

TRINE UNIVERSITY GRADUATE PROGRAMS

MASTER OF ENGINEERING

- **BIOMEDICAL MAJOR**
- **CIVIL ENGINEERING MAJOR**
- **MECHANICAL ENGINEERING MAJOR**

MASTER OF SCIENCE WITH A MAJOR IN CRIMINAL JUSTICE **

MASTER OF SCIENCE IN LEADERSHIP **

**see SPS Catalog for degree information

http://www.trine.edu/adult_students/resources/documents/SPS2010_2012CourseCatalogTrineGeneralInformation_Section_1_05_2011.pdf

GRADUATE POLICIES

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.

ADMISSION REQUIREMENTS

Students seeking to enroll in graduate studies must have:

1. A bachelor's degree from a regionally-accredited institution in an appropriate academic field, **or**
2. a bachelor's degree from a regionally accredited institution in a related field and significant major-specific professional experience, **or**
3. a bachelor's degree from a non-regionally accredited institution in an appropriate or related field and GRE test scores of 475 verbal and 600 quantitative or higher. (A GMAT score of 570 or higher may substitute for the GRE at the discretion of the department chair, program director, or dean.)

Applicants whose native language is not English must provide evidence of a minimum score of 550 on the paper-based TOEFL, 79 on the Internet-based TOEFL, or 6.5 on the International English Language Testing System (IELTS).

Admittance to any graduate program is valid for one year from the time of admission to enrollment.

STUDENT CLASSIFICATIONS

1. Dual Undergraduate/Graduate

Dual 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 Technology. These students will be changed to graduate status after earning 132 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 BS degree when the BS requirements are met. Students will be awarded each degree upon completion of its respective degree requirements.

2. Graduate

Prospective graduate students are required to submit a completed Graduate Application, official academic transcripts from every previous undergraduate and graduate institution attended (except Trine University), and supplemental admission materials as required by the department or program in order to be considered for admission into graduate programs.

Transcripts of 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.

One of the following conditions must be met to enroll in graduate coursework:

1. An undergraduate grade point average of 3.0 or greater **or**
2. Permission for admission as a conditional graduate student as be approved by the program chair/director and dean as follows:

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 1-page narrative describing challenges or extenuating circumstances that led to the student earning less than 3.0 GPA in undergraduate work. Students must include a description of specific strategies they will use to ensure academic progress within the graduate degree program.
- An additional letter of recommendation from a professional colleague who can address the applicant's situation and potential for success.
- The applicant's resume or vita indicating positions held that demonstrate task commitment, knowledge and skill relevant to the applicable course of study.

Upon receipt of the all materials, the application will be reviewed by the department chair/program director and a recommendation will be made to the dean for conditional

admission. Students admitted conditionally will become graduates 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.

3. Special Graduate Student

Special Graduate Student status is 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 nominal rate is charged per credit hour. For special graduate students who are non-degree seeking, full tuition will be charged.

All graduate admission decisions must be reported once each semester to the assistant vice president for graduate studies.

ACADEMIC RESIDENCY/TRANSFER CREDIT

A maximum of 6 semester hours of graduate course credit completed at other graduate schools may be counted toward completion of the Master's 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 the master's degree.

The final 15 credits of a master's degree must be taken at Trine University unless a waiver is granted by the academic dean upon recommendation of the program chair/director.

For the five-year engineering programs, students holding senior class standing may take up to 6 credit hours in the graduate program with the approval of the program coordinator, and if: (1) these credits were not applied to the undergraduate degree, (2) the credits were earned in designated graduate courses, and (3) a grade of B or better was earned in the course.

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.

CREDIT BY EXAMINATION

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

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
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.	

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 satisfactorily completed the vast majority 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 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 year from the end of the 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.

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 grade-point averages. All entries remain a part of the student’s permanent academic record.

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 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.

ACADEMIC STANDING

Students whose cumulative GPA drops below a 3.0 will be dismissed from Trine University. A student who is dismissed may apply for readmission immediately by contacting the Registrar 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.

GRADE APPEALS

The awarding of grades is the prerogative of the classroom instructor in accordance with policies posted in the Trine University Catalog. 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 due to miscalculation or clerical error, the error should be reported to the Registrar immediately on the prescribed form. The appropriate program chair/director must approve any adjustment of grades.

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

- Approach the professor and explain the problem.
- If the professor and student do not come to an agreement, the student should write a letter to the program director/chair.
- If the program director/chair's mediation does not resolve the issue, the student should file a written appeal to the Dean.

