GUIDE TO GRADUATE STUDY AND DEGREE PROGRAMS

IN

MECHANICAL ENGINEERING

DEPARTMENT OF MECHANICAL & INDUSTRIAL ENGINEERING
LOUISIANA STATE UNIVERSITY
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This handbook is for the graduate students and faculty of the MECHANICAL ENGINEERING Program. Policy changes may occur at any time. Students are responsible for checking with the MIE Graduate office and/or the Director of Graduate Studies in ME for updates. Mechanical Engineering Program Policies have been worked out by the Graduate Studies Committee and approved by the Mechanical Engineering Graduate Faculty of the Department.

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Links to forms required by LSU's Graduate School and the ME Graduate Program should be retrieved from Graduate School and/or the MIE Department website.

General Description

The Department of Mechanical & Industrial Engineering (MIE) is one of seven engineering departments at LSU. In the Mechanical Engineering (ME) program of the MIE department, there are currently 26 full-time faculty members. Graduate student enrollment, including both mechanical engineering and engineering science students supervised by the ME faculty, is about 60, nearly two-thirds of whom are in the Ph.D. program.

Mechanical Engineering faculty members span general areas of expertise ranging from the traditional ones such as mechanical systems (design & control), materials science & engineering, and thermal-fluid science and combustion, to more novel ones such as micro/nano-systems (design and fabrication) and molecular-level engineering. The ME faculty is primarily involved in research related to Energy, Materials & Manufacturing, Aerospace and Bio-Technology applications. Research is funded through grants from federal agencies (NSF, NASA, DoD, DoE, NIH etc.), state government (Louisiana Board of Regents), national laboratories, and various industries. The graduate faculty works closely with graduate students in research projects that cover both traditional and nontraditional areas. Graduate students are engaged in experimental, numerical, and modeling studies and can select their coursework from mechanical engineering and other departments, in consultation with their advisory committees. Students have access to excellent laboratory facilities and equipment, as well as to extensive computer systems, both in the department and on the LSU campus. Mechanical engineering graduates are prepared for employment in industry, universities, state and federal government, and the private sector.

In the ME Program, most graduate students are financially supported through research assistantships, teaching assistantships, or fellowships. Research areas are broadly organized as mechanical systems, thermal sciences, and materials science and engineering. Individual faculty supervising graduate research specialize in a range of topics including robotics, controls, biomechanics, tribology, fluid dynamics, combustion, microsystems, materials science, advanced manufacturing, and others.

Student organizations within the department include the ME Graduate Student Association (ME-GSA), Chapters of the American Society of Mechanical Engineers (ASME), American Institute of Aeronautics and Astronautics (AIAA), Society of Automotive Engineers (SAE), The Materials Society (TMS) - American Society for Metals (ASM), and National Association of Corrosion Engineers (NACE). In addition, some mechanical engineering students belong to the college chapters of the Society of Black Engineers (SBE) and Society of Women Engineers (SWE).

ME Graduate Faculty

By Appointment Rank

Full Professors

Devireddy, Ram
Gonthier, Keith
Guo, Shengmin
Khonsari, Michael
Li, Guoqiang
Meng, Wen Jin
Moldovan, Dorel
Nikitopoulos, Dimitris
Park, Sunggook
Wahab, M.

Associate Professors

Barbalata, Corina
Gartia, Manas
Gilbert, Hunter B.
Menon, Shyam
Palardy, Genevieve
Schoegl, Ingmar
Wang, Ying

Assistant Professors

Marvel, Christopher
Owoyele, Ope
Stein, Adrian

Instructors

Becnel, Andrew
Molaei, Parsa
Pettrey, Katherine
Saadatian, Salar
Walker, Eamonn

Professors Emeriti

Acharya, Sumanta
Arnas, A. Ozer
Courter, Robert W.
Daniel, Lawrence R. "Dan"
Sabbaghian, Mehdi
Sinclair, G. B.
Waggenspack, Warren
Wang, Wanjun
Yannitell, Daniel W

