metal Technologies Group, Auburn, Indiana

Theresa E. Wagler (2011)  
 Fort Wayne, Indiana  
 B.A. (Taylor University)  
 Executive Vice President and CFO Steel Dynamics, Inc. Fort Wayne, Indiana

R. Wyatt Weaver (2004)  
 Angola, Indiana  
 B.S. and M.D. (Indiana University)  
 Parkview Physician's Group, Angola, Indiana

## Trustees Emeriti

(Dates denote years of active service as a trustee.)

Jimmie Caldwell (1976-2009) *Chair Emeritus*  
 Indianapolis, Indiana  
 B.S.C.E., Hon. D.E. (Tri-State University)  
 Registered Professional Engineer  
 President and Chair (ret.), Chair Emeritus, Geiger and Peters, Inc.,  
 Indianapolis, Indiana

Louis L. Holtz (2011-2017)

Orlando, Florida

B.S. (Kent State University); M.S. (University of Iowa)

Honorary Degrees (Trine University, University of Notre Dame, Kent State University, Gonzaga University, Benedictine University, and Wingate University)

ESPN Sports Analyst (ret.)

Hall of Fame Collegiate Football Coach

Orlando, Florida

Paul R. Kahlenbeck (1983-1998) *Chair Emeritus*

Columbus, Indiana

B.S.M.E., Hon. D.E. (Tri-State University)

Vice President (ret.), Cummins Engine Company, Inc., Columbus, Indiana

John W. Kirsch (1965-1975)

Sturgis, Michigan

Ed. (Albion College); M.B.A. (Indiana University);

Chair of the Board (ret.), Kirsch Company, Sturgis, Michigan

Gary L. Ray (1990-2002) *Chair Emeritus*

Medina, Ohio

B.S.M.E., Hon. D.E. (Tri-State University); M.B.A. (Wharton Graduate Division, University of Pennsylvania);

President/Owner, Transformer Engineering Corp., Cleveland, Ohio

Richard A. Rosenthal (1971-1977)

Niles, Michigan

B.S. (University of Notre Dame);

Director of Athletics, University of Notre Dame, South Bend, Indiana

Clifford D. Ryan (2009)

Naples, Florida

B.S.B.A. (Tri-State College)

Manager, R. & R. Real Estate, Ltd., Naples, Florida

Ralph D. Trine (1990-2020)

Fremont, Indiana

B.S.M.E., Hon. D.E. (Tri-State University)

M.S.M.E., M.B.A. (Michigan State University)

Chair and CEO, Vestil Manufacturing Co., Angola, Indiana

Sheri Trine (2007-2020)

Fremont, Indiana

Hon. D.H.L. (Tri-State University)

Executive Vice President, Vestil Manufacturing Co., Angola, Indiana

# Faculty

*Year in parentheses denotes when employment with Trine University began.*

Brendan Allen (2021)

Assistant Professor, Department of Humanities & Communication  
Jannen School of Arts & Sciences

B.A. (University of Kansas); M.A. (University of Maine); M.F.A. (Temple University)

William Barge (2002)

Associate Professor, Department of Computer Science & Information Technology  
Allen School of Engineering and Computing

B.S. (Miami University); M.B.A. (Indiana University),  
M.S. (Regis University); Ph.D. (Indiana State University)

William Barry (2008) *Dean*

Professor, Reiners Department of Civil & Environmental Engineering  
Allen School of Engineering and Computing

B.S. (Carnegie Mellon University); M.S. (Stanford University); Ph.D. (Carnegie Mellon University)

Max Baumgartner (2013) *Chair, DPT, College of Health Professions*

Professor, Doctor of Physical Therapy

B.A. (University of Toledo); B.S. (University of Toledo/Medical College of Ohio); P.T. (University of St. Augustine); Ph.D. (Nova Southeastern University); O.C.S.; F.A.A.O.M.P.T.