If these steps do not resolve the problem, or if impractical, the student may petition the Grade Review Board in writing for a hearing of the issue. Information regarding this may be obtained from the Vice President for Academic Affairs. The petition shall set forth in detail the basis for the review. This should be done by the midterm of the first regular term following the assignment of the grade. The Board may grant an extension of this time limit. If the Board agrees to hear the case, it will so inform the student by the end of that term. In grade review cases, the student is responsible for presenting evidence to support his/her position.

At the Grade Review Hearing, the student shall present his/her argument followed by the professor's response. The Board shall promptly prepare a written recommendation and forward copies to all parties involved, including the Chairperson and Vice President for Academic Affairs. The report shall include dissenting opinions on the Board, if any. Recommendations of the Board are advisory. In cases involving death, incapacity, or prolonged inaccessibility of the professor, or in similar unusual circumstances, the professor's immediate supervisor is responsible for assigning the grade. Records of each

case heard by the Board shall be maintained in the office of the Vice President for Academic Affairs. If the student or professor involved wishes to appeal the decision on procedural grounds, he/she should file an appeal within two working days for the decision with the Vice President for Academic Affairs. If any procedural irregularities are discovered, he/she will notify the student and the Board within ten working days after the appeal.

The Vice President for Academic Affairs shall appoint the faculty members who will serve on the Board. He shall choose one regular member and one alternate (who will be from a different department, if possible) from each school. In addition, the Student Senate shall elect two student members and their alternates. Student members must have junior or senior standing. The faculty members shall serve three-year, staggered terms, and faculty members serving their third year will chair the committee. Student members shall serve one-year terms.

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 course work 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.

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.

ACADEMIC INTEGRITY

The University prohibits all forms of academic misconduct. Academic misconduct refers to dishonesty in examinations (cheating), presenting the ideas or the writing of someone else as one's own (plagiarism) or knowingly furnishing false information to the University by forgery, alteration, or misuse of University documents, records, or identification. Academic dishonesty includes, but is not limited to, the following examples: permitting another student to plagiarize or cheat from one's own work, submitting an academic exercise (written work, printing, design, computer program) that has been prepared totally or in part by another, acquiring improper knowledge of the contents of an exam, using unauthorized material during an exam, submitting the same paper in two different courses without knowledge and consent of professors, or submitting a forged grade change slip or

computer tampering. The faculty member has the authority to grant a failing grade in cases of academic misconduct as well as referring the case to Student Life.

PLAGIARISM

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 will result in an F for that assignment. 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), will at least result in an F for that assignment and could result in an F for the course.

DEGREES

An "Intent to Graduate" form obtained through the Registrar's office 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 5 years.

TRANSCRIPTS

A hold may be applied to the release of a transcript or other information requested from an academic record for a student who has an overdue indebtedness to the University.

A current student may obtain a maximum of five unofficial (personal) copies of his or her Trine University transcript at no charge while attending the University. All official transcripts which bear the registrar's signature and school seal are available at an additional cost. Additional unofficial transcripts are also available at additional cost.

RELEASE OF STUDENT INFORMATION

To ensure compliance with the federal government's Family Education Rights and Privacy Act (FERPA), the following general principles and procedures govern the release of information from student academic records.

A written request signed by the student whose name appears on the transcript and that contains information such as date of birth and/or the Trine University student identification number, is required before a University transcript or other information from the student's academic record may be released. Trine University will not release copies of transcripts from another institution. Exceptions to the above statements are outlined in the following paragraph:

- The Office of the Registrar may release transcripts or information from academic records including reports of academic standing to administrative and faculty members of Trine University whose responsibilities require this information.
- Public directory information from student records may be released at any time unless restricted by the student. This includes the student's name, local and permanent addresses and telephone numbers, e-mail address date and place of birth, major field of study, class year, participation in officially recognized activities

and sports, weight and height of athletic team members, dates of attendance, degrees, awards received, and photographs.

- Information pertaining to graduation and honors achieved may be released for publication unless otherwise restricted by the student.

Upon proper identification, a student will be shown the following:

- His or her Trine University permanent academic record, including the student's file and transcript.
- His or her transcripts from another institution.

SEMESTER HOUR LOAD

The semester course load of a full-time graduate student is 9 hours. The maximum load for a full-time student is 12 credits in any fall or spring semester or combined summer sessions. Any course load greater than 12 credit hours must be approved by the assistant vice president for graduate studies upon the petition of the school dean.