Past Faculty Contributors

Charalampopoulos, Tryfon T.
Murphy, Michael
Raman, Aravamudhan
Ram, Yitshak
Wong, Harris

By Topical Group

Mechanical Systems

Barbalata, Corina
Gartia, Manas†
Gilbert, Hunter B.
Khonsari, Michael†
Li, Guoqiang
Palardy, Genevieve
Park, Sunggook‡
Stein, Adrian
Wahab, Muhammad

Thermal Fluids

Devireddy, Ram
Gartia, Manas
Gonthier, Keith
Guo, Shengmin
Khonsari, Michael
Menon, Shyam
Nikitopoulos, Dimitris
Owoyele, Ope
Schoegl, Ingmar

Materials Science and Engineering

Devireddy, Ram†
Gartia, Manas†
Gonthier, Keith†
Guo, Shengmin†
Marvel, Christopher
Meng, Wen Jin
Moldovan, Dorel
Li, Guoqiang*
Park, Sunggook
Wahab, Muhammad*
Wang, Ying

* Core member of Mechanical Systems Group
† Core member of Thermal-Fluid Science Group
‡ Core member of Materials Science and Engineering Group

More details on research topics of individual faculty members can be found at the MIE website. Each faculty member is assigned a separate section for the research courses ME 8000 and ME 9000.

Graduate Studies Committee

The ME Graduate Studies Committee (GSC) oversees and administers the daily operation of the ME graduate programs and their procedures for the department. The GSC also assumes other responsibilities on graduate matters as assigned by the Graduate School, the department chair, or the committee members. This committee is responsible for supervising all aspects of the graduate program, which includes but is not limited to: providing recommendations on graduate admissions, reviewing the graduate-level curriculum and proposing revised curricula, reviewing graduate student progress, maintaining regular communication between the department and graduate students, regularly reviewing the needs and performance of the graduate program, and considering and making the departmental decision on student petitions and appeals.

Advanced Degrees in Mechanical Engineering

Graduate Degree Programs

The Mechanical Engineering (ME) program offers degree programs leading to:

- Master of Science
- Doctor of Philosophy

In addition, the department participates in the college's Interdisciplinary Engineering Science degree programs and offers a Graduate Minor in Mechanical Engineering (see Section "Other Programs").

Admissions Standards

To pursue an advanced degree in Mechanical Engineering, an applicant must hold a B.S. degree from an engineering department accredited by the Accreditation Board of Engineering and Technology (ABET), or the equivalent. Special programs can be developed if the degree is from another discipline. The graduate faculty of the department must approve these special programs. As a potential graduate student of Mechanical Engineering, you must meet the minimum requirements for admission to LSU's Graduate School before being considered for admission into the Mechanical Engineering graduate program. The admission requirements of the department are in addition to those of the Graduate School and are generally more restrictive. Typically, a minimum undergraduate and/or Masters grade-point average of 3.0 ("A" = 4.0, "B"=3.0) and competitive GRE scores are required. Applications with a Quantitative Reasoning GRE score below the 80th percentile will not be considered unless petitioned by an ME faculty member. For foreign applicants a minimum TOEFL score of 213 (computer-based), 550 (paper-based), 79-80 (internet based – IB) or minimum 6.5 (IELTS) would be expected. As deciding on admissions and assistantships as well as taking care of visa formalities take considerable time, potential students are advised to apply sufficiently early, say six to nine months in advance of the semester in which they wish to enroll.

Full Time Graduate Student Status

A full-time graduate student at the MS or Ph.D. level is required to take at least nine (9) credit hours of approved course work and one (1) hour of ME 7901 seminar course during fall/spring semesters. The ME 7901 seminar course is required for registration every semester (excluding summer terms) for full-time graduate students. A part time graduate student at the M.S. or Ph.D. level is required to take the ME 7901 seminar course for one semester only and attend for that semester during his or her degree program.

