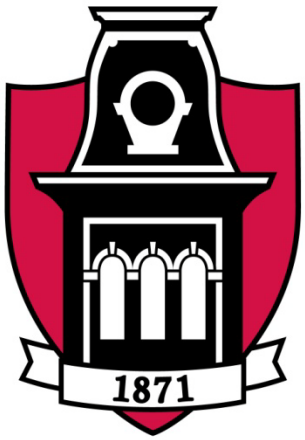
Graduate Program Manual

Department of Mechanical Engineering



UNIVERSITY OF
ARKANSAS

Department of Mechanical Engineering
Fayetteville, Arkansas 72701
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Table of Contents

The first edition of the Mechanical Engineering Graduate Program Manual was adopted by the Mechanical Engineering faculty and published in January, 1984. This edition was approved by the faculty and published in August, 2014.

Introduction

The objective of graduate education is for the student to develop analytical, experimental and/or computational abilities in order to work independently in the field of mechanical engineering. At the doctoral level, such abilities are directed toward independent and original research. The Department of Mechanical Engineering (MEEG) offers, as a member of the Graduate School of the University of Arkansas, the following degrees:

- Master of Science in Mechanical Engineering (MSME), thesis option
- Master of Science in Mechanical Engineering (MSME), non-thesis option
- Doctor of Philosophy (PhD) in Engineering

This document describes the admission requirements, degree requirements, and other rules and regulations that the student is expected to follow while working towards one of these degrees. Information in this document supplements the Graduate School's Graduate Student Handbook with information specifically concerning graduate students in the Department of Mechanical Engineering. Additional information is available on the Graduate School website and in the Graduate School Catalog of Studies.

Graduate Studies Committee

The Mechanical Engineering Graduate Studies Committee (MEGSC) is appointed and given the charge by the Head of the Department of Mechanical Engineering to oversee the graduate program. It is the responsibility of the MEGSC to develop and interpret the policies under which the department's graduate degree programs operate. The graduate faculty members of the Department of Mechanical Engineering approve these policies. The MEGSC administers these policies described herein and has the authority to make admissions decisions and to dismiss students from the MEEG graduate program after consulting with the student's major advisor.

Appeals of MEGSC decisions are initiated by the student, preferably with the support of the major advisor or thesis/dissertation director. Such appeals must be made in the form of a letter to Prof. Douglas Spearot (NANO 213, dspearot@uark.edu), Chair of the MEGSC, within four weeks of when the student is notified of a decision. Questions concerning policy should be directed to Prof. Spearot.

Forms submitted to the department by the graduate student should be submitted to Mr. Chris Jacob (MEEG204, cjj004@uark.edu). Mr. Jacob will distribute the forms to either the Chair of the MEGSC or the Head of the Department of Mechanical Engineering for the necessary signatures, and will forward the forms onto the Graduate School if appropriate.

Applying to the Graduate Program

Application for admission to the MS or PhD degree programs in mechanical engineering is made online via the Graduate School website. All applicants to the MEEG graduate program must provide Graduate Record Exam (GRE) scores and a one page Statement of Purpose with their application which describes what research field they wish to pursue in graduate school. In addition to the online application, those students applying for an assistantship must complete the Application for Graduate Assistantship form. Domestic students should submit this form and all supporting documents with their online application. International applicants should submit this form and all supporting documents to the Graduate and International Admissions Office with their application.

Once the student's application is accepted by the Graduate School, their application is forwarded to the department for review and possible admission. The student's application, including their Statement of Purpose, is made available to the graduate faculty in the Department of Mechanical Engineering. A decision to admit or decline the applicant is made by the Chair of the MEGSC after receiving input from the graduate faculty.

MSME Admission Requirements

For admission to the MSME Program, applicants should have an ABET accredited BSME degree with a minimum overall grade point average (GPA) of 2.7/4.0 or a GPA of 3.2 or above on the last 60 hours of their BSME curriculum. All applicants must achieve a score on the GRE general test of at least 154/145/3.0 on Q/V/AW sections to be considered for admission. International applicants must also achieve an acceptable score on a written exam, unless their native language is English. Information on English language proficiency is provided by the International Admissions Office. Students that are sponsored are expected to meet all entrance requirements before enrolling in classes as a graduate student in the Department of Mechanical Engineering.