MASTER OF ENGINEERING

The rapid pace of technological advancement has resulted in a demand for engineers with advanced training. There is growing support for the concept that the master's degree should be the first professional degree for the practice of engineering. A proposal to require one year of education beyond the bachelor's degree for registration as a Professional Engineer is now being considered in many states. Engineers with the skills necessary to lead the design of a complex system are highly sought by industry. By emphasizing advanced design skills rather than research, the Master of Engineering program addresses this need.

ADMISSION REQUIREMENTS

Students seeking to enroll in graduate studies must have:

4. A bachelor's degree from a regionally-accredited institution in an appropriate academic field, *or*
5. a bachelor's degree from a regionally accredited institution in a related field and significant major-specific professional experience, *or*
6. a bachelor's degree from a non-regionally accredited institution in an appropriate or related field and GRE test scores of 475 verbal and 600 quantitative or higher. (A GMAT score of 570 or higher may substitute for the GRE at the discretion of the department chair, program director, or dean.)

Applicants whose native language is not English must provide evidence of a minimum score of 550 on the paper-based TOEFL, 79 on the Internet-based TOEFL, or 6.5 on the International English Language Testing System (IELTS).

STUDENT CLASSIFICATIONS

1. Dual Undergraduate/Graduate

Dual 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 Technology. These students will be changed to graduate status after earning 132 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 BS degree when the BS requirements are met. Students will be awarded each degree upon completion of its respective degree requirements.

2. Graduate

Prospective graduate students are required to submit a completed Graduate Application, official academic transcripts from each previous undergraduate and graduate institution attended (except Trine University), and supplemental admission materials as required by

the department or program in order to be considered for admission into a graduate program.

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.

One of the following conditions must be met to enroll in graduate coursework:

3. An undergraduate grade point average of 3.0 or greater *or*
4. Permission for admission as a conditional graduate student as approved by the program chair/director and dean as follows:

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 1-page narrative describing the challenges or extenuating circumstances that led to the student earning less than 3.0 GPA in undergraduate work. Students must include a description of specific strategies they will use to ensure academic progress within the graduate degree program.
- An additional letter of recommendation from a professional colleague who can address the applicant's situation and potential for success.
- The applicant's resume or vita indicating positions held that demonstrate task commitment, knowledge and skill relevant to the applicable course of study.

Upon receipt of the all materials, the application will be reviewed by the department chair/program director and a recommendation will be made to the dean for conditional admission. A students 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.

3. Special Graduate Student

Special Graduate Student status is 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.

ACADEMIC RESIDENCY/TRANSFER CREDIT

A maximum of 6 semester hours of graduate course credit completed at other graduate schools may be counted toward completion of the master's 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 the master's degree.

The final 15 credits of a master's degree must be taken at Trine University unless a waiver is granted by the academic dean upon recommendation of the program chair/director.

For the five-year engineering programs, students holding senior class standing may take up to 6 credit hours in the graduate program with the approval of the program coordinator, and providing: (1) these credits were not applied to the undergraduate degree, (2) the credits were earned in designated graduate courses, and (3) a grade of B or better was earned in the course.

GRADUATION REQUIREMENTS

The Master of Engineering degree requires 30 semester credits. A student can choose a capstone-course option, requiring 27 credits of approved course work and a 3 credit capstone project, or a design-project option, requiring 24 credits of approved coursework and 6 credits of design work.

A full-time student will normally complete the program in twelve months.

Students must have a 3.0 cumulative GPA and carry a "C" or better in all courses to qualify for graduation. Students whose cumulative GPA drops below a 3.0 will be dismissed from Trine University. A student who is dismissed may apply for readmission immediately by contacting the Registrar 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.

BIOMEDICAL ENGINEERING MAJOR

MISSION AND OBJECTIVES

The biomedical engineer requires the analytical tools and broad understanding of modern engineering and science, fundamental understanding of biological or physiological systems, and familiarity with recent technological innovations. Biomedical engineers seek to improve human health through advances in healthcare and medicine. This includes advancing the understanding of prevention, diagnosis, and treatment of human injury, disease, and the health complications associated with aging. Yet, despite dramatic advances in medicine and biology during the past two decades, most of these achievements have not yet led to any substantial improvement in human health. Addressing this problem constitutes a major challenge for biomedical engineers of the present generation, and for those of future generations as well.