International students are required to be full-time and conform to these regulations to take adequate preparatory courses to demonstrate proficiency in written and spoken English before being allowed to teach. This is expected of all foreign students within the first year.

Probationary Status

Full-time students with ***probationary status upon admission*** must complete a minimum of nine (9) credit hours of technical graduate-level courses with at least a 3.00 average. Students will remain on probation until nine hours of technical graduate-level courses have been completed with at least a 3.00 average. Failure to attain this average may result in being dropped from the program. Part-time students entering on probation and registering for fewer than nine hours may be dropped from the Graduate School if their semester and/or graduate GPA is less than 3.00 during any semester they are registered. Students admitted on probation may not be appointed to assistantships or fellowships until they attain good academic standing. (See PS-21 for additional information)

If probationary status is acquired at the end of any semester, the student becomes ineligible for any assistantship while on probation. A graduate student placed on academic probation by the Graduate School

for failing to make satisfactory progress may not be appointed or reappointed to a graduate assistantship unless the student's cumulative/semester GPA is at least 3.00. Details and additional information regarding eligibility for a graduate assistantship may be found in PS-21, and on the Graduate School on-line Catalog @ https://catalog.lsu.edu/index.php

M.S. Degree

To receive an M.S. degree from the ME program, you must satisfy the M.S. degree requirements, as specified in the current General Catalog. The M.S.ME program offers both thesis and non-thesis tracks. An accelerated M.S.ME path is available to LSU undergraduate students demonstrating superior academic performance.

1. Major Professor and Graduate Advisory Committee

When you start the program, you must choose a **major professor** who is affiliated with the Mechanical Engineering program and specializes in your area of interest. With your major professor's guidance, you are required to select members for your **graduate advisory committee**. This committee will be chaired by your major professor and will include at least two other professors. Two members must be ME faculty, and one can be from a different program. They all need to be members of the LSU Graduate Faculty, where at least one ME faculty should be a full member. You must meet with all committee members and complete the departmental **major professor agreement** form. The form should be submitted to the graduate coordinator by the start of your second semester in the program.

2. Plan of Study

At the beginning of the graduate program, you and your major professor will create a plan that outlines the courses to be taken for your M.S.ME degree. This initial plan must be documented on the departmental **plan of study** form and approved by your advisory committee. The completed form should be submitted to the graduate coordinator together with your major professor agreement by the start of your second semester in the program. You should review your plan of study every semester with your major professor. In case any changes should be required, you will need to get approval from your major professor and submit an updated plan of study to the graduate coordinator.

3. Degree Requirements

The **thesis option** requires a minimum of 24 hours of lecture courses (must not include any type of independent study) and a minimum of six hours of thesis research (ME 8000). The **non-thesis option** requires a minimum of 30 hours of lecture courses and two three credit-hour ME 7903 courses taken in consecutive semesters.

Curricular requirements for both options include:

- At least 9 credit hours from an approved list of core courses.
- At least 50% of the required course work must be at the 7000-level.
- At least 50% of the required course work must be in Mechanical Engineering.
- 3 credit hours of 4000 level or higher mathematics courses are recommended.
- Attendance of the ME Graduate Seminar (ME 7901).
- A research presentation in the departmental Graduate Student Research Conference (GSRC) is required prior to graduation.

Graduate Seminar

The ME 7901 Graduate Seminar course is offered each Fall and Spring semester. Full-time students must attend the seminar each semester, whereas part-time students only need to attend for one semester. After a student successfully defends their thesis or if they participate in an out-of-state internship or exchange program, they are excused from seminar attendance. Seminar registration is waived if the condition is met for the entire semester.

Thesis and Non-Thesis Report

A Master's degree requires the preparation of a final document. This document will be used in your final examination, where you show that you have mastered your chosen subject. Depending on your program track, you will either write a thesis or a non-thesis report:

- A **Master's Thesis** should demonstrate the capacity for research, originality of thought, and facility in organizing materials. Students pursuing the thesis option take ME 8000 thesis research under the direction of their major professor.
- A **Non-Thesis Master's Report** should document the ability to do in-depth analysis of a Mechanical Engineering topic, without the need to pursue rigorous research. Students pursuing the non-thesis option take no more than one ME 7903 independent study course per semester under the direction of their major professor.