PhD Admission Requirements

Applicants applying to the PhD program directly following their undergraduate studies should have an ABET accredited BSME degree with a minimum GPA of 3.0/4.0 overall or a GPA of 3.2 on the last 60 hours in their BSME curriculum. All applicants must achieve a score on the GRE general test of at least 158/149/3.0 on Q/V/AW sections and demonstrate an ability to communicate fluently in English. Information on English language proficiency is provided by the International Admissions Office. Applicants who have completed requirements for a Master's degree from an accredited U.S. university are not required to submit a TOEFL or IELTS score. Applicants not granted admission to the PhD program may apply for the MSME program. Students that are sponsored are expected to meet all entrance requirements before enrolling in classes as a graduate student in the Department of Mechanical Engineering.

Applicants interested in the PhD program who are currently enrolled in the MSME program at the University of Arkansas are required by the Graduate School to apply for entrance into the

PhD Program via the online Graduate School Application. It is not necessary for current MSME graduate students to submit transcripts or standardized test scores. Applicants should have completed at least 24 hours on their MSME Program of Study and have a GPA of at least 3.0 on that coursework.

Financial Aid

Financial aid is available to highly qualified students in the form of teaching assistantships, research assistantships and fellowships. Each financial aid opportunity has different rules for eligibility and application instructions. The applicant is expected to understand and adhere to these rules. Failure to adhere to these rules may result in the assistantship or fellowship support being revoked and dismissal from the graduate program.

Teaching Assistantships

The department provides a limited number of Graduate Teaching Assistantships (GTAs) each academic year, which provide the student a stipend and tuition for up to 20 hours of work per week. Specific duties are at the discretion of the faculty in charge of the courses to which the GTA is assigned and can involve a variety of tasks from grading to preparing materials for distribution to students and supervising lab sections. Graduate Teaching Assistantships are awarded on a competitive basis according to the following criteria:

- Academic ability
- Language skills
- Willingness to pursue doctoral research

To be considered for a teaching assistantship for fall enrollment, all applicants must submit the Application for Graduate Assistantship form by February 1st. The department cannot guarantee that GTA positions will be available for students starting during the spring semester. International applicants who would like to be considered for a GTA must demonstrate satisfactory proficiency in spoken English by presenting a 26 or above on the spoken portion of the internet based TOEFL (iBT) exam or a 7.0 or above on the spoken portion of the International English Language Testing System (IELTS). If the GTA requires the international student to teach students, the student must also pass the University of Arkansas Spoken Language Proficiency Test (SLPT). Students admitted with course deficiencies are not eligible for GTA positions until the specified deficiencies are met by the student.

Research Assistantships

Graduate Research Assistantships (GRAs) are awarded to graduate students by faculty who are principal investigators (PIs) on research grants and contracts. These assistantships enable the student to gain work experience on current research problems, and the student's work typically serves as the basis for their thesis or dissertation. Students are provided a stipend and usually tuition support for up to 20 hours of work per week. Often, graduate students will work beyond the required number of hours to advance their thesis or dissertation research. The Application

for Graduate Assistantship form should be submitted with their application, and the student should contact faculty members to discuss assistantships that are available.

Guidelines Governing GTAs and GRAs

The following guidelines are applicable to both Graduate Teaching and Research Assistantships.

- Graduate students initially assigned a GTA are supported for their first two semesters. The graduate student is expected to find support on a GRA thereafter. GTA positions may be renewed only under special circumstances and requests for renewal should be made to the MEGSC.
- Any graduate assistant who fails to maintain satisfactory progress towards the degree for which they are registered will lose their assistantship. Unsatisfactory progress includes a GPA of less than 3.0, failing to make research progress, and failing qualifying exams.
- Half-time (20 hours per week) graduate assistants must carry at least 6 semester hours but may not carry more than 12 during each regular semester. At least 3 hours must be carried each summer.
- GTA stipends are $1275/month for MSME students and $1500/month for PhD students with all tuition, but not fees, waived for half-time assistantships. Non-resident tuition is waived for quarter-time assistantships.
- GRA stipends are $1200-$1500/month for MSME students and $1500-$2000/month for PhD students with all tuition, but not fees, waived for half-time assistantships. Exact monthly stipend is at the discretion of the faculty member who serves as the PI for the research grant or contract supporting the student.
- Half-time graduate assistants are eligible to enroll in the student health insurance plan at a discount. Spouse and dependents may enroll in the plan, but do not receive the discount.

Fellowship and Grant Opportunities

The University offers several fellowship opportunities for graduate education. Information can be found on the financial aid section of the Graduate School website. The following is a list of opportunities most commonly sought by graduate students in MEEG.

Distinguished Doctoral Fellowships (DDF)
Distinguished Doctoral Fellowships are awarded by the Graduate School to PhD students upon nomination by the department head/chair and subsequent approval of the Graduate Dean and the Graduate School Fellowships Advisory Committee. First priority will be given to U.S. citizens and permanent residents and applicants cannot already be enrolled in a doctoral program at the University of Arkansas. Deadline for nominations is February 1st.

