Department of Mechanical Engineering

GRADUATE STUDENT HANDBOOK

This guidebook contains graduate school and mechanical engineering department graduation requirements as well as department policies. Although this guidebook is intended to be a common source for all information, it is ultimately student's responsibility to verify graduation requirements and necessary deadlines. Questions or suggestions on the guidebook's content should be directed to the Chair or Director of Graduate Program.

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1. ADMISSION REQUIREMENTS

Admission to the Mechanical Engineering MS and Ph.D. programs is subject to the requirements of the Texas Tech University Graduate School. Complete details regarding admission may be obtained from: *https://www.depts.ttu.edu/gradschool/admissions/howtoapply.php*

2. UNIVERSITY ACADEMIC REGULATION

ME Department complies unconditionally with the university's regulations. The details of the University Academic Regulation can be found at: https://www.depts.ttu.edu/gradschool/academic

Requirements for graduate enrollment are outlined in TTU OP 64.02. Below we summarize important details and provide additional rules/recommendations for ME.

2.1 Full-time study & residency

	MS Student (min - max)	Ph.D. Student (min - max)
Spring	9 – 16	9 – 13
Fall	9 – 16	9 – 13
Summer I	3 – 6	3 – 6
Summer II	3 – 6	3 – 6

a. Minimum credits for both Spring and Fall semesters are required for all graduate students
b. Supported students (see section 8.1) must take the minimum number of credits in all semesters (Spring, Fall, Summer 1, and Summer 2
c. Students who fail to register when required without an official leave of absence are subject to review for readmission by the standards in effect at the time of reconsideration
d. Exceptions for full-time employment require approval by the Graduate Dean.

The number of hours for which students must enroll in each semester depends on their level of involvement in research and their use of university facilities and faculty time. Students in residence who are devoting full time to research should enroll for 9 to 12 hours.

2.2 Required thesis/dissertation hours & Continuous Enrollment

Once a student has started their thesis/dissertation research, the following requirements must be followed.

a. Enroll in 6000/8000 courses
    1. At least 6 hours of 6000 is required for the master's thesis
    2. At least 12 hours of 8000 is required for a doctoral dissertation.
    3. Course should be under the supervision of committee chairperson
    4. Can be supervised by other committee members directly involved in research
    5. May not enroll in 6000/8000 courses before formal admission to a degree program
b. Maintain continuous enrollment by registering for 6000/8000 courses in each regular semester and once each summer until degree requirements are completed
    1. Off-campus students may register for 1 hour of 6000 or 8000 with departmental approval until their final semester, at which time they enroll for at least 3 hours.

2.3 Maximum allowable graduate hours

Students not making timely progress toward completion of the doctoral degree are subject to termination by the graduate dean.

Doctoral program

The Texas Legislature has capped fundable graduate study at 99 doctoral hours.

a. Students with more than 99 doctoral hours will pay out-of-state tuition
b. The maximum time allowed for completing the doctoral degree is EIGHT years from the first doctoral semester or FOUR years from admission to candidacy, whichever comes first. The graduate dean must approve exceptions or extensions in advance.

Non-doctoral programs

c. Students beyond the maximum allowable graduate hours as determined by the Texas Legislature may be required to pay out-of-state tuition, regardless of residence status.
d. The maximum time allowed for completing a master's degree is six years.
e. The graduate dean must approve exceptions or extensions in advance.

2.4 Registration in the semester of graduation

There are three official graduation dates: December, May, and August.

a. Every candidate must be registered in the Graduate School in the session of graduation.
b. Non-thesis/dissertation students must register for at least 1 hour of non---thesis coursework if all other requirements are met.
c. Students pursuing a thesis/dissertation must register for at least 3 hours of 6000/8000 course in semester of their graduation.
d. Failure to graduate at expected time requires satisfying continuous enrollment in following semester
e. A new "Statement of Intention to Graduate" is required for each semester.

2.5 Leave of absence

Official leave of absence, which is granted by the dean of the Graduate School upon departmental recommendation, may be requested only in case of serious medical conditions and other exceptional reasons.

a. Normally, leaves of absence will not exceed one year.
b. Leaves of absence do not extend the maximum time allowed for completion of the degree.
c. Students unless granted an official leave of absence from the program for medical or other exceptional reasons.

3. ACADEMIC PROBATION AND SUSPENSION

Policies regarding academic probation are outlined in OP 64.04.
In brief, every student enrolled in the Graduate School, whether working toward a degree or not, is required to maintain a high level of performance and to comply fully with the policies of the institution. The Graduate School reserves the right to place on probation or to suspend any post---baccalaureate or graduate student who does not maintain satisfactory academic standing or who fails to conform to the regulations of the university. These include

a. Academic probation for student's whose cumulative GPA falls below 3.0 are placed on academic probation and have two consecutive semesters to raise their cumulative GPA
b. Suspension for one semester for a student who fails to raise their GPA during academic probation or for unprofessional conduct such as cheating or plagiarism
c. Dismissal for continued unsatisfactory performance.
d. In accordance with OP 64.07, any student who has been suspended may appeal

The mechanical engineering program has additional standards and review procedures for probation, suspension, and dismissal outlined in this handbook.