Charlene Bell (2021)

Associate Professor, Nursing Program  
College of Health Professions

B.S.N., M.S.N. (Wilmington University of Toledo); Ph.D. (Capella University)

Catherine Benson (2012) *Dean, Ketner School of Business & Director of Golf Management*

Assistant Professor, Ketner School of Business

Rick L. & Vicki L. James Dean's Chair in Ketner School of Business

B.A. (Transylvania University); P.G.A. Certification; M.S.L. (Trine University)

Angela Berger (2018)

Assistant Professor, Department of Science  
Rinker-Ross School of Health Sciences

B.S. (Michigan State University); Ph.D. (Indiana University)

Michael Biegas (2005)

Associate Professor, Department of Psychology & Social Sciences  
Jannen School of Arts & Sciences

B.A. (Tri-State University); M.A. (Michigan State University)

Tyann Billman (2021)

Assistant Professor, Physician Assistant Studies  
College of Health Professions

B.S. (University of Washington); M.S. (Western Michigan University)

Michael Blaz (1976) *Department Chair*

Professor, Department of Psychology, & Social Sciences

Jannen School of Arts & Sciences

B.A. (University of Minnesota); M.A. (Illinois State University); Ph.D. (University of Kentucky)

Justin Bock (2016)

Assistant Professor, Franks School of Education

Franks School of Education

B.S. (Taylor University); M.Ed. (Indiana Wesleyan University)

Angela Bojrab (2014)

Associate Professor, Department of Science

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A.S., B.S., (Purdue University); D.P.M. (Ohio College of Podiatric Medicine and Catholic Health System, Sisters of Charity Hospital Podiatric Medicine and Surgery)

Ana Boman (2015)

Lecturer, Department of Humanities & Communications

Jannen School of Arts & Sciences

B.A., M.A. (Indiana Purdue Fort Wayne); M.A. (Universidad de Valladolid)

Jacob Borden (2019)

Associate Professor, Department of Chemical & Bioprocess Engineering

B.S. (Rose-Hulman Institute of Technology); M.S. (Auburn University); M.B.A. (Spring Hill College); Ph.D. (Northwestern University)

Kristina Brewer (2004) *Director of Information Services, Carew Campus*

Instructor

Information Services, Carew Street Campus

College of Health Professions

B.A. (Western Michigan University); M.L.I.S. (University of Michigan)

Earl D. Brooks, II (2000) *President*

Professor, Science

B.S., M.S., Ph.D. (University of Tennessee)

Greg Brooks (2015)

Assistant Professor, Ketner School of Business

B.S. (Ball State University); MBA (Saint Francis University)

Andrew Brown (2019)

Assistant Professor, Department of Humanities & Communication

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Kodi Buell (2011)

Instructor, TrineOnline

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James Canino (2010)

Professor, Wade Department of Mechanical & Aerospace Engineering

Allen School of Engineering and Computing

B.S. (Milwaukee School of Engineering); M.S., Ph.D. (Purdue University)

Stephen Carr (2003)

Associate Professor, Department of Electrical & Computer Engineering

Allen School of Engineering and Computing

B.S. (University of Ulster); Ph.D. (Queens University of Belfast)

Sean Carroll (1990)  
 Professor, Department of Electrical & Computer Engineering  
 Allen School of Engineering and Computing  
 B.E. (Vanderbilt University); M.S.E., Ph.D. (Princeton University)

Paul Cervone (2018) *Director, Physician Assistant Studies*  
 Assistant Professor/Medical Director, Physician Assistant Studies  
 College of Health Professions  
 B.A. (University of Pennsylvania); M.P.S. (Penn State); M.D. (University of Pittsburgh)

Gurudutt Chandrashekar (2018)  
 Assistant Professor, Wade Department of Mechanical & Aerospace Engineering  
 Allen School of Engineering and Computing  
 B.S. (Rashtrreeya Vidyalaya College of Engineering); M.S. (Ruhr University of Bochum); Ph.D. (University of Wyoming)

Linda Conley (2010) *KSB Director of Accreditation for ACBSP*  
 Assistant Professor, Ketner School of Business  
 B.S.B.A., M.O.D. (Bowling Green State University)

Linda Cooper, (2020)  
 Assistant Professor  
 Ketner School of Business  
 B.B.A., M.A. (Eastern Michigan University); M.B.A. (University of Michigan)

Charles Copeland (2018)  
 Assistant Professor, Physician Assistant Studies  
 B.S. (Purdue University); B.S., P.A. (University of Nebraska)