- The DDF Fellow receives a 12-month, 50% Graduate Assistantship position provided by the department or by a faculty member within the department from a research grant or contract for a minimum of 4 years.
- The DDF Fellow receives a monthly stipend commensurate with that of other doctoral

graduate assistants within the department and tuition paid by the GRA position.
- The DDF Fellow receives an additional $22,000/year paid in monthly installments for a maximum of 4 years.
- The DDF Fellow is required to apply for an NSF grant during their first year, with the assistance of their research advisor, if one is available in their area of study.

Doctoral Academy Fellowships (DAF)

Doctoral Academy Fellowships are awarded by the Graduate School to PhD students upon nomination of the department head/chair and subsequent approval of the Graduate Dean and the Graduate School Fellowships Advisory Committee. First priority will be given to U.S. citizens and permanent residents and applicants cannot already be enrolled in a doctoral program at the University of Arkansas. Highest priority will be given to applicants who apply by February 1st, although DAF applications may be submitted at any time, depending on availability.

- The DAF Fellow receives a 12-month, 50% Graduate Assistantship position provided by the department or by a faculty member within the department from a research grant or contract for a minimum of 4 years.
- The DAF Fellow receives a monthly stipend commensurate with that of other doctoral graduate assistants within the department and tuition paid by the GRA position.
- The DAF Fellow receives an additional $10,000/year paid in monthly installments for a maximum of 4 years.

Cogburn Teaching Fellowship

The Cogburn Teaching Fellowship is for students that are strongly considering teaching in academia as a profession and want lecture experience. The Cogburn Fellowship provides a 50% GTA position and payment of tuition for degree-related course work. The student receives hands on training working one-on-one with MEEG faculty on curriculum development, course management, and lecture skills.

Benjamin Franklin Lever Tuition Fellowship

The Lever Tuition Fellowship is designed to increase diversity by providing financial assistance to graduate students from underrepresented groups. This fellowship is not available to otherwise qualified graduate students who receive tuition payment from another source, such as a graduate assistant position or other tuition award. A limited number of fellowships are available each year. Most fellowships are awarded beginning the fall semester of the academic year. The application/nomination deadline is June 15th.

- Applicants for the fellowship must be U.S. citizens and regularly admitted to the graduate degree program of their interest.
- Benjamin Franklin Lever Fellows must maintain full-time enrollment for each semester the fellowship is applied towards tuition payment. Full-time enrollment for graduate students is 9 hours each major semester (fall and spring). Enrollment during the summer semester is optional, but if the student does enroll, 6 hours is considered full-time.
- Benjamin Franklin Lever Fellows must maintain good academic standing throughout the

degree program (2.85 or above on all graduate work).

Travel Grants
PhD students are eligible for travel grants of $1000 per academic year awarded by the Graduate School to attend and/or present a paper at a professional meeting, and MS students are eligible for $600 per academic year to present a paper at a professional meeting.

Applicants with non BSME Undergraduate Degrees

Applicants with a non BSME undergraduate degree are usually required to take the following deficiency courses that provide the background preparation needed for graduate coursework in the Department of Mechanical Engineering.

- MATH 2584 - Differential Equations
- MEEG 2703 - Computer Methods in ME
- MEEG 2013 - Dynamics
- MEEG 2103 - Introduction to Machine Analysis
- MEEG 2303 - Introduction to Materials
- MEEG 3013 - Mechanics of Materials
- MEEG 3113 - Machine Dynamics and Control
- MEEG 4104 - Machine Element Design
- MEEG 2403 - Thermodynamics I
- MEEG 3503 - Fluid Mechanics
- MEEG 4413 - Heat Transfer
- MEEG 4483 - Thermal Systems Analysis and Design
- MEEG 4202 - Mechanical Engineering Lab III

Deficiencies may be remedied in the following ways:

- Take deficiency courses or their equivalent at an institution offering ABET accredited engineering degrees. Non-ABET schools whose courses are accepted for transfer are also acceptable. A 3.0/4.0 GPA on these courses must be presented.
- Make an acceptable grade on a competency exam offered in the deficiency course. A competency exam is offered for all courses except MEEG 4202. The exams are taken at the University of Arkansas.
- Present evidence of previous work in an academic or non-academic setting which is equivalent to the coursework listed above.

Remedy of deficiencies does not constitute a BSME degree, but it does provide adequate preparation for pursuit of the MS or PhD degree in mechanical engineering.