4. COMMON POLICIES FOR ALL GRADUATE DEGREES

Outlined below are common policies for all Mechanical Engineering graduate students.

4.1 ME Concentration Areas

In both the PhD and Masters curriculum, students are required to take courses in specific ME Concentration areas. Those areas and classes that satisfy the requirements are listed below

a. Materials and Mechanics: ME 5340 Elasticity, ME 5342 Fracture and Failure Analysis, ME 5343 Contact Mechanics of Engineering Materials, ME 5345 Computational Mechanics I, ME 5337 Mechanics of Nanomaterials, ME 5358 Biomaterials
b. Thermo/Fluids and Heat Transfer: ME 5321 Thermodynamics, ME 5322 Conduction Heat Transfer, ME 5325 Convection Heat Transfer, ME 5326 Combustion, ME 5327 Advanced Heat Transfer, ME 5335 Mathematical Models of Turbulence, ME 5336 Computational Fluid Dynamics, ME 5338 Advanced Fluid Mechanics, ME 5360 Bio-Fluid Mechanics
c. Dynamics and Controls: ME 5311 Advanced Dynamics, ME 5312 Control Theory I, ME 5313 Control Theory II, ME 5314 Nonlinear Dynamics, ME 5316 Advanced Vibrations, ME 5317 Robot and Machine Dynamics
d. Design: ME 5352 Probabilistic Design, ME 5356 Digital Human Modeling for Human-Centric Design, ME 5351 Advanced Engineering Design

4.2 Outside-department course

Although there is a possibility that a graduate student can take courses outside the ME department, please be advised that you need pre-approval to do so. Otherwise the course may not be counted as effective and helpful in your degree plan. Please consult your advisor or the graduate advisor before you register for any outside department course.

4.3 Graduate Seminar

One credit hour of graduate seminar (ME 5120) is required for all graduate students. Students register for this course in their first full-time graduate semester but must attend seminars throughout their entire academic career. Policies regarding attendance and grading are provided in the course syllabus which is found in Appendix?

4.4 Maximum allowable C’s

The department will permit only a single grade of C for courses listed on the Official Degree Plan. If a student earns two or more C's or any single grade less than C, he or she must meet with a group consisting of the Faculty Advisor, Advisory Committee, and the Department Graduate Advisor. This group will recommend appropriate action, which may include probation or suspension by the Department.

4.5 Degree plan

All graduate students are required to submit a degree plan during their first semester. Forms for the degree plan can be found here: https://www.depts.ttu.edu/me/grad/

4.6 Expectations of Faculty

Students should expect the faculty to be committed to creating a scholarly environment where effective learning and professional growth are enhanced. Actions toward this goal include but are not limited to the following:

a. providing opportunities in core courses for students to develop a graduate---level understanding of mechanical engineering principles
b. challenging and stretching students to achieve high standards of excellence
c. encouraging students to broaden their knowledge of mechanical engineering as well as to develop expertise in an area of research
d. including new technology areas in elective and core courses.

4.7 Conflict Resolution

It is possible that some conflict may develop between a student and a faculty member. This may include issues with a professor in a course they take, their faculty advisor, the professor teaching a course they TA, or many other unenumerated roles. Hopefully, such issues are of a small nature and can be worked out between student and faculty member. However, if such issues become significant, impacting either the student's or faculty members ability to perform their duties, the following procedures should be followed.

a. If the issue involves a student's TA/GPTI performance see section 7 if it involves a student's academic progress, or research progress see section 6.
b. Otherwise, the student/faculty member should first contact the student's faculty advisor and seek guidance or help in resolving the issue.
c. If the issue is not resolved or is between the student and their faculty advisor, any party involved may contact the associate chair of graduate studies to help resolve the issue.
d. The associate chair will conduct a meeting with all parties and attempt to help resolve any ongoing problems and find a mutually beneficial outcome.

5. M.S. DEGREE REQUIREMENTS

The MSME is a graduate degree requiring an additional 18 to 24 months of study beyond the undergraduate degree, BSME. General information of graduate requirements for masters degrees and steps for graduation can be found at:
https://www.depts.ttu.edu/gradschool/academic/MastersPrograms.php.
Below we present information specifically concerning the Master of Science in Mechanical Engineering (MSME).

5.1. Leveling Requirements

Students who have undergraduate/graduate degrees from technical disciplines outside mechanical engineering will be required to take leveling courses.

a. At a minimum these courses include,
    1. Six hours of thermal/fluid science courses (e. g. ME 3322, ME 3370, ME 3371)
    2. Six hours of mechanical science courses (e. g. ME 2311, ME 3331, ME 3433, ME 3464)
    3. Computational Methods (ME 2315)
    4. All undergraduate math courses in the BSME curriculum
b. If a student can show completion of equivalent courses in their undergraduate/graduate degree, they will count towards the leveling requirement.
c. Additional courses may be required depending upon the background of the student and will be assigned on a case by case by Associate Chair of Graduate studies and/or the student's Advisory Committee.
d. Leveling courses do not apply toward the requirements of the MSME degree.