Amanda Davis (2017)  
 Assistant Professor, Department of Exercise Science  
 Rinker-Ross School of Health Sciences  
 B.S. (University of Indianapolis); M.S. (Des Moines University)

Lauren Decker (2014)  
 Instructor, Department of Mathematics & Physics  
 Jannen School of Arts & Sciences  
 B.S. (Indiana-Purdue University); M.A. (Western Governors University)

Jacqueline Delagrang (2015) *Department Chair*  
 Assistant Professor, Department of Criminal Justice  
 Jannen School of Arts & Sciences  
 B.S. (Trine University); M.S. (Trine University); J.D. (Western Michigan University Thomas M. Cooley Law School)

Ryan Dombkowski (2014)  
 Professor, Doctor of Physical Therapy  
 College of Health Professions  
 B.A. (Wabash College); Ph.D. (University of Notre Dame)

Philip Downs (2021) *Director of Master Programs*  
 Assistant Professor, Franks School of Education  
 B.A., B.S., M.S., (Indiana-Purdue University, Fort Wayne); Ph.D. (Purdue University)

Samuel Drerup (2016) *Faculty President*  
 Associate Professor, Department of Science

Rinker-Ross School of Health Sciences  
B.S. (Ohio University); M.S. (Wright State University); Ph.D. (Ohio University)

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Associate Professor, Department of Science  
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Martin Dygert (2017)  
Lecturer, Department of Mathematics and Physics  
Jannen School of Arts & Sciences

Keirsten A. Eberts (2014) *Assistant Vice President and Dean of Academics*

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College of Graduate and Professional Studies  
B.S., M.S.L. (Trine University)

Nicole Edmonds (2019)  
Assistant Professor, Doctor of Physical Therapy Program  
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B.S. (Ball State University); D.P.T. (Grand Valley State University)

Jenna L. Encheff, P.T., Ph.D. (2015) *Director of DPT*  
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B.S., M.S., P.T., Ph.D. (The University of Toledo)

Tennille Fenstermaker (2018)  
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Allen School of Engineering and Computing  
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Tracey Floto (2015) *Executive Director of Assessment and Accreditation*  
Assistant Professor  
Academic Affairs  
A.S. (Schoolcraft College); B.A. (Spring Arbor College); Teacher Certification (Indiana University-Purdue University, Ft. Wayne); M.S.L. (Trine University)

Sarah Franzen (2009) *Dean, Jannen School of Arts & Sciences*  
Associate Professor, Department of Humanities & Communication  
Jannen School of Arts & Sciences  
B.A., M.S. (Indiana University); Ph.D. (University of Indiana of Pennsylvania)

Nadeena Frye (2019) *Dean, College of Health Professions*  
Associate Professor, Nursing Program  
College of Health Professions  
B.S.N., M.S.N. (Indiana Wesleyan University); Ph.D. (Capella University)

Roberta Gagnon (2017)

Assistant Professor, Department of Design Engineering Technology  
 Allen School of Engineering and Computing  
 B.S. (University of Toledo); M.B.A. (Florida Institute of Technology)

Maria Gerschutz (2013) *Department Chair*  
 Associate Professor, Department of Biomedical Engineering  
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Anna Glowinski (2020)  
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Max Gong (2019)  
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 Allen School of Engineering and Computing  
 B.A.Sc., Ph.D. (University of Toronto); M.A. Sc. (University of Guelph)

Gary Greene (2013) *Department Chair*  
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 Laurence L. Dresser Chair of Engineering  
 Allen School of Engineering and Computing  
 B.S., M.S. Ph.D. (Missouri University of Science & Technology) P.E.

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 Franks School of Education  
 B.A. (Norfolk State University); M.A. (Pennsylvania State University); M.S.Ed. (Indiana University-Purdue University, Ft. Wayne); Ph.D. (Indiana State University)

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 Allen School of Engineering and Computing  
 B.S. (Purdue University); M.S. (DeVry University)

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 Instructor, College of Graduate and Professional Studies  
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Kandee Heisler (2010)

Lecturer, Department of Humanities & Communication

Jannen School of Arts & Sciences

B.A., M.A. (Morehead State University)

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Professor, McKetta Department of Chemical & Bioprocess Engineering

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B.S. (University of Missouri-Rolla); M.S. (University of Kansas); M.S., Ph.D. (Yale University)