MSME Degree Program

The Department of Mechanical Engineering offers both thesis and non-thesis MSME degrees. Graduate students are encouraged to do research resulting in a thesis for their MSME degree. The thesis is an in-depth study which may be experimental, theoretical, or a design, supported by appropriate analysis, that is written in a specified format. Although the student may propose their own research topic and seek an advisor, the usual procedure is for a student to work on a problem originated by a MEEG faculty member.

Graduate students wishing to attain a non-thesis MSME degree are required to do an independent project and provide a written report and presentation. The project is the design or an analysis of a typical engineering problem via experimental, computational or theoretical means. The report describes the project work and is written in the same general format as a thesis.

Research Advisor and Committee

Upon admission to the MSME graduate program, the student will be provided with an initial faculty advisor. This faculty member will advise the student on course selection, which faculty members are in their field of research interest and other matters related to the MEEG graduate program. The graduate student must contact their initial advisor soon after they accept their position in the MEEG graduate program. The initial advisor is not obligated to provide financial support for the incoming student.

By the end of the first semester in the graduate program, a student not making up deficiencies should select a major advisor by mutual agreement. The major research advisor must be a full-time mechanical engineering graduate faculty member and could be the same faculty member assigned as the initial advisor for the student. Because selection of a major advisor involves a personal arrangement between the student and a graduate faculty member, the Department of Mechanical Engineering cannot guarantee that a student will be able to find a member of the faculty willing to act in this capacity. With the advice and consent of the major advisor, the student recommends an advisory committee of two or three additional professors from the graduate faculty. The other committee members may be either full or part time graduate faculty members with the committee members' areas of specialization consistent with the student's area of interest. One member may be from another department. The committee recommendations are submitted to the department on the Master's Program Advisory Committee form to be approved by the MEEG Department Head and the Graduate School Dean.

MSME Program of Study

The MSME Program of Study form should be prepared in consultation with the initial or major advisor and submitted to the department prior to registration of the student's second semester in the MSME program. The Program of Study should consist of a coherent plan of courses consistent with the student's educational objectives. Note, not all courses are offered every semester; frequency of offerings is indicated in the Graduate School Catalog. All graduate

students must submit an update to their Program of Study annually prior to registration for spring classes (fall registration period). An advising hold will be placed on the student's registration status until the Program of Study is submitted and approved by the Chair of the MEGSC.

Thesis Option

A Program of Study for the thesis option must include a minimum of 24 hours of coursework, in addition to the thesis and any required deficiencies:

- At least 12 hours of mechanical engineering courses at the 5000 level or above
- At least 6 hours of acceptable mathematics
- Maximum of 3 hours of MEEG 591V Special Project

New courses in development are often taught as MEEG 591V before they are assigned a course number. These are not included in the 3 hour maximum for MEEG 591V courses. A minimum of 6 semester credit hours of MEEG 600V Masters Thesis is required in addition to coursework.

Once a research topic is chosen, usually during the first or second semester in the MSME program, the student must submit the Master's Thesis Committee and the Master's Thesis Title forms to the department.

After completing the necessary research, the student writes the thesis in the proper format and submits it to the thesis director for approval. Proper thesis format is described in the Guide for Preparing Theses and Dissertations published by the Graduate School. The approved thesis is distributed to the rest of the thesis committee at least two weeks before the final comprehensive examination. After passing this examination and negotiation of final matters with the thesis committee, the student prepares the final thesis manuscript and obtains approval signatures from the thesis committee. The thesis is submitted electronically to the Graduate School.

Non-Thesis Option

A Program of Study for the non-thesis option includes a minimum of 33 hours of coursework, in addition to any required deficiencies:

- At least 18 hours of mechanical engineering courses at the 5000 level or above
- At least 21 hours in mechanical engineering
- At least 6 hours of acceptable mathematics
- No more than 6 hour or less than 3 hours of MEEG 591V Special Project

New courses in development are often taught as MEEG 591V before they are assigned a course number. These are not included in the minimum or maximum hours above.

Upon completion of the project and preparation of the project report, the report is submitted to the major advisor for approval. The approved report is distributed to the rest of the advisory committee at least two weeks prior to the final comprehensive examination. After passing this

examination and negotiation of final matters with the advisory committee, the student prepares the final version of the report and obtains approval signatures from the advisory committee.