Accelerated M.S.ME Program

If you are an LSU junior studying Mechanical Engineering with a GPA of at least 3.5, you are eligible for an accelerated Master of Science in Mechanical Engineering. This program is available for both non-thesis and thesis tracks. The thesis track is reserved for exceptional students invited by the department. The requirements for both tracks are the same as the regular M.S.ME program, where up to half of the required graduate credit hours can be taken prior to receiving the B.S.ME. The program is structured so that completion of this degree is possible with one year after receiving the B.S.ME.

For the accelerated M.S.ME program, follow these steps:

1. Find an advisor willing to supervise your master's project (thesis or non-thesis)
2. Submit application documents to the graduate coordinator by the end of the semester before starting your final year in the B.S.ME program:
   - 1-page summary of your research project.
   - Major Professor Agreement (departmental form).
   - Plan of Study (departmental form).
   - Request for Accelerated Master's Program (LSU Graduate School form).
3. During the final year of your B.S.ME program, you should:
   - Start your research project (thesis option).
   - Take up to 9 credit hours counting towards both B.S.ME and M.S.ME degrees (requires Graduate School approval); additional graduate courses will only count for M.S.ME.
   - Apply to the LSU Graduate School.
4. After graduating with your B.S.ME, you should:
   - Reserve the summer for research (recommended for thesis option).
   - Take remaining credit hours to satisfy degree requirements.
   - Submit application for degree and request final defense at the beginning of the spring semester (refer to deadlines published by the LSU Graduate School).

Transfer of Courses

If you have taken graduate-level courses from a previous university and want to transfer courses to LSU, you may be able to transfer up to 50% of credit hours required for the LSU degree. For each course, you must document equivalency by providing a syllabus for the course taken at the previous university as well as the corresponding course description at LSU. All course transfers need to be discussed with and approved by each member of your advisory committee. For any substituted core course, an additional approval is required by the last ME faculty to teach the equivalent course at LSU. The completed departmental course transfer request form should be submitted together with all applicable documentation to the graduate coordinator.

Petitions

A petition to waive or modify any of the requirements in this section requires approval of your graduate advisory committee and the Graduate Studies Committee (GSC) of the ME program.

4. Final Examination

An open, announced, oral presentation and a "defense" examination is required after completion of writing of thesis or non-thesis project. The exam part is administered by your advisory committee in a closed session for privacy purposes.

- You must schedule the final examination and submit the **Application for Degree: Master's Degree** form before the current semester deadline as indicated on the Graduate School calendar. In addition to meeting the semester deadline, the final examination request should be submitted to the Graduate School at least three weeks prior to the proposed examination date.
- You must provide copies of thesis/report at least two weeks prior to the final examination to your examination committee. The document must have been reviewed and approved by your major professor prior to submission to the committee members.
- The result of this examination will be filed with the Graduate School by your major professor through the graduate coordinator as soon as possible, provided all degree and program requirements have been met.
- For the thesis option, you must upload your thesis document to the Graduate School website by the semester deadline indicated on the Graduate School calendar.

Other Requirements

Check with the Graduate Administrative Coordinator and Graduate School regarding other requirements regarding graduation. Also, leave your future contact address with the Graduate Administrative Coordinator. Keep in touch with your home department and Alma Mater, and inform us of your professional affiliation and growth in your career.

Doctoral (Ph.D.) Degree

For the Ph.D. degree, you must satisfy the general requirements as specified in the Graduate Catalog, which can be found on the Graduate School Web-Site, as well as the departmental requirements listed below. All decisions regarding your program of study must be made in consultation with your major professor, your Graduate Advisory Committee, and the Graduate Studies Committee of the department.