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B.A. (Rocky Mountain College); M.A. (University of Maine);

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A.S.N. (Ivy Tech Community College); B.S.N., M.S.N. (Western Governors University); Ph.D. (Capella University)

Jiang, Lingxiao “Jenson” (2015) *Associate Director*

Global Partnerships

B.S. (The University of Hong Kong); M.B.A. (Trine University)

Ira Jones (1983)

Professor, Department of Science

Rinker-Ross School of Health Sciences

B.S. (Davidson College); M.S. (New York University); Ph.D. (Auburn University)

Mark Kays (2007) *Director*

Associate Professor, Music Program  
 Jannen School of Arts & Sciences  
 B.S. (Ball State University), M.S. (Indiana University)

Haseeb Kazi (2006) *Director, Study Abroad*  
 Professor, Department of Mathematics & Physics  
 Jannen School of Arts & Sciences  
 B.S. (University of Punjab), M.S. (Quaid-I-Azam University), M.S., Ph.D. (Southern Illinois University)

Chad Keefer (2005)  
 Associate Professor, Department of Mathematics & Physics  
 Jannen School of Arts & Sciences  
 B.S., M.A., Ed.D. (Ball State University)

Kinsey Cotton Kelly (2012)  
 Assistant Professor, Department of Biomedical Engineering  
 Allen School of Engineering and Computing  
 B.S., Ph.D. (Louisiana Tech University)

Mahesh Khadka (2016)  
 Associate Professor, Department of Electrical & Computer Engineering  
 Allen School of Engineering & Technology  
 B.S. (Nepal Engineering College); M.S., Ph.D. (Oklahoma State University)

Anthony Kline (2012) *Dean*  
 Associate Professor, Franks School of Education  
 B.S., M.A., Ph.D. (Ball State University)

Jon Koch (2014)  
 Professor, Wade Department of Mechanical & Aerospace Engineering  
 Allen School of Engineering and Computing  
 B.S. (Valparaiso University); M.S., Ph.D. (Stanford University)

Lauren Kocsis (2020)  
 Assistant Professor, Department of Exercise Science  
 Rinker-Ross School of Health Sciences  
 B.S. (Trine University); M.S. (Indiana University)

Marek Kolar (2009)  
 Associate Professor, Ketner School of Business  
 B.B.A. (Northwood University); M.A. (Western Michigan University);  
 Ph.D. (Michigan State University)

Vinnie Lang (2014)  
 Instructor, Department of Exercise Science  
 Rinker-Ross School of Health Sciences  
 B.A., M.S. (Purdue University)

Brian Lapp (2020)  
 Assistant Professor, Physician Assistant Studies Program  
 College of Health Professions  
 B.A. (Wittenberg University); M.S. (Miami University); M.S. P.A.-C. (Western Michigan University)

Anthony Layson (2009)  
 Professor, Department of Science  
 Rinker-Ross School of Health Sciences

B.Sc. (Indiana-Purdue University); Ph.D. (Iowa State University)

Chanda Lichtsinn (2020) *Director*

Assistant Professor, Speech Language Pathology

College of Health Professions

B.S. (Purdue University); M.S. (Bowling Green State University)

Liu, Changhong "John" (2019)

Assistant Professor, Wade Department of Mechanical & Aerospace Engineering

Allen School of Engineering and Computing

B.S. (Chongqing Jiaotong University); Ph.D. (University of Kansas)

Jennifer Lloyd (2018) *Director Surgical Technology*

Instructor, Surgical Technology Program

College of Health Professions

Surgical Technologist (University of Saint Francis); B.S., HCM (Siena Heights University)

Rocky Lo (2021)

Lecturer, Department of Psychology and Social Sciences

Jannen School of Arts & Sciences

A.S. (Delta Community College); B.S. (Central Michigan University); M.A.' Ph.D. (Walden University)

Franklin Luchini (2014)

Assistant Professor, Department of Design Engineering and Technology

Allen School of Engineering and Computing

B.A., B.S. (Michigan State University); M.S. (Purdue University)

Amanda Malefyt (2012) *Department Chair*

Associate Professor, McKetta Department of Chemical & Bioprocess Engineering

Allen School of Engineering and Computing

B.S. (Tri-State University); Ph.D. (Michigan State University)