Approved Graduate Level Courses

All 4000 level and higher MEEG courses, except those required in the BSME curriculum, may be used for graduate credit. The following courses are acceptable for fulfilling the mathematics requirement:

- MATH 3423 Advanced Applied Math
- MATH 4353 Numerical Linear Algebra
- MATH 4363 Numerical Analysis
- MATH 4443 Complex Variable for Application
- MATH 4503 Differential Geometry and Vector Calculus
- MATH 4513 Advanced Calculus I
- MATH 4523 Advanced Calculus II
- MATH 5303 Ordinary Differential Equations
- MATH 5313 Partial Differential Equations
- MEEG 4703 Math Methods in Engineering
- MEEG 5003 Continuum Mechanics
- MEEG 5733 Advanced Numerical Methods
- PHYS 5073 Math Methods of Physics
- STAT 5103 Introduction to Probability Theory

Receiving graduate credit for MATH 3423 requires the student to submit the Graduate Credit for Undergraduate Course form. This form must be signed by the student's advisor, instructor of the course and submitted to the Graduate School prior to the beginning of the course.

Final Comprehensive Examination

A final comprehensive examination administered by the student's thesis or project advisory committee is required at the completion of the student's coursework and thesis/project. The final examination is scheduled by the student in consultation with the major advisor. The examination covers the thesis/project and other related subjects. The examination results are reported to the department on the Record of Progress - Masters Degree form for confirmation by the Chair of the MEGSC and approval by the Department Head. If the examination is failed, the student must petition their committee for reexamination; otherwise, the student is dismissed.

Transferring between MSME Programs

A MSME student who transfers from the thesis option to the non-thesis option may count up to 6 hours of MEEG600V Masters Thesis for MEEG591V Special Project. The student's research advisor must send a memo to the Graduate School requesting that the thesis hours are converted to 'Degree Studies' and that a grade of 'CR' is assigned to those hours.

Schedule for Completion of MSME Requirements

A timetable of events for the MSME degree is listed below. It is the responsibility of the student to see that all necessary actions and forms are completed on time. Failure to comply with the deadlines given may result in disciplinary action and/or delay in graduation.

Action	Deadline
Select major advisor.	First or early second semester.
Select an Advisory Committee. Submit Master's Program Advisory Committee form to the department.	Early in second semester.
Submit MSME Program of Study form to department.	Annually prior to registration for spring classes (fall registration period).
Submit Master's Thesis Committee form to the department. Submit Master's Thesis Title form to the department. Submit 200 word abstract for research to the department.	End of first year; no later than 3 months prior to final comprehensive examination.
Apply to graduate in Graduate School Office.	By end of second week of last semester.
Submit thesis/project to thesis/advisory committee. Prepare using Guide for Preparing Theses and Dissertations.	Two weeks before final comprehensive examination.
Pass final comprehensive exam and address any thesis/report edits. Submit Record of Progress Master's Degree to the department.	Seven days before Graduate School thesis submission deadline.
Submit thesis electronically to the Graduate School. Submit Intellectual Property Disclosure form to the Graduate School.	Specified by the Graduate School.

All requirements for the MSME degree must be completed within six years from the beginning of the first semester enrolled as a graduate student in the MEEG Department. Requests for deviations from any of the above guidelines must be submitted in writing to the MEGSC for consideration after approval by the major advisor or thesis director. Any requests for deviations from Graduate School rules must be submitted to the Graduate Dean.

PhD Degree Program

The Department of Mechanical Engineering offers a PhD in Engineering. Earning a PhD requires the student to perform independent research in a field of specialization resulting in a dissertation and often multiple publications in journals or other peer-reviewed outlets. The dissertation is an in-depth study which includes experimental, computational and/or theoretical components, that is written in a specified format. Although the student may propose their own research topic and seek an advisor, the usual procedure is for a student to work on a problem originated by a MEEG faculty member.

Research Advisor and Committee

For a student entering the PhD graduate program after completing their BSME and/or MSME degree at another university, the student will be provided with an initial faculty advisor. This faculty member will advise the student on course selection, which faculty members are in their field of research interest and other matters related to the MEEG graduate program. The graduate student must contact their initial advisor soon after they accept their position in the graduate program. The initial advisor is not obligated to provide financial support.

By the end of the first semester in the graduate program, a student not making up deficiencies should select a major advisor by mutual agreement. The major research advisor must be a full-time mechanical engineering graduate faculty member and could be the same faculty member assigned as the initial advisor for the student. With the advice and consent of the major advisor, the student recommends an advisory committee of four or five additional professors from the graduate faculty. The committee member's areas of specialization should be consistent with the student's area of interest. At least one member must be from another department and at least two, in addition to the major advisor, must be from the Department of Mechanical Engineering. Selections for major advisor and advisory committee must be submitted to the department on the Doctoral Program Advisory Committee form to be approved by the Department Head and the Graduate School Dean. Usually, the major advisor and doctoral advisory committee later serve as the dissertation director and dissertation committee, respectively. The dissertation director and committee are named when the dissertation proposal is submitted. Students not able to find a dissertation director within six months after passing the qualifying examination may be dismissed from the program.