5.2. MSME Common Requirements

To obtain the MS degree, you need to satisfy the Graduate Seminar requirements as well as the academic regulations mentioned above and following requirements.
Concentration Area
All masters students pursuing any option must select and designate a single concentration area from those listed in section 4.1. 9 credit hours of ME lecture courses must be taken in the chosen concentration area.
Breadth Area
All masters students must take an additional 6 credit hours in ME lecture courses outside their chosen concentration from any class listed in section 4.1.
Mathematics Courses
All report students are required to take 6 hours of advanced mathematics. The required courses should be selected from two different groups defined below,

a. ME 6330 Analysis of Vectors, Tensors, and Linear Systems
b. ME 5301 Analysis of Engineering Systems, MATH 5310 Principles of Classical Applied Analysis I
c. ME 5302 Numerical Analysis of Engineering Systems, MATH 5334 Numerical Analysis I, MATH 5311 Principles of Classical Applied Analysis II

Elective Courses
Each option will require a varying number of free graduate elective courses. These can be,

d. ME 5xxx and ME 6330 Advanced Topics in Mechanical Engineering
    1. If a 6330 class is converted to a ME 5xxx, a student cannot take both for credit
e. From engineering/science courses offered by other departments.
    2. Up to 1 non-technical course that may be approved if it is determined to be relevant for careers in engineering-related fields
f. Up to 3 hours of elective courses may be independent study.
g. If a student participates in a graduate internship/coop, 3 hours of ME 7000 may be included on their official degree plan to replace three hours of free elective.
    3. F-1 international students may not use a graduate internship/Co-op as graduate research, ME 7000, unless it is an integral part of the student's academic program and is stated so in writing by the student's academic advisor (per United States immigration regulations).
h. Courses not allowed in any MS degree plan: MATH 5360 Advanced Mathematics for Teachers I, MATH 5361 Advanced Mathematics for Teachers II, MATH 5366 Introduction to Analysis I, MATH 5367 Introduction to Analysis II, MATH 5368 Abstract Algebra Applied I, MATH 5369 Abstract Algebra Applied II, MATH 5370 History of Mathematics, MATH 5371 Topology of the Real Line I, MATH 5372 Topology of the Real Line II, MATH 5375 Modern Geometry I, MATH 5376 Modern Geometry II, MATH 5377 Applied Mathematics I, MATH 5378 Applied Mathematics II, STAT 5302 Applied Statistics I, STAT 5303 Applied Statistics II

Faculty advisor and advisory committee
Each graduate student must have a Faculty Advisor from the Graduate Faculty of the Mechanical Engineering Department to advise them on academic, thesis, or report matters. The Faculty Advisor will assist the student with the selection of a thesis or report topic and the courses needed to satisfy the requirements of the MSME degree

For Coursework option students, the Associate Chair of Graduate Studies will serve as the Faculty Advisor.

For students pursuing a report or thesis option, the Associate Chair of Graduate Studies may temporarily serve as the Faculty Advisor during the student's first semester in the master's degree program. Once the student finds a professor to act as their report/thesis advisor, this professor will act as their faculty advisor. Furthermore, these students must also assemble an Advisory Committee by the end of their second semester. This committee is,

i. Chaired by the Faculty Advisor
j. Composed of at a minimum 2 additional graduate faculty members for the thesis option or ONE additional for the report option.
k. Responsible for approval of the student's thesis/report.

Committee membership is formalized when the student files the Official Degree Program and Admission to Candidacy.

5.3 MSME Options

Currently, the Department offers the three master's program options: thesis option, report option and coursework option.

Coursework option

a. The coursework option requires a minimum of 30 hours consisting entirely of coursework.
b. In addition to the core, breadth, and mathematics courses, students must take an additional 15 hours of graduate level course work designated as free graduate electives.
c. Up to 3 hours of free elective courses may be substituted by graduate research ME 7000 not related to an internship or co-op on the official degree plan.
d. The MS course work only option requires a final examination to be administered/approved by the ME departmental Graduate Advisor. The exam will be geared on courses taken by the student toward the student's selected program. Coursework students should check with the Graduate Advisor regarding the format of the exam.

Report option

The master's report option includes writing and defending a substantial report to graduate.

e. The report option requires a minimum of 30 hours consisting
f. In addition to the core, breadth, and mathematics courses, students must take an additional 12 hours of graduate level course work designated as free graduate electives
g. Up to 3 hours of free elective courses may be substituted by graduate research ME 7000 not related to an internship or co-op on the official degree plan.
h. A master's report and defense are required for graduation when taking this option. The report should follow the guidelines below.
    1. When writing their report, the student must register for ME 6301 Master's report under the guidance of their advisor.
    2. The master's report is not as extensive as a thesis and may represent work other than original research.
    3. The report need not conform strictly to the Graduate School booklet, but rather to the individual requirements of the student's Faculty Advisor.
    4. A final approved copy of the report must be supplied to the Mechanical Engineering Department for archival purposes.
    5. The student must satisfy their committee by giving a formal report presentation that is open to faculty and students.
        i. Students are required to present a draft of the report one week prior to the presentation.
        ii. An announcement of the presentation must be given to the Department two weeks in advance of the presentation.