Mindy Maples (2020)

Assistant Professor, McKetta Department of Humanities & Communication

Jannen School of Arts & Sciences

B.A. (Goshen College); M.A. (Regent University)

Bradley Martin (2019)

Assistant Professor, Department of Criminal Justice

Jannen School of Arts and Sciences

B.S. (Bowling Green State University); M.P.A., J.D. (University of Toledo)

Melissa Mayus (2017)

Associate Professor, Department of Humanities & Communication

Jannen School of Arts & Sciences

B.A. (University of Notre Dame); M.A. (Saint Louis University); M.A. (University of Iceland);

Ph.D. (University of Notre Dame)

Jeffrey McGowan (2016) *Ralph W. Ketner Distinguished Professorship*

Assistant Professor, Ketner School of Business

B.B.A., M.B.A. (University of Notre Dame); C.P.A.

John Milliken (2004) *Assistant Vice President for Academic Success*

Professor, Department of Criminal Justice

Jannen School of Arts & Sciences

B.A. (The Ohio State University); J.D. (University of Toledo)

Andrea Mitofsky (2008)

Professor, Department of Electrical & Computer Engineering  
Allen School of Engineering and Computing  
B.S., M.S., Ph.D. (University of Illinois)

Kevin Molyet (2009)

Associate Professor, Department of Design Engineering Technology  
Allen School of Engineering and Computing  
B.S., M.S., Ph.D. (University of Toledo)

Vicki Moravec (2002) *Department Chair; Director, Honors Program*

Professor, Department of Science  
Rinker-Ross School of Health Sciences  
B.S. (Indiana University Purdue University-Fort Wayne);  
Ph.D. (University of Illinois-Chicago)

Thomas Morrill (2020) *Director Math Help Center*

Assistant Professor, Department of Mathematics & Physics  
Jannen School of Arts & Sciences  
B.A. (Earlham College); M.S., Ph.D. (Oregon State University)

Timothy J. Murphy (2008)

Instructor, Reiners Department of Civil & Environmental Engineering  
Allen School of Engineering and Computing  
B.S. (Virginia Polytechnic and State University); M.S. (University of Texas)

Starr Newman (2018)

Instructor, Master of Physician Assistant Studies  
College of Health Professions  
B.S. (Purdue University); B.S.P.A. (University of St. Francis); NCCPA Certification (State of Indiana)

Cindy Neyer (1998)

Associate Professor, Department of Mathematics & Physics  
Jannen School of Arts & Sciences  
B.S. (University of Kansas); Ph.D. (Iowa State University)

Marissa Ford Nichols (2018) *Department Chair*

Assistant Professor, Department of Mathematics & Physics  
Jannen School of Arts & Sciences  
B.S. (Millikin University); M.A. (Eastern Illinois University)

Angelia Niederhelman (2017)

Assistant Professor, Department of Mathematics and Physics  
Jannen School of Arts & Sciences  
B.S. M.S. (Indiana – Purdue University, Fort Wayne)

Christine Olding (2018) *Department Chair*

Assistant Professor, Department of Humanities and Communication  
Jannen School of Arts & Sciences  
B.A., M.A. (University of Dayton); Ph.D. (Kent State University)

Francisco Ortiz (2015) *Dean of Students*

Instructor, Department of Criminal Justice  
Jannen School of Arts & Sciences

B.S. (Trine University); M.S. (Indiana Wesleyan University)

Cynthia Palmer (2019)

Assistant Professor, College of Health Professions

B.S. (Saint Mary's College); M.S. (Indiana University School of Medicine); Ph.D. (University of Notre Dame)

Hong Park (2009)

Associate Professor, Department of Science

Rinker-Ross School of Health Sciences

B.S. (Pukyong National University) M.S., Ph.D. (University of Wisconsin - Milwaukee)

John Patton (2014)

Associate Professor, Department of Biomedical Engineering

Allen School of Engineering and Computing

B.S. (University of Michigan); M.S. (New Mexico State University); Ph.D. (Rice University)

Brandon Podgorski (2017) *Director Center for Sports Studies*

Assistant Professor, Ketner School of Business

B.G.S. (Indiana University); M.S. (Ohio State University)