PhD Program of Study

The PhD Program of Study form should be prepared in consultation with the initial or major advisor and submitted to the department prior to registration of the student's second semester in the PhD program. The program of study should consist of a coherent plan of courses consistent with the student's educational objectives. Note, not all courses are offered every semester; frequency of course offerings is indicated in the Graduate School Catalog. All graduate students must submit an update to their Program of Study annually prior to registration for spring classes (fall registration period). An advising hold will be placed on the student's registration status

until the Program of Study is submitted and approved by the Chair of the MEGSC.

After the BSME degree or its equivalent, the student's Program of Study must include 48 hours of graded coursework, of which:

- At least 30 hours at the 5000 level or higher
- At least 12 hours of acceptable mathematics
- No more than 3 hours of MEEG 590V Research or MEEG 591V Special Problems
- No more than 6 hours of 4000 level courses (excluding math requirement courses)

New courses in development are often taught as MEEG 591V before they are assigned a course number. These are not included in the 3 hour maximum for MEEG 591V courses. A minimum of 30 hours of MEEG 700V Dissertation is required in addition to coursework. Six hours of MEEG 600V Master's Thesis may be applied to this total.

A student who has earned a MS degree may petition the MEGSC to apply up to 30 hours from his MS degree program of study to the coursework requirements. If courses from another institution are included in the proposed program, sufficient information, such as textbook and syllabi used, typical quizzes, typical problems, etc., may be required so that the courses may be evaluated by the MEGSC.

Approved Graduate Level Courses

All 4000 level and higher ME courses in the Graduate Catalog, except those required in the BSME curriculum, may be used for graduate credit. All of the following courses are acceptable for fulfilling mathematics requirements, but at least 6 of the required 12 coursework hours must be taken in the Mathematics Department:

- MATH 3423 Advanced Applied Math
- MATH 4353 Numerical Linear Algebra
- MATH 4363 Numerical Analysis
- MATH 4443 Complex Variable for Application
- MATH 4503 Differential Geometry and Vector Calculus
- MATH 4513 Advanced Calculus I
- MATH 4523 Advanced Calculus II
- MATH 5303 Ordinary Differential Equations
- MATH 5313 Partial Differential Equations
- MEEG 4703 Math Methods in Engineering
- MEEG 5003 Continuum Mechanics
- MEEG 5733 Advanced Numerical Methods
- PHYS 5073 Math Methods of Physics
- STAT 5103 Introduction to Probability Theory

Receiving graduate credit for MATH 3423 requires the student to submit the Graduate Credit for

Undergraduate Course form. This form must be signed by the student's advisor, instructor of the course and submitted to the Graduate School prior to the beginning of the course.

PhD Qualifying Examination

The purpose of the qualifying examination is to determine the ability of the student to understand fundamental mechanical engineering principles and apply them to the solution of problems. Those who enter the PhD program with a BSME degree take the exam at first opportunity after the 1st year anniversary of entering the program. This allows those who do not pass the exam to complete requirements for an MSME degree. Those who enter the PhD program with a MSME degree take the exam in the 2nd semester after entering the PhD program. Those who fail all or parts of the exam are required to take only the failed part(s) a second time. Students must submit the Request to take Qualifying Examination form to the MEGSC at least 4 weeks prior to the date of the qualifying examination.

The qualifying exam consists of three written exams, each 2 hours long, in subject areas chosen by the student. The exams are closed book/note on material through first year graduate level. Each is followed by a ½ hour oral exam in the week following the written exam. The student must choose exams from a list of traditional MEEG areas with the option of selecting topics from special/emerging/interdisciplinary areas. At least 2 of the 3 areas must be traditional.

Traditional MEEG topics

- Statics and Dynamics
- Mechanics of Materials
- Mechanical Design
- Materials
- Thermodynamics
- Fluid Mechanics
- Heat Transfer
- System Dynamics/Controls

Special/Emerging/Interdisciplinary topics

- Nano/Micro Engineering
- Computational Methods
- Bioengineering

The exams are administered and evaluated by subject area committees within MEEG. The Chair of each subject area committee provides the Chair of the MEGSC the results at the culmination of the oral portion of the exam. In most cases, the graduate faculty will give a student who has failed the examination on the first attempt one opportunity to retake all or part of the examination at its next offering. The qualifying examination results, together with the individual's academic record, engineering experience, evidence of ability to conduct independent research, and other

material are used by the graduate faculty to determine if an applicant is allowed to continue in the PhD program. Passing the qualifying examination is an important step in the process of obtaining the PhD degree. However, passing the qualifying examination does not yet constitute admission to candidacy.