Thesis option

The thesis option requires writing and defending a thesis to graduate.

i. The thesis option requires a minimum total of 30 credit hours
j. Six hours of ME 6000 Master's Thesis must be taken
k. In addition to the core, breadth, and mathematics courses, students must take an additional 3 hours of graduate level course work designated as free graduate electives

l. No ME 7000 is allowed on the official degree plan unless it is via internship/Co-op, in which case 3 hours can be used in place of an elective.
m. In situations where the students' thesis is highly interdisciplinary the two breadth courses and the additional free elective may all be taken in other departments or colleges as needed with approval of the faculty advisor.
n. A master's thesis and defense are required for graduation when taking this option. The report should follow the guidelines below.
    1. The thesis represents the results of original and significant research work in Mechanical Engineering conducted by the student under the supervision of the Faculty Advisor and Advisory Committee.
    2. The written thesis must be submitted to the graduate school and approved by the students' Advisor and Advisory Committee.
    3. The thesis must be prepared and formatted in strict conformance with the requirements of the graduate school which can be found at the following link: https://www.depts.ttu.edu/gradschool/academic/thesis_diss/defend_format_submit/DefendFormatSubmit.php
    4. It is the student's responsibility to ensure that English usage is proper. Students are encouraged to employ assistance (typically students majoring in English) in correcting their thesis or report manuscripts prior to submittal to their Faculty Advisors.
    5. Students are required to defend their thesis in an oral presentation to their Advisory Committees
        i. A draft of the thesis must be provided to the Advisory Committee at least one week prior to the defense.
        ii. The date and place of the defense presentation must be advertised two weeks in advance of the defense and the presentation must be open to the public.
    6. Failure to follow these guidelines may delay graduation.

Distance Learning

A MSME is available via distance learning (https://www.depts.ttu.edu/coe/distance/MSME.php) The following policies apply to that program.

o. Only the coursework and project options are allowed. There is no online thesis option.
    1. The requirements for these 2 options are identical to those above.
p. Only the Materials and mechanics (section 4.1.a) and the Design (4.1.d) concentration areas are available as a focus area.
q. The seminar requirement (ME 5120) is not required for distance students.

6. Ph. D. Degree Requirements

The Ph.D. is a graduate degree requiring an additional 36-60 months of study beyond the undergraduate degree, BSME. The primary goal of a PhD student is to complete research leading to successful defense of a thesis dissertation. Therefore, students true measure of progress is not based on hours worked but progress made towards defense. It is awarded to students who have completed a program of graduate courses, a final examination, and a dissertation.
All Ph.D. student will have to balance multiple responsibilities that can include coursework, research, academic enrichment, teaching, and other responsibilities. The overall time spent is variable based on support mechanism, advisor, and project. It is expected that all Ph.D. students are spending at a minimum 50-60 hours/week on the sum of these activities.
General information of graduate requirements for Ph.D. degrees and steps for graduation can be found at:
https://www.depts.ttu.edu/gradschool/academic/Doctoral_Students.php
Below we present information specifically concerning the Ph.D. Below we present information specifically concerning a Doctorate in Mechanical Engineering.

6.1. Faculty advisor and advisory committee

Faculty advisor
Each graduate student must have a Faculty Advisor from the Graduate Faculty of the Mechanical Engineering Department to advise them on academic, thesis, or report matters. Most Ph.D. students who arrive at TTU mechanical engineering will already have an advisor assigned to them when arriving which will be made clear in the offer letter, they signed which outlined their acceptance, means of support (Section 8,1), and an advisor.
In some rare occasions, a new Ph.D. student may not have an advisor in their first semester. These students are advised by the Associate chair of graduate studies during their first semester. During this time, students should seek to find a Faculty Advisor with the faculty. Upon mutual agreement, the student should then report to the Department Graduate Student Advisor whom will be their faculty advisor by the end of the first semester of attendance.
Students should expect their faculty advisor to be committed to creating an environment where effective learning and professional growth are enhanced. Actions toward this goal include but are not limited to providing,

a. Opportunities for professional development
b. Opportunities to present at local, national, and international conferences
c. Advice to help achieve long term professional goals
d. Resources necessary to accomplish research project
e. Prompt and responsive feedback to work product
f. An environment conducive to research and free exchange of ideas

Advisory committee
Each student pursuing the Ph. D. program must also have an Advisory Committee to assist with academic and dissertation matters. This committee is

g. Chaired by the Faculty Advisor
h. Composed of a minimum of 3 additional graduate faculty members
    1. 2 ME faculty members

2. 1 external TTU graduate faculty
3. 1 Graduate Dean's representative.