1. Major Professor and Graduate Advisory Committee

The Graduate School has specifically defined requirements regarding the full advisory committee. The ME program of the MIE Department will follow these regulations:

- Consists initially of three members of the graduate faculty; **all three committee members must be members of the graduate faculty.**
- Major Professor, who acts as chair or co-chair, must be from the ME program of the MIE department.
- If either an adjunct or a non-tenure track faculty member is the major professor, a full-time tenured or tenure-track graduate faculty member from the ME program of the MIE department must co-chair the committee.
- At least one-half of the graduate faculty on doctoral committees must be full-time tenured or tenure-track faculty at LSU. A minimum of two of those faculty members must be from the student's major department at LSU and at least one of whom must be a full member of the LSU graduate faculty.
- Remaining members may be from the major department or may be from outside the department if pertinent to the student's area of concentration, with the proviso that at least one of the remaining members must be a full member of the graduate faculty.
- Any declared outside minors require representation, either among the first 3 members of the committee or by additional appointments to the committee.
- In addition, the Dean of the Graduate School appoints a member or members of the graduate faculty to serve on the doctoral general and final examination committees (aka dean's representative).
- Refer to the ***Graduate School Catalog on the Graduate School's Website for more detailed Information: https://catalog.lsu.edu/index.php***

2. Course Work

Course offerings are listed in the Graduate School Catalog. A petition to waive any of the requirements in this section requires approval of the graduate faculty through your Advisory Committee and the Graduate Studies Committee (GSC). Equivalency of courses offered as substitutes or transfers will be determined by the last faculty member to teach the required course.

Direct Admission to Ph.D. from B.S.

If you are deemed eligible by the GSC to enter the Ph.D. program directly from a B.S. degree, you will be required to take a minimum of 36 hours of course work (not S/U graded coursework) and 18 hours of dissertation research (ME 9000). The entire course work must be approved by the major professor and advisory committee, as evidenced by the attestation of the departmental plan of study form. The form is recommended to be submitted to the department by the end of the first semester for M.S. degree holders and before the end of the first year for the B.S. graduate.

- Declare a primary specialization in one of the following areas:
  Thermal Sciences, Mechanical Systems, or Materials Science and Engineering
- Take a minimum of 12 credit hours of core courses in thermal sciences, mechanical systems, or materials science and engineering

- Take 3 credit hours of a Math course
- Take 21 credit hours of technical elective courses (selected by student/major professor/advisory committee)
- Take a minimum of eighteen (18) credit hours of course work at the 7000 level (6 courses)
- Register for ME 7901 (ME Graduate Seminar): required to register and attend every semester (excluding summers).

  Please Note: The seminar attendance requirement for part-time students will be for one semester only. The seminar course (ME 7901) attendance requirement is waived for any student, after the date when he/she has successfully defended his/her thesis, or while he/she is participating in an out-of-state internship or out-of-state student exchange program under approval of his/her major professor. If this condition is met for an entire semester, the registration requirement is waived.
- **Core courses for PhD students are the same as required for M.S. Degree students**
- Take a minimum of eighteen (18) hours of ME 9000
- You are required to present your research results at a departmental forum before graduation, usually during your final semester in residence. This is done in the departmental, annual Graduate Student Conference (GSC), prior to graduation.

Admission to Ph.D. from M.S.

If the student has earned a recognizable M.S. degree with at least 24 hours of graduate-level courses, **he/she may be allowed to transfer up to 18 hours of course work credit** upon approval by the major professor and the student's advisory committee, which will count on the requirement of a minimum of 36 hours of course work. You will require a minimum core requirement of 12 credit hours thermal sciences, mechanical systems, or materials science and engineering, along with 6 credit hours of technical electives (related to the student's research area and approved by the advisory committee), and 18 hours of dissertation research (ME 9000) for the Ph.D. degree. Among the 12 credit hours of core course work, a minimum of 9 credit hours should be taken from 7XXX level courses. Course work must be approved by the major professor and the student's advisory committee, as evidenced by the certification of the departmental plan of study form and the Doctoral Degree Audit and Request for General Examination, which is submitted no later than three (3) weeks to the Graduate School in advance from the actual date of the general exam (you would put all your course work on this form). **Please Note:** Independent/Specialty Topics courses (ME 7903) will NOT count towards the 18 hour course requirement for Ph.D. students with obtained Master's Degrees.