PhD Dissertation Proposal

A dissertation proposal is the first step in meeting the dissertation requirement. The proposal begins with an approximately 200 word abstract of the research followed by a more detailed statement of the work to be undertaken, its objectives and expected significance, its relation to previous work and work in progress elsewhere, and a reference list. The general plan of work, including the experiments and/or simulations to be performed should be included. The proposal should not exceed 15 pages in length, not including cover page and references.

The proposal is submitted to the research advisor and doctoral dissertation committee. The student gives a public seminar on the proposed work soon thereafter, and an oral examination on the merits of the proposed work and the student's knowledge in the field of the proposal is conducted by the doctoral dissertation committee. The purpose of the exam is to approve the proposal and to determine if the student has the knowledge to do the proposed research. Final approval of the proposal after the oral exam rests with the doctoral dissertation committee.

Submission and defense of the dissertation proposal serves as the candidacy examination. After approval of the proposal and passage of the oral exam, the student and their advisor submit the Doctoral Dissertation Title, Doctoral Dissertation Committee, and Candidacy Exam Notification forms to the department for approval by the Department Head and submission to the Graduate School. These forms and the dissertation abstract must be submitted no later than one year after passing the qualifying examination and no less than one year prior to the final examination.

PhD Dissertation Submission and Final Examination

It is the responsibility of the student to keep the dissertation committee aware of the progress of their doctoral research. When it is determined that the necessary research has been completed, the dissertation is written in the proper format with the aid and guidance of the dissertation director, as described in the Guide for Preparing Theses and Dissertations published by the Graduate School.

The completed dissertation must be a definite scholarly contribution which may be in the form of new knowledge of fundamental importance or of modification, amplification, and interpretation of existing significant knowledge. After approval by the dissertation director, the dissertation is distributed to the dissertation committee for review. This must be done no later than two weeks before the final examination. In addition, the student must send a dissertation abstract and a memorandum announcing the time and location of the final examination to the department and the Graduate School. This must be done no later than two weeks before the final examination. The Doctoral Record of Progress form will be sent to the major adviser when the Graduate School receives notice of the final examination.

The final examination is oral and open to the public. The final examination is primarily a defense of the dissertation research, but it may also include other aspects of the candidate's graduate work. After a successful defense and negotiation of final dissertation matters, the candidate prepares the final manuscript and submits it to the Graduate School electronically for final approval. The student submits, with the appropriate signatures from their research advisor and the doctoral committee, the Doctoral Record of Progress form to the department. The Doctoral Record of Progress form will be certified by the Chair of the MEGSC before it is submitted to the Graduate School. All documents must be received by the Graduate School prior to the dissertation submission deadline. If the final examination is failed, the student must petition their committee for reexamination; otherwise, the student is dismissed from the program.

Schedule for Completion of PhD Requirements

A timetable of events for the PhD degree is listed below. It is the responsibility of the student to see that all necessary actions and forms are completed on time. Failure to comply with the deadlines given may result in disciplinary action and/or delay in graduation.

Action	Deadline
Select major advisor.	First or early second semester.
Select an Advisory Committee. Submit Doctoral Program Advisory Committee form to the department.	Early in second semester.
Submit PhD Program of Study form to the department.	Annually prior to registration for spring classes (fall registration period).
Submit Request to Take Qualifying Examination to the department.	Three weeks before the examination.
Prepare proposal, give public seminar on proposed work, and pass candidacy examination.	No later than 1 year after passing qualifying exam.
Submit Doctoral Dissertation Committee form to the department. Submit Doctoral Dissertation Title form to the department. Submits Candidacy Exam Notification to the department. Submits 200 word abstract for proposal to the department.	After successfully presenting the PhD proposal.
Apply to graduate in the Graduate School Office.	By end of second week of last semester.
Submit dissertation to dissertation committee. Prepare using Guide for Preparing Theses and Dissertations.	Two weeks before final comprehensive examination.
Submit dissertation abstract and announcement of the final examination to the department and Graduate School.	Two weeks before final comprehensive examination.
Pass final comprehensive exam and address any dissertation edits. Submit Record of Progress - Doctoral Program to the department.	Seven days before Graduate School dissertation submission deadline.
Submit thesis electronically to the Graduate School. Submit Intellectual Property Disclosure form to the Graduate School.	Specified by the Graduate School.

All requirements for the PhD must be completed within seven years after entering the PhD program. Requests for deviations from any of the above guidelines must be submitted in writing to the MEGSC for consideration after approval by the major advisor or thesis director. Any requests for deviations from Graduate School rules must be submitted to the Graduate Dean.