This committee is responsible for the comprehensive examination and approval of the dissertation. This committee should be selected shortly after the student has selected a Faculty Advisor and prior to the end of the first year of attendance. Committee membership is formalized when the student files for admission to candidacy.

6.2 Research

To reiterate, no matter what mechanism of support the fundamental goal of a supported student is to conduct research related to the project to which they are assigned by their thesis advisor culminating in a dissertation of original research. The specifics of research duties will be communicated to the student by the faculty advisor and may include (but are not limited to) the following,

a. Conducting original research through experiment, simulation, or theoretical calculations as related to their research project
b. Taking responsibility for laboratory safety, maintenance, and training of new personnel
c. Self-educating through independent reading and literature search of academic journals
d. Academically challenging and stretching fellow graduate students and faculty by discussing their own work and other's work for the personal growth of themselves and others
e. Seeking expertise outside of your lab/advisor to achieve research goals
f. Continuously pursuing research goals and a deep understanding of both general mechanical engineering principles and their specific research area

Evaluation of Research Progress by Faculty Advisor
Continuation of support for all supported students depends upon the satisfactory performance of their assigned duties as well as their academic progress including both course work and research. Therefore, evaluation of research progression is essential. The following guidelines will be used by advisors for evaluation,

g. A meeting every semester, which should include the following…
    1. Setting goals for the upcoming semester in terms of tangible products and progress
    2. Discussion of achievement related to goals from the previous semester
    3. Outlining of areas where improvement is needed for the student
    4. Discussion of resources the student may need to achieve their goals more easily
h. Grade in courses related to research output such as ME 7000, 8000, or similar
i. Tangible research output including papers, conference presentations, etc…
j. The faculty advisor should document details of the discussion, grades, and products each semester

If a student fails to progress and meet faculty expectations as documented in semesterly meetings, the following process will occur,

k. A meeting will occur between student, faculty advisor, and associate chair of graduate studies
l. The advisor should provide documentation of where students have been struggling
m. The student should provide a response to such issues

n. The three participants will create a remediation plan for improvement. It should include,
    1. Specific goals
    2. Timeline for achievement
    3. Consequences
    4. Signatures of all 3 parties
o. If performance does not improve per the remediation plan, cessation of support by the department may occur.

6.3 Course work & Credit Hours requirements

a. The doctorate requires a minimum of 60 credit hours of course work and 12 hours of Research Credit at the doctoral level.
    1. A minimum of 36 hours of lecture courses and graduate seminar
    2. A minimum of 24 hours of ME 7000 typically with student's advisor
    3. A minimum of 12 hours of ME 8000
        i. A student must satisfy the rules for continuous enrollment as laid out in section 2.2.
        ii. Students should not register for ME 8000 courses until they have completed their Qualifying Exam section 6.5.
b. The lecture courses (6.3.a.a) with the following requirements:
    1. A student will be required to take 6 hours of math courses from 2 different groups outlined listed below completed in the first 2 semesters.
        i. ME 5301 Analysis of Engineering Systems, MATH 5310 Principles of Classical Applied Analysis I, or MATH 5311 Principles of Classical Applied Analysis II, ME 6330 Vectors and Tensor Analysis
        ii. ME 5302 Numerical Analysis of Engineering Systems, MATH 5334 Numerical Analysis 1, Math 5335 Numerical Analysis 2, STAT 5384 Statistics for Engineers and Scientists 1, Math 5385 Statistics for Engineers and Scientists 2, or CE 5310 Numerical Methods in Engineering
    2. 6 hours of courses from a single core concentration area listed in section 4.1 completed within the first 2 semesters.
    3. A total of 18 credit hours within the mechanical engineering department, which includes core concentration courses but excludes math requirements.
    4. The balance of remaining courses may be selected from mathematics, science, and engineering with the approval of the Faculty Advisor and Advisory Committee. All must carry graduate credit.
c. Students may transfer some credits from a masters degree to their Ph.D.
    1. Students transferring from the TTU ME Master's program can apply ALL graduate level credits to the ME Ph.D. degree.
    2. Students transferring from another graduate program can apply 6 graduate level courses (18 credit hours) maximum to Ph.D. Degree. The courses must be approved by the student's Faculty Advisor.

Leveling

Students with a bachelor's degree in a field other than mechanical engineering may be required to take undergraduate leveling courses in preparation for graduate studies in mechanical engineering. The leveling course requirements are determined by the Director of Graduate Studies upon the student's admission to the Ph.D. program.

6.4 Journal publication requirement

The department of Mechanical Engineering requires, as part of its PhD degree requirements, that all its PhD degree candidates have at least two journal publications prior to the defense of their PhD thesis.

6.5 Qualifying exam

The goal of this exam is to consistently evaluate PhD students research skills, critical thinking, and oral/written communication.

Timing

a. The exam should take place in the student 4th semester and after completion of core courses (2 core and Math)
b. The exact timing is left to the advisor, student, and committee

Committee Composition

The committee will consist of 5 faculty members.

c. The first 4 committee members are identical in composition to the PhD advisory committee
    1. Faculty advisor
    2. 2 ME faculty Members
    3. 1 External Faculty member or 1 Additional ME Faculty Member
d. The associate chair of graduate studies will be the 5th committee member.
    4. The role of the associate chair is to ensure consistency across exams, procedures are followed, and to act as the tie breaking vote.