For transfer of courses from a previous university, you need to complete the required transfer form that can be found on the MIE website.

Minor Requirements for PhD in ME (optional for Ph.D. students)

Minor: If a student chooses to, he/she can complete a minor in an area either within the ME department or outside in another appropriate department, relevant to the program. Students with a major in mechanical systems or thermal fluids may choose materials science and engineering within ME as their minor emphasis area, and vice versa. Alternatively, the minor area could be centered on a program offered in another department at LSU.

For an internal minor, 9 credit hours of graduate level course work in the area is required, of which a minimum of three (3) credit hours must be in 7XXX level courses. The selection of courses relevant to the minor emphasis program is left to the student and the minor professor. An overall average of 3.00 or better is required in the courses of the minor area.

Grade Point Average

- No grade of 'D' will count towards your Ph.D.

- Minimum GPA of at least a 3.0 every semester unless you are receiving a scholarship or fellowship in which a higher GPA average will be required (for example, EDA Fellows should maintain a minimum of a **3.5 average**)

3. Ph.D. Qualifying/Comprehensive Examinations

Qualifying examinations are administered by the department through the Mechanical Engineering Coordinators for Materials, Mechanical Systems, Thermal Fluids, and Math. Passing in a minimum of three areas including Mathematics is required to qualify.

The areas for examination will be selected in conjunction with your major professor. At least one of the exams will be required in your major field. If you change your major professor after you have successfully completed the qualifying examinations, you may be required to retake some or all of the examinations at the discretion of the new major professor.

If you fail in any given qualifying exam, you will be given one more opportunity to pass the subject the next time when an exam is offered in that subject. Two consecutive failures will lead to your termination from the ME Ph.D. program. You will, however, be able to continue if you receive a conditional pass provided you fulfill the stipulated conditions mentioned below.

You will not be able to select another subject without the permission from your advisory committee and ME graduate studies committee. If the advisory committee approves the substitution, it will be considered equivalent to the second attempt on that subject and failure in that subject will lead to your termination from the ME Ph.D. program.

Upon the exam results being made available to students, students have one week (i.e., seven calendar days) to submit a written request for their examination to be regraded. The written request should include appropriate reasons for regrading. Email these written requests to gradmie@lsu.edu.

Qualifying Exam Guidelines

The following graduate faculty-approved policies and procedures apply:

I. Type of Examination

Written, or oral, or optionally written and oral examinations should be scheduled in area group and advisory committee approved fields. The examinations are given in the following fields:

Thermal Science	**Mechanical Systems**	**Materials**
i) Fluid Mechanics	i) Statics/Strength/Failure	i) Materials Science
ii) Thermal Science	ii) Dynamics/Control/Vibrations	ii) Materials Engineering

Mathematics (required for ALL Ph.D. students)

Students should **select two examinations out of the first three groups** after consulting with their major professors and advisory committee members. Note that at least one examination in the major area is required. Some groups would require both the examinations to be selected in the major area. In addition, the **examination in Mathematics is compulsory for all students.**

II. Qualifying Exam Requirements

The following requirements apply to all written qualifying exams (exceptions are noted below).

Average score ≥ 70% → Pass

60% ≤ average score < 70% → Conditional Pass

Should a student receive "Conditional Pass" on the first attempt of an examination, student must choose only one of two options, either (a) take up to 2 courses to correct his/her deficiency and earn a grade B (3.0) or better in each course, or (b) retake the examination the next time it is offered. A result of "Conditional Pass" on the second attempt of an examination OR a grade of "B-" or lower on any course

recommended in the "Conditional Pass" is considered a result of "Failure" and the student shall be dismissed from the Mechanical Engineering Ph.D. Program. A student who chooses to retake the exam the next time it is offered, the first attempt will be counted as a fail.