Graduate Program Regulations

The following regulations are common between MSME and PhD programs in the Department of Mechanical Engineering. The student is expected to understand and to abide by these rules. Correspondence between the department and its graduate students is primarily through email. Students must check their email regularly in order to avoid missing information necessary to their degree program. Paper correspondence is placed in mailboxes located in the Mechanical Engineering Academic Office, MEEG 204. Each student is provided a mailbox, and it should be checked regularly.

Orientation

An orientation session for new University of Arkansas graduate students is conducted early each fall and spring semester by the Graduate School. All new graduate students are expected to attend, but all graduate students may attend. Those students that are provided GTA positions must attend a separate Teaching Assistant orientation session.

Annual Review

Every MS and PhD student is reviewed annually for progress towards their degree, in the spring semester, by their major advisor via face-to-face meeting. At a minimum, the review covers (a) if the student has completed courses with an adequate grade point average; (b) if the student is making satisfactory progress towards their thesis/dissertation/project research and is completing the required examinations; and (c) if the student if satisfying all other requirements for their degree.

After the review, the Graduate Student Annual Review form is signed by the student, the major advisor and submitted to the department for Department Head review and approval. This form must be submitted to the department no later than May 15th each spring semester. An advising hold will be placed on the student's registration for fall classes (spring registration period) until the Annual Review form is submitted to the department. Students who refuse to participate in the review process are dismissed from the degree program.

Graduate Seminar

Every graduate student must register for MEEG 6800 Graduate Seminar every semester enrolled. It is not necessary for the student to include MEEG 6800 Graduate Seminar in their Program of Study. Graduate students are expected to attend all seminars and each student's grade in MEEG 6800 is based on seminar attendance. Seminars are given by MEEG graduate students upon recommendation by their major advisor, by MEEG faculty or by guests from outside of the department or university. Students are expected to give a seminar in MEEG 6800 annually. A schedule is published at the beginning of each semester for seminars in MEEG 6800.

Academic Standing

In order to retain regular graduate standing, an MSME student must maintain a GPA of 3.0, the minimum for which the MSME degree is awarded, on courses included on the Program of Study and 2.85 on all graduate coursework. When a student drops below this GPA they are placed on academic probation. In addition, no more than six hours of C and no courses for which a grade of D or lower is obtained may be counted toward graduation.

Academic Integrity

The Provost and Vice Chancellor for Academic Affairs has created and implemented a process which facilities the investigation of alleged violations and the penalty for confirmed violations of academic honesty. Graduate students are expected to understand and to abide by the academic integrity policy pertaining to both academic courses and research integrity.

Research Compliance

Research activity that involves any of the following requires review and approval by an institutional compliance committee prior to starting the research. The student cannot decide that their research is exempt.

- Human subjects - Institutional Review Board (IRB)
- Live vertebrate animals - Institutional Animal Care and Use Committee (IACUC)
- Human pathogens - Institutional Biosafety Committee (IBC)
- Recombinant DNA - IBC
- Biological agents and/or toxins - IBC
- Human tissues, cell lines, and/or bodily fluids - IBC
- Radioisotopes - Radiation Safety Committee (RSC)

When the research involves a combination of these research activities, as is sometimes the case, it may be necessary to secure the approval of two or more committees, e.g., Biosafety Committee and the Institutional Review Board for a study involving the collection and analysis of blood from human subjects. For more information, responsibilities of each of these committees, instructions on how to apply for committee approval, the required forms, and the appropriate contact people, contact Research and Sponsored Programs.

Graduate Program Forms

All forms are available for download from the Mechanical Engineering website or the Graduate School website. Direct links to each form are provided below.

Application Process

Graduate School Application for Admission
Application for Graduate Assistantship

Academic Coursework

Grad Credit for Undergraduate Course (3000 & 4000 level)
Out-of-Career Registration
Administrative Change of Registration
Advising Worksheet

Thesis/Dissertation Submission

Graduate Student Annual Review
Intellectual Property Disclosure
ME Thesis/Dissertation Style Guide
Guide for Preparing Theses
Guide for Preparing Dissertations

MSME

Proposed MSME Program of Study
Master's Program Advisory Committee Report
Master's Thesis Committee Report
Master's Thesis Title
Record of Progress - Master's Degree

PhD

Request to Take Qualifying Examination
Schedule of Study - Doctoral Program
Doctoral Program Advisory Committee Report
Candidacy Exam Notification
Doctoral Dissertation Committee Report
Doctoral Dissertation Title