Exam Format

e. 1 week prior to oral exam student will provide a thesis prospectus of no more than 2500 words (~ 5 single spaced pages) that describes and motivates their PhD Project it should contain the following items
    1. A statement on the topic of the research and explanation of its importance
    2. Concise review of literature
    3. Description of the hypothesis or question of the research
    4. Experimental methods and/or procedures
f. A 60-minute oral exam will be conducted.
    5. The student will present 20-minute on their research progress up to this point
    6. The committee will then have 40-minutes to question the student on topics…
        i. Related to their oral presentation and their prospectus
        ii. Of core mechanical engineering concepts relevant to the prospectus

Grading Criteria

g. Committee members will vote to either pass or fail the student based on the following criteria
    1. Demonstrated knowledge related to the topic of their prospectus

2. Ability to analyze and critical evaluate content in real time
3. Ability to provide answers clearly and succinctly

h. Passing shall be a majority vote of the committee
    4. In the case of a tie vote, the associate chair will act as tie breaker

Notification

i. Student's advisors will be notified by the graduate associate chair whether the student' passes or fails the exam.
    1. In the case of a failing result, the associate chair will provide written feedback from the committee to the student and their advisor.
j. The student's advisor will inform the student of their exam pass or fail and determine the next steps with the student.

Retake

k. All students are allowed to attempt a single re-take.
l. The students would be asked to completely redo the qualifier process in all formats.

Failure of Qualifiers.

1. Upon failing twice, the student will be asked to leave the PhD program in the ME department.

6.6 Research Proposal

The intent of the PhD Proposal is to demonstrate that the candidate understands the relevant scientific background, how the proposed research fits into the general field, and has original ideas for research to expand the 'state-of-the-art', bring in new information, or provide an original perspective on the central problem.

a. The Research Proposal should occur one year after passing the Qualifying Exam.
    1. The faculty advisor may request an extension in writing to the associate chair of graduate studies.
b. The candidate prepares a written Research Proposal covering the PhD project. It should include,
    1. An adequate search of the relevant literature
    2. Outline of work already accomplished
    3. Plans for proposed future work
c. The written research proposal must first be approved by the Advisor and then submitted to each Committee no less than ten (10) days before the date of the presentation.
d. The written proposal is then presented to the committee who are given time for questions.
    1. The oral presentation by the candidate must include questions from the Committee.
e. Immediately following the presentation, the Committee determines a pass/fail
    1. At the discretion the committee, the candidate may repeat the defense one additional time within one semester.

6.7 Dissertation and Final Oral Examination

The doctoral dissertation represents the results of original and significant research work in mechanical engineering conducted by the student under the supervision of the Faculty Advisor and Advisory Committee.

A dissertation is required of every candidate for a doctoral degree. This requirement is separate and apart from other requirements in doctoral programs; consequently, successful performance in other areas does not necessarily guarantee the acceptance of a dissertation.
For graduate school guidelines for the dissertation and oral presentation follow this link:
https://www.depts.ttu.edu/gradschool/academic/Doctoral_Students.php
ME requirements for written dissertation

a. The dissertation work as documented via Me 8000 courses must earn a grade of at least B in order to qualify the student for graduation.
b. The thesis must be prepared and formatted in strict conformance with the requirements of the graduate school which can be found at the following link: https://www.depts.ttu.edu/gradschool/academic/thesis_diss/defend_format_submit/DefendFormatSubmit.php
c. It is the student's responsibility to ensure that English usage is proper. Students are encouraged to employ assistance (typically students majoring in English) in correcting their thesis or report manuscripts prior to submittal to their Faculty Advisors.

Students must have a final public defense of their dissertation to their Advisory Committee. The following are the ME requirements for this presentation.

e. The defense is scheduled by the student and the advisory committee and must occur prior to the defense deadline during the semester of graduation.
f. A draft of the thesis must be provided to the Advisory Committee three weeks prior to the defense.
g. An announcement of the defense must be given to the Department three weeks in advance of the defense.
h. The required Defense Notification Form noting the time, place, and other information concerning the examination is available on the web site: https://www.depts.ttu.edu/me/grad/phd/index.php
i. The advisory committee and the graduate dean or a professor designated to act in place of the graduate dean conduct the examination.
j. All members of the committee participate fully in the examination and cast a vote.
k. Professors, student and other audience members other the committee may participate in the examination but have no vote in determining the outcome.
l. At the conclusion of the examination, the chairperson of the advisory committee will send a written notice to the Graduate School giving the result of the examination.

7. Supported Students Responsibilities

The following policies below apply to all students supported by any mechanism (section ????) within the Department of Mechanical Engineering at Texas Tech University. These policies are in addition to college/university OPs. Where there may be conflict between written policy in the graduate handbook and university/college OP, the OP supersedes policy here.