Average score < 60% → Fail

With the exception of the Math exam, which has separate criteria, the student must retake the exam the next time it is offered and pass it. If the student fails the exam in the second attempt, he/she will be terminated from the Ph.D. program.

50% ≤ Average score < 70% Conditional Pass (Math Exam)

For an average score between 60% and 70%, the same rules as stated above apply, i.e. the student must take up to 2 courses to correct his/her deficiency and earn a grade B or better in each course. For a score between 50% and 60%, the same rules as stated above apply except that the student must take 3 courses to correct his/her deficiency, and earn a grade B or better in each course. In either case, the courses will be selected by the Math committee, and will not count toward the Ph.D. degree coursework requirement.

Average score < 50% Fail (Math Exam)

The student must retake the exam the next time it is offered and pass it. If the student fails the exam in the second attempt, he/she will be terminated from the Ph.D. program.

III. Scheduling of Examinations

The qualifying examinations in all subjects are given once a year, around the start of the fall semester. The deadline to complete registration for the PhD Qualifying Exams is May 15th, which is when study guides are provided. A potential PhD candidate must schedule qualifying examinations according to the following rules:

1. Students must complete at least one attempt in each of the applicable subjects before the beginning of their fourth semester of enrollment as a graduate student at LSU.
2. If a student has not attempted all exam subjects according to time limits stated above, any missed exam counts as a failed first attempt. Students will have to unconditionally pass on their second attempt to continue in the ME PhD program.

IV. Conduct of the Examinations

The area group coordinators are responsible for administering the examinations. Each group generates the examination questions through due solicitation process. For the sake of convenience, each examination is handled by one designated examiner who seeks the questions from the faculty concerned, selects the ones for the test in consultation with the group members and sets up the question paper in the examination area.

The selected questions appearing in the examination must have solutions prepared at the time of inclusion of the questions in the paper. The examination papers with the solutions and other data as specified above are given to the Graduate Administrative Coordinator for processing.

The examiner or any other designated member proctors the examination at the time when it is administered. Students are advised not to write their names on the answer sheets. They sign in and are identified on a master list against the number of the examination paper given to them. This list is turned over to the graduate administrative coordinator at the end of the examination. The examiner and/or any others designated by the group shall grade the examination papers.

At least two members of the graduate faculty will be involved in grading. It is the responsibility of the examiner designate and the group leader to ascertain the final average score of the examinees, get the final results approved by the entire group and turn in the results to the Graduate Program Coordinator for due processing.

The Graduate Administrative Coordinator will inform the examinees of the results.

4. General Examination

Upon completion of essentially all course work (not before the last semester of course work), your graduate advisory committee will administer the general examinations (including the minor fields). **PhD candidates are required to take their general exam within 15 months after they completely satisfy the requirements for the qualifying exam.** The nature and extent of these examinations will be at the sole discretion of the advisory committee. In addition to possible oral examinations, presentation and successful defense of a plan of research is required.

- A request for the general examination must be submitted to The Graduate School by the student's department chair at least three weeks prior to the proposed examination date.
- Submit your major professor approved research proposal to the advisory committee administering the general examination at least two weeks before the examination.

Continuous Registration Requirement - Doctoral candidates must maintain continuous registration for a minimum of three semester hours of credit each regular semester (excluding summer) from the completion of the general examination to the end of the semester in which an approved dissertation is submitted to the Graduate School.

5. Research Seminar

Before graduation, you must present a seminar, discussing the major results of your research. This should occur at the Graduate Student Research Conference scheduled annually.

Earning a passing grade in the ME Graduate Seminar Series, ME 7901, is also required. Full-time graduate students are required to register for ME 7901 (Graduate Seminar) and attend every semester. Part-time students are required to register and attend the seminar (ME 7901) course for one semester. You are not allowed to have more than two excused absences and one unexcused absence in any semester in the seminar course in order to pass. Keep track of other departmental seminar and presentation requirements.