Danny Powell (2014)

Associate Professor, Ketner School of Business

B.S.B.A. M.B.A., M.A. (Indiana Wesleyan); Ed.D. (Oakland City University)

Joshua Pranger (2019)

Instructor, TrineOnline

College of Graduate and Professional Studies

Janelle Pulczynski (2020) *Director, Amy Nicholls Writing Center*

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B.A. (College of St. Scholastica); M.A. (University of Nebraska); M.A., Ph.D. (University of Wisconsin-Madison)

David Quist (2019)

Assistant Professor, Science Department

Rinker-Ross School of Health Sciences

B. S. (College of Literature, Science, and the Arts); M.A., Ph.D. (Krieger School of Arts and Sciences);

Jeffrey Raymond (2014)

Instructor, McKetta Department of Chemical & Bioprocess Engineering

Allen School of Engineering and Computing

B.S. (Michigan State University); M.S. (Trine University)

Jeremy Rentz (2010) *Director, Center for Teaching Excellence*

Associate Professor, Reiners Department of Civil & Environmental Engineering

William & Patricia Schantz Professorship in Civil Engineering

Allen School of Engineering and Computing

B.S., Ph.D. (University of Iowa)

Kimberly Rentz (2019)

Assistant Professor, Department of Mathematics and Physics

Jannen School of Arts and Sciences

B.S. (Kansas State University); M.S. (University of Iowa)

Deborah Richard (2019)

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B.A., MBOL, MBA (Defiance College)

Patrick Ridout (2016)  
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Information Services, Academic Success Center  
B.A. (Indiana University Southeast); M.L.I.S. (Indiana University)

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Instructor, Surgical Technology Program  
College of Health Professions  
A.A.S. (University of Saint Francis)

Thomas Ruediger (2014)  
Associate Professor, Doctor of Physical Therapy  
College of Health Professions  
B.A. (Concordia College); M.P.T. (Baylor University); D.S. (Rocky Mountain University);  
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Jodi Sandvik (2019)  
Assistant Professor, Doctor of Physical Therapy  
College of Health Professions  
B.S. (Marquette University); M.S. (Miami University); D.P.T. (Drexel University); DS.C. (Rockey Mountain University)

Rizacan Sarikaya (2021)  
Assistant Professor, Department of Mechanical & Aerospace Engineering  
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B.Sc. (Istanbul Technical University); M.Sc., Ph.D. (University of Kansas)

John Shannon (2007-2015, 2018) *Vice President of Academic Affairs*  
Professor, English  
B.A. (State University of New York); M.A. (Southern Illinois University);  
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Sameer Sharma (2008) *Department Chair*  
Professor, Department of Electrical & Computer Engineering  
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B.S. (Punjab Engineering College, India); M.S. (Brandeis University); M.S.E., Ph.D. (Oklahoma State University)

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B.S., M.B.A. (Indiana Institute of Technology)

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Vernon Stanger (2015)  
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Associate Professor, Department of Exercise Science  
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B.S. (University of Northern Iowa); Ph.D. (Notre Dame)

Benjamin Steele (2019)  
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B.S. (Indiana University); M.S. (University of Bridgeport); PA-C

Shane Steele (2015) *Department Chair*  
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Rinker-Ross School of Health Sciences  
B.S. (Boston University); D.P.T. (Rosalind Franklin University of Medicine and Science)

Laurie Stockton-Monreno (2020) *Director of Montessori Education*  
Assistant Professor, Franks School of Education  
B.S., M.S. (University of Texas)

Steven Sullivan (2015)  
Associate Professor, Doctor of Physical Therapy  
College of Health Professions  
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Catherine Swick (2010) *Dean*  
Associate Professor, Department of Exercise Science  
Rinker-Ross School of Health Sciences  
B.S., M.Ed., Ph.D. (Bowling Green State University)

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Associate Professor, Wade Department of Mechanical & Aerospace Engineering  
Allen School of Engineering and Computing  
B.S., M.S. (Brigham Young University); Ph.D. (University of Michigan)

Joseph Thompson (2010)  
Instructor, Wade Department of Mechanical & Aerospace Engineering  
Allen School of Engineering and Computing  
B.S. (Trine University)