7.1 Teaching Assistants

Eligibility

General eligibility for a TA or outlined in OP 64.03.

a. English proficiency is evaluated by the ITA program.

Course Assignment

Students will be assigned a course to TA on a semester-by-semester basis. Assignments will be made by the departmental leadership committee. Assignments will be based on several factors including,

b. Student's area of expertise
c. Number of sections/students in courses
d. Teaching needs
e. Student's previous TA/GPTI experience

When assigning a TA to multiple sections, the department will attempt to have them assigned to multiple sections of the same course whenever possible.

Workload

f. A full time TA workload toward teaching responsibilities is 20 hours/week.
    1. If partially supported through other means, total hours are adjusted equivalently (i.e. 0.5 TA is responsible for 10 hours/week).
    2. If assigned to multiple classes, the total workload is evenly divided amongst those classes and/or professors teaching those classes based on the total number of students in all sections. i.e.
        i. If sections have roughly equivalent numbers of students a TA's time would be divided evenly amongst those sections.
        ii. If a TA was assigned to 3 sections and 1 had 2x as many students as the other 2, the TA's hours would be weighted such that ½ their time would be allocated to the larger section and ¼ each to the smaller ones.

g. Workload hours are allocated on a weekly basis.
    1. Hours are not bankable or accrued over time.
        i. A TA only who only works 1 hour in a particular week does not have an additional 19 hours that can be used at a later time.
    2. TA's should never be asked and will not work extra hours beyond their total workload.
    3. However, an IOR may save up to 25% of the hours allotted to them from one week to use the very next week.
        i. Such occasions should be infrequent and not regularly scheduled.
        ii. The TA should be provided at least 1 weeks' notice before such an event

TA responsibilities.
The general role of the TA is to assist the instructor of record in managing an assigned course. The TA should report to the professor/instructor in charge of their assigned course one week before the course begins. At this time, they will be informed of the general expectations and guidelines for the course.

Each week the professor/instructor of record will contact the TA and set specific duties for them to accomplish. It is the responsibility of the instructor of record/supervisor to create a manageable workload for the TA and not exceed the TA's allocated hours for that section. Instructors should take care to estimate how long a specific task should take. For example, a single section of 45 students with a homework that takes ~5 minutes to grade is 3h45m of work.

Which specific tasks are assigned to the TA are the prerogative of the instructor of record for the assigned course. The following guidelines detail acceptable TA responsibilities

The following tasks are required of TAs, but not considered part of the hourly workload,

h. Graduate students are assumed to be familiar with fundamental ME undergraduate courses
    1. Reviewing basic concepts does not count towards their TA workload hours
    2. If a TA chooses to attend class to review material on their own accord, this also does not count towards their workload hours.
i. Maintaining close communication with the professor in charge via email and short meetings to outline needed activities
j. Maintaining and providing a log of worked hours so instructor of record can evaluate performance (if requested)

Any or all of the following activities are reasonable requests of a TA and count towards their weekly workload.

k. Preparation to learn a specific, non-fundamental skill. This may include,
    1. Learning to use unfamiliar software
    2. Learning to operate a specific tool/equipment
    3. Learning content for higher level/specialty classes such as electives or advanced courses not typically taught at most schools
l. Grading laboratory reports, homework assignments, projects, quizzes, etc…
    1. Instructors of record should provide a grading rubric and review TA's work to ensure consistency and correctness if the TA does not meet the requirements to be an instructor of record as set out below.
m. Grading multiple choice exams
n. Preparing notes for discussion sessions
o. Running discussion sessions
p. Running extra review sessions
q. Providing office hours
r. Creating solution sets
s. Attending classes
t. Creating content for online resources such as help videos, review problems, etc…
u. Adding specific content to an online resource
v. Maintaining course grade sheet or inputting specific grades into online grade book

w. Conducting a lecture in the absence of the instructor of record
    1. This should only be occurring if faculty members are temporarily off campus due to scheduled work-related travel or emergency

The following activities should not be asked of any TA,

x. Grading of entire exams, large sections of exams, or a large number of exams should be left to GPTI's and/or instructors
y. Regularly teaching class
z. Running or creating online class portals
aa. Acting as IT support for the faculty member online resources...i.e. if a faculty member is unsure of how to implement something on blackboard (or similar sites) they should not attempt to have the TA solve this problem or figure out how achieve this.

Evaluation and Management of TA

TA's performance will be evaluated every semester using the following resources:

bb. The relevant supervisors will be provided with a TA evaluation form to give both numerical feedback and/or specific comments on a TA's performance.
cc. Reports of TA misconduct/issues provided to the department via the dean of students.
dd. Direct complaints of performance to either the Department Chair or the Director of graduate studies.

If a semester evaluation of a student indicates significant deficiencies or direct complaints indicate the need for immediate action, the following will occur,

ee. A meeting will occur between student, faculty advisor, and associate chair of graduate studies
ff. The associate graduate chair will provide the documentation that indicates the student is underperforming in their duties.
gg. The student and advisor can provide a response/explanation.
hh. The three participants will create a remediation plan for improvement. It should include,
    1. Specific goals
    2. Timeline for achievement
    3. Consequences
    4. Signatures of all 3 parties
ii. If performance does not improve per the remediation plan, cessation of support by the department may occur.