The difficulty in translating advances in biomedical research to improved healthcare is due, in large part, to the dramatic shift in the character of healthcare problems in industrialized nations. Chronic illness, rather than acute injury and disease, is now the dominant issue in healthcare, consuming the vast majority of healthcare dollars, personnel, and facility usage. This situation will be exacerbated in coming decades as the population ages. As a result, improvements in our ability to prevent, diagnose, and treat chronic illness has become the primary focus of the national healthcare agenda. Accordingly, the mission of the biomedical engineering program is to prepare graduate engineers to face these new twenty-first century challenges, to initiate and foster collaboration in biomedical engineering education and in design and development, and to promote technology transfers and regional economic growth in the biomedical industry.

The goals of the graduate program in biomedical engineering are: to provide graduates with the broad skills necessary to make significant engineering contributions to medical and healthcare, to advance to leadership positions in the biomedical industry, and to provide service to society.

To meet these goals, the following objectives have been identified for the graduate program in biomedical engineering. A graduate of the Master of Engineering program with a Biomedical Engineering major shall be able:

1. to work professionally, at a leadership level, in applying engineering approaches to solve problems in medicine and/or biology;
2. to design, analyze, and test experimental processes for observing and discovering important structural and behavioral properties of physiologic systems, biological materials, or biomaterials;
3. to design, analyze, and test processes and products directed toward the prevention of injury or disease, or to enhance healing and/or quality of healthcare;
4. to clearly and effectively communicate design ideas and test results; and
5. to evaluate and implement engineering-oriented research and development in the biomedical sciences.

CURRICULUM

The Master of Engineering degree has a heavy design and/or testing emphasis. The Master of Engineering with a Biomedical Engineering major requires 30 semester credits. A student can choose a capstone-course option, requiring 27 credits of approved course work and a 3 credit capstone project, or a design project option, requiring 24 credits of approved coursework and 6 credits of design work. The design project will ideally involve industrial sponsorship.

BIOMEDICAL ENGINEERING MAJOR	30 HRS.
PROGRAM REQUIREMENTS	REQUIRED
HOURS	
BIOMEDICAL ENGINEERING CORE	12 HRS.
BME 5003 Principles of Biomedical Engineering	(3)
BME 5013 Applied Anatomy & Physiology	(3)
BME 5103 Musculoskeletal Biomechanics	(3)
BME 5203 Introduction to Biomaterials	(3)
BIOMEDICAL ENGINEERING ELECTIVES	9-12 HRS.
BME 5023 Biomedical Measurements & Instrumentation	
BME 5043 Finite Element Analysis	
BME 5113 Kinematics of Human Motion	
MAE 5583 Design of Experiments	
MATHEMATICS	3 HRS.
Any 400-level mathematics course.	(3)
CAPSTONE/DESIGN PROJECT	3-6 HRS.
BME 600X Capstone/Design Project	
TOTAL	30 HRS.

CIVIL ENGINEERING GRADUATE PROGRAM

MISSION AND OBJECTIVES

The mission of the civil engineering program at Trine University is to provide graduates with quality preparation for the practice of civil engineering, to provide graduates with opportunities to pursue graduate studies, and to provide technical and educational services to their profession and communities. To meet these goals the following outcomes have been identified for the graduate program in civil engineering. A graduate of the Master of Engineering program with a Civil Engineering major must have:

1. the ability to apply knowledge in the specialized areas of
 - A. **structural** engineering, or
 - B. **environmental** engineering,
2. the ability to understand business, management, and leadership fundamentals, and
3. the ability to clearly and effectively communicate design ideas in written and oral formats.

CURRICULUM

Program requirements draw from the American Society of Civil Engineers' Body of Knowledge report, which outlines the knowledge, skills, and attitudes of a licensed professional engineer. The degree requires 30 semester credits. A student can choose a capstone-course option, requiring 27 credits of approved coursework and a 3 credit capstone project, or a design-project option, requiring 24 credits of approved coursework and 6 credits of design work.

MASTER OF ENGINEERING – CIVIL ENGINEERING MAJOR

PROGRAM REQUIREMENTS

REQUIRED HOURS

STRUCTURAL ENGINEERING TRACK

30 HRS.

STRUCTURES GRADUATE COURSES

12 - 15HRS.