Alison Todd (2016)  
Assistant Professor, Franks School of Education  
B.A. (Union College); M.Ed. (Lesley University); M.A. (Castleton State College)

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Assistant Professor, Franks School of Education

B.S. (Trine University); M.S. (IUPU, Indianapolis); Ph.D. (Central Michigan University)

Kelly Trusty (2015)

Associate Professor, Ketner School of Business

B.A. (Purdue University); M.A. (Ball State University);

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R. Thomas Trusty (2007) *Department Chair*

Associate Professor, Department of Design Engineering Technology

Allen School of Engineering and Computing

B.S. (Purdue University); M.A. (Ball State University); M.S. (Trine University)

Timothy Tyler (1993 -1998, 1999)

Professor, Reiners Department of Civil & Environmental Engineering

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Allen School of Engineering and Computing

B.S., M.S. (West Virginia University); Ph.D. (Virginia Polytechnic);

P.E. Virginia and Indiana

Anthony Vasaturo (2019)

Assistant Professor, Department of Mathematics and Physics

Jannen School of Arts and Sciences

B.S., M.A., Ph.D. (University of Toledo)

Emilio Vazquez (2014) *Medical Director*

Associate Professor, Physician Assistant Studies

College of Health Professions

B.S. (George Washington University); M.D. (University of Maryland School of Medicine)

John Wagner (1994)

Professor, McKetta Department of Chemical & Bioprocess Engineering

Allen School of Engineering and Computing

B.S. (University of Colorado); Ph.D. (Rice University); P.E. Ohio

Emily Watkins (2019)

Assistant Professor, Department of Exercise Science

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B.S. (Purdue University); D.P.T. (Trine University)

Melanie Watson (2015)

Associate Professor, Department of Biomedical Engineering

Allen School of Engineering and Computing

B.S., M.S.E., Ph.D. (Louisiana Tech)

Darryl Webber (2006) *Department Chair*

Professor, Wade Department of Mechanical & Aerospace Engineering

Allen School of Engineering and Computing

B.S. (Montana College of Mineral Science and Technology);

M.S. (Montana Tech of the University of Montana);

Ph.D. (Missouri University of Science & Technology)

Tricia Widenhoefer (2016)

Associate Professor, Doctor of Physical Therapy



B.A., M.S. (University of Indianapolis); D.P.T. (University of Montana)

Sharon Willey, (2020), *Director of Nursing Program*

Associate Professor, Nursing Program

College of Health Professions

A.S.N. (Floyd College); B.S.N. (Ball State University); M.S.N.Ed. (Indiana Wesleyan University); D.N.P. (Walden University)

Kevin Woolverton (2015)

Associate Professor, Department of Electrical & Computer Engineering

Allen School of Engineering and Computing

B.S. (Kansas State University); M.S. (Oklahoma State University); Ph.D. (Texas Tech University)

Kimberly Wright (2014)

Assistant Professor, Department of Psychology & Social Sciences

Jannen School of Arts & Sciences

B.A. (Miami University); M.A. (Bowling Green State University)

Donna Wyse (2016)

Assistant Professor, Department of Psychology & Social Sciences

Jannen School of Arts & Sciences

B.S. (Defiance College); M.S. (Capella University)

Wendy Yagodinski (2020) *Department Chair*

Assistant Professor, Department of Computer and Information Systems

Allen School of Engineering & Computing

B.S. M.S. (Trine University)

Godfred Yamoah (2016)

Assistant Professor, Department of Mathematics & Physics

Jannen School of Arts & Sciences

B.S., M.S. (University of Lagos); Ph.D. (Clarkson University)

Henry Yukevich (2021)

Assistant Professor, Department of Humanities & Communication

Jannen School of Arts & Sciences

B.A. (Grove City College); M.A. (University of Dayton), Ph.D. (Indiana University of Pennsylvania)

Sarah Zimmer (2016)

Assistant Professor, Department of Humanities & Communication

Jannen School of Arts & Sciences

B.A., (Columbia College); M.F.A. (Cranbrook Academy of Art)

Christina Zumbrun (2006)

Associate Professor, Department of Mathematics & Physics

Jannen School of Arts & Sciences

B.B.S. (Hardin-Simmons University); M.S. (Purdue University);