7.2 Graduate Part Time Instructor

Eligibility

General eligibility for a GPTI is outlined in OP 64.03 and 32.36

a. English proficiency which is evaluated by the ITA program.
b. GPTI's must have completed at least 18 hours of graduate work or have a MA's in the field they teach.

Course Assignment

Students will be assigned a course to GPTI on a semester-by-semester basis. Assignments will be made by the departmental leadership committee. Assignments will be based on several factors including,

c. Student's area of expertise
d. Number of sections/students in courses
e. Teaching needs
f. Student's previous TA/GPTI experience

Workload

A full time GPTI workload toward teaching responsibilities is 20 hours/week.

g. For a GPTI, a 3 credit class is considered 10 hours of work (~3 hours teaching in the classroom and ~7 hours of work outside the classroom)

GPTI Responsibilities

GPTI's are assumed to be familiar with fundamental ME undergraduate courses due to the eligibility requirements to be a GPTI. Therefore, general review of material are not considered part of their weekly workload. The following activities are considered part of their work load,

j. Creating and providing a syllabus for the course
k. Creation of all in class lecture content, handouts, homework, tests, etc.…
l. Grading of all lab reports, homework, assignments, etc.…
m. Communicating with instructor of record in the case that a GPTI is primary instructor
n. Holding office hours

The above activities are not an exhaustive list, and a GPTI may perform other activities in their role as a primary instructor of record. Therefore it is important to note that the primary responsibility of a GPTI is to successfully orchestrate and manage a class for an entire semester taking on all duties/responsibilities that come with that.

Evaluation and Management of GPTIs

GPTI's performance will be evaluated every semester using the following resources:

o. GPTI's course evaluation scores as recorded by TTU will be reviewed by the department.
p. Reports of GPTI misconduct/issues provided to the department via the dean of students.
q. Direct complaints of GPTI performance to either the Department Chair or the Director of graduate studies.

If a semester evaluation of a student indicates significant deficiencies or direct complaints indicate the need for immediate action, the following will occur,

r. A meeting will occur between student, faculty advisor, and associate chair of graduate studies
s. The associate graduate chair will provide the documentation that indicates the student is underperforming in their duties.
t. The student and advisor can provide a response/explanation.
u. The three participants will create a remediation plan for improvement. It should include,
    5. Specific goals
    6. Timeline for achievement
    7. Consequences

8. Signatures of all 3 parties

v. If performance does not improve per the remediation plan, cessation of support by the department may occur.

7.3 Vacation, Absence, and Leave

a. All Supported students are entitled to the TTU approved holiday schedule: https://www.depts.ttu.edu/hr/EmpBenefits/HolidaySchedule.php

b. Further absences and requests for time off will be handled by,
   1. Department Chair/Graduate Program Chair for unassigned TA/GPTI
   2. Faculty advisor and Department Chair/Graduate Program Chair for assigned TA/GPTI
   3. Faculty advisor for RA

8. Financial Support

8.1 Departmental support

The ME department provides Teaching Assistantship (TA), Research Assistantship, (RA), and Graduate Part time instructor (GPTI) to support qualified students.
Graduate students can be supported through 4 mechanisms:

a. Research Assistantship (RA) via external funding
b. Research Assistantship (RA) via internal/external fellowship awarded to a student
    a. See OP 64.08 for university/college policies regarding such funding mechanisms
c. Teaching Assistantship (TA) via departmental funds or college funds
    a. See OP 64.03 for university/college policies regarding such funding mechanisms
d. Graduate Part Time Instructors (GPTI) via departmental or college funds
    a. See OP 64.03 for university/college policies regarding such funding mechanisms

Student support can come from a single mechanism as outlined above or can be from a combination of the above. During their graduate degree the mechanism of funding may change based on departmental needs and/or advisor's resources. Continuation of support for all funded students depends upon the satisfactory performance of their assigned duties as well as their academic progress including both course work and research.

Unfunded students
Unfunded students who choose to start a graduate degree acknowledge that they are not and may never be provided any funding by the department or individual faculty.

8.2 Graduate School Support and Scholarships

Graduate school has various scholarships and fellowships which may help you financially.
Go and check: https://www.depts.ttu.edu/gradschool/financial/GeneralFellowships.php
or send an E-mail to gradfellowships@ttu.edu for detailed information.

APPENDIX I. SOFTWARE PACKAGES SUPPORTED BY ME DEPARTMENT

Currently, the ME department supports MATLAB, ANSYS, Inventor 11, NI Labview, Solidworks and MathCAD. These software packages are available on all computers in the open computer laboratory. More detailed information of available software will be found at:
http://www.depts.ttu.edu/itts/software/

APPENDIX II. DEPARTMENTAL SAFETY PROTOCOLS

The safety protocols can be viewed and downloaded at:
https://www.depts.ttu.edu/me/safetyplan.php