CE	5503	Advanced Structural Analysis
CE	5513	Structural Dynamics
CE	5523	Finite Element Methods
CE	5533	Advanced Solid Mechanics
CE	5553	Structural Design Loads
CE	5563	Structural Systems
CE	5593	Special Topics in Structural Engineering

ELECTIVES

9 HRS.

CE	4513	Advanced Steel Design
CE	4543	Prestressed Concrete Design

CE 4553 Timber Design
 CE 4563 Bridge Engineering
 CE 4703 Special Topics in Geotechnical Engineering
 CE 4713 Foundation Design
 CE 5573 Advanced Concrete Design
 MAE 5663 Materials Failure Analysis
 Or other engineering course approved by advisor.

PROFESSIONAL DESIGN ELECTIVE **0 - 3 HRS.**

Any course that is consistent with the student's professional goals and approved by graduate advisor.

CAPSTONE/DESIGN PROJECT **3 - 6 HRS.**

CE 590X CE Capstone/Design Project I

TOTAL **30 HRS.**

ENVIRONMENTAL ENGINEERING TRACK **30 HRS.**

ENVIRONMENTAL GRADUATE COURSES **12 - 15 HRS.**

CE 5103 Special Topics in Water and Wastewater Treatment
 CE 5113 Environmental Engineering Chemistry
 CE 5123 Solid Waste Management
 CE 5303 Advanced Hydrologic and Hydraulic Modeling
 CE 5313 Groundwater Hydrology and Contaminant Transport

ELECTIVE COURSES **9 HRS.**

CE 4113 Hazardous Waste Engineering
 CE 4123 Water Treatment Principles and Design
 CE 4133 Wastewater Treatment Principles and Design
 CE 4303 Open Channel Hydraulics
 CE 4313 Water Resources Engineering
 CE 4323 Engineering Hydrology
 CE 4333 Design of Water Distribution Systems and Sewers
 CHE 4033 Air Dispersion Modeling
 CHE 4043 Air Environmental Control
 CHE 4073 Biochemical Engineering
 CHE 4083 Plant Management

Or other engineering course approved by graduate advisor.

PROFESSIONAL DESIGN ELECTIVE **0 - 3 HRS.**

Any course that is consistent with the student's professional goals and approved by graduate advisor. (3)

DESIGN PROJECT **3 - 6 HRS.**

MECHANICAL ENGINEERING GRADUATE PROGRAM

MISSION AND OBJECTIVES

The mission of the mechanical engineering program at Trine University is to enable graduates to become productive engineers, to advance to leadership roles in the profession, and to provide service to society. To meet these goals the following outcomes have been identified for the graduate program in mechanical engineering. A graduate of the Master of Engineering program with a Mechanical Engineering major must have:

1. the ability to work professionally, at a leadership level, in the areas of both thermal and mechanical systems design;
2. the ability to integrate technical knowledge, through trade-off studies, leading to a complex engineering design, with consideration of economic, manufacturability, sustainability, safety, and environmental concerns;
3. the ability to communicate design ideas clearly and effectively; and
4. the ability to evaluate and implement engineering design solutions.

CURRICULUM

The Master of Engineering degree has a heavy design emphasis, as opposed to the research emphasis of a Master of Science degree. The degree requires 30 semester credits. A student can choose a capstone-course option, requiring 27 credits of approved coursework and a 3 credit capstone project, or a design-project option, requiring 24 credits of approved coursework and 6 credits of design work.

MASTER OF ENGINEERING MECHANICAL ENGINEERING MAJOR PROGRAM REQUIREMENTS

**30 HRS.
REQUIRED HOURS**

MECHANICAL ENGINEERING GRADUATE CORE

12 HRS.

MAE	5213	Advanced Heat Transfer	(3)
MAE	5223	Introduction to Computational Fluid Mechanics	(3)
MAE	5433	Mechanism Synthesis	(3)
MAE	5543	Advanced Machine Design	(3)

MECHANICAL ENGINEERING GRADUATE ELECTIVES

6 - 9 HRS.

MAE	5753	Computer Integrated Manufacturing
MAE	5663	Materials Failure Analysis
MAE	5473	System Dynamics and Control
MAE	5583	Design of Experiments

MATHEMATICS

3 HRS.

Any 400 level mathematics course.

(3)

BUSINESS

One 500 level course selected from the Ketner School of Business
with approval of the graduate advisor.

3 HRS.

(3)

CAPSTONE/DESIGN PROJECT

MAE 600X Mechanical Engineering Graduate Project

3- 6 HRS.

TOTAL

30 HRS.