Ph.D. (Western Michigan University)

## Faculty and Administration Emeriti

Susan Anspaugh (2005) Professor Emeritus, 2020, Exercise Science

Brett Batson (2006) Professor Emeritus, 2020, Mechanical Engineering

Jerry Beehler (1969) Professor Emeritus, 2005; Mathematics

Ann Benson (1985) Professor Emeritus, 2018; Science

John Berger (1983) Professor Emeritus, 1994; Business Administration

Jean Deller (1989) Professor Emeritus 2018; Education

Arthur E. Eberhardt (1952) Professor Emeritus, 1990; Electrical Engineering

Carl H. Elliot (1974) President Emeritus, 1983

Satish Goyal (1979) Professor Emeritus, 1987; Civil Engineering

Albert Guilford (1957-59, 1961-62, 1963, 1967) Professor Emeritus, 2005; Civil & Envir. Engineering

Karen Hamilton (2007) Professor Emeritus, 2016; Education

Roger Hawks (1977) Professor Emeritus, 2009; Mechanical & Aerospace Engineering

William W. Hill (1961) Professor Emeritus, 1993; Mechanical & Aerospace Engineering

Peter Hippensteel (1964) Professor Emeritus, 2005; Biology

Joan Karbach (1994) Professor Emeritus, 2006; English

Leo F. Kuhn (1961) Professor Emeritus, 1992; Engineering Graphics

Sushil Kumar (1981) Professor Emeritus, 2005; Civil & Environmental Engineering

Richard Kruger (1965) Associate Professor Emeritus, 2006; Mathematics

Donald Jones (1996) Professor Emeritus, 2019; Communication

Michael J. Lesiak (1967) Associate Professor Emeritus, 2004; Accounting

William Maddock (1998) Professor Emeritus, 2019; Sport Management

Dan Matthews (1983) Professor Emeritus, 2020; Informatics

Kenneth Meeks (1997-2008) Professor Emeritus, 2008; Civil Engineering

William Meyers (1964-66, 1972-76, 1983) Professor Emeritus, 2005; Aero. & Mechanical Engineering

Derald Moore (1968) Professor Emeritus, 1998; Social Sciences

John E. Morin (1966) Professor Emeritus, 2004; Social Sciences

Edward Nagle (1967) Professor Emeritus 2008; Department of Technology

Aldo R. Neyman (1986) Professor Emeritus, 1999; Business Administration

Dennis Petrie (1975) Professor Emeritus, 2010; Language & Humanities

Chester A. Pinkham (1967) Professor Emeritus, 2002; Chemistry

R. John Reynolds (1993) President Emeritus, 2000

Richard A. Ruselink (1966) Associate Professor Emeritus, 2004; Mathematics

Majid Salim (1984) Professor Emeritus, 2019; Chemical Engineering

Jeanine Samuelson (1986) Professor Emeritus, 2016; English

Lawrence Samuelson (1983) Professor Emeritus, 2010; Electrical & Computer Engineering

William R. San Giacomo (1965) Professor Emeritus, 2012; Golf Management

VK Sharma (2008) Professor Emeritus, 2015; Engineering

Leonard E. Sheffield (1966) Professor Emeritus, 1998; Business Administration

Sally Simpson (1995) Professor Emeritus, 2014; Education

Alan R. Stoudinger (1962) Professor Emeritus, 2003; Electrical & Computer Engineering

Frank Swenson (1982) Professor Emeritus, 1998; Mechanical Engineering

David Syler (1968) Professor Emeritus, 2009; Mathematics

Dolores Tichenor (1967) Professor Emeritus, 2010; Mathematics

Thomas Tierney (1974) Professor Emeritus, 2013; Language & Humanities

Debra VanRie (1991) Professor Emeritus, 2019; Mathematics

Suzanne Van Wagner (1983) Professor Emeritus, 2012; Education

William J. Walter (1972) Professor Emeritus, 1993; Business Administration

Kathie Wentworth (1993) Professor Emeritus, 2018; Academic Support Services

Robert Whelchel (1969-72, 1974) Professor Emeritus, 2008; Electrical & Computer Engineering

James Zimmerman (1973) Professor Emeritus, 2005; Arts & Sciences



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