Please Note: The seminar attendance requirement for part-time students will be for one semester only. The seminar course (ME 7901) attendance requirement is waived for any student, after the date when he/she has successfully defended his/her thesis, or while he/she is participating in an out-of-state internship or out of state student exchange program under approval of his/her major professor. If this condition is met for an entire semester, the registration requirement is waived.

6. Dissertation and Final Examination

The dissertation must demonstrate a mastery of research techniques, ability to do original and independent research, and skill in formulating conclusions that in some way enlarge upon or modify accepted ideas.

An open, announced, oral presentation of the dissertation and a "defense" examination is required after completion of writing of the dissertation. The exam part is to be administered by the student's advisory committee in a closed session for privacy purposes.

- A request for the final examination must be submitted to The Graduate School by the student's department chair at least three weeks prior to the proposed examination date or by the current semester deadline, if the student is a candidate for a degree (see the academic calendar for all pertinent dates).
- The examining committee, including the dean's representative, must have copies of the dissertation at least two weeks prior to the final examination. The dissertation must have been scrutinized and approved by your major professor prior to submission to the committee members.
- The result of this examination will be filed with the Graduate School by the major professor through the graduate administrative coordinator as soon as possible, provided all degree and departmental requirements have been met.

Other Requirements - Check with the Graduate Administrative Coordinator and the Graduate School regarding other requirements regarding electronic submission of dissertation, payment of fees, etc. Also, leave your future contact address with the graduate administrative coordinator. Keep in touch with your home department and Alma Mater, and inform us of your professional affiliation and growth in your career.

Other Programs

Interdisciplinary Programs

The College of Engineering offers programs leading to two interdisciplinary graduate degrees:

- Master of Science in Engineering Science
- Doctor of Philosophy in Engineering Science

These programs provide a mechanism for one to pursue advanced study in interdisciplinary fields, not covered by the graduate programs administered by individual departments of the college, such as Materials Science, Environmental Science, etc. The Associate Dean for Research and Graduate Activities of the College of Engineering administers these programs by keeping records of all students enrolled in interdisciplinary studies and by acting as coordinator for admissions decisions and as Program chairman of record on all documentation.

To participate in any of these programs, contact the Associate Dean for Research and Graduate Activities of the College of Engineering, as well as appropriate faculty within the ME program of the MIE Department. In general, these individuals, along with your advisory committee determine admission requirements, program of study, and examinations.

Graduate Minor in Mechanical Engineering

Graduate minors in Mechanical Engineering are available to students whose primary degree program is in another department at LSU. Students pursuing a formal minor in ME must include a representative from the Mechanical Engineering faculty on their graduate advisory committee, either as one of the first three members or as an additional appointed member.
Coursework for a formal minor may overlap with that required for the student's major; however, at least three (3) credit hours must be taken in addition to the requirements for the major. To complete a minor in Mechanical Engineering, students must take a total of nine (9) credit hours of graduate-level coursework in the discipline, including at least three (3) credit hours at the 7000 level. The selection of courses relevant to the minor emphasis is determined by the student in consultation with the Mechanical Engineering faculty member serving on the graduate advisory committee. A minimum GPA of 3.00 is required across all minor coursework.

Appendix: Graduate Course Offerings

Course descriptions are provided in the LSU General Catalog. Not all courses are offered every semester. For a list of courses offered in a specific semester, refer to LSU Course Offerings.

List of Approved Core Courses

Research areas are broadly organized as thermal sciences, mechanical systems, and materials science and engineering. The list of approved core courses in these areas are as follows.

Thermal Sciences

- ME 7313 Advanced Fluid Dynamics I
- ME 7323 Advanced Fluid Dynamics II
- ME 7333 Hydrodynamic Stability
- ME 7343 Computation of Fluid Flow & Heat Transfer
- ME 7433 Advanced Heat Transfer I
- ME 7443 Advanced Heat Transfer II

Mechanical Systems

- ME 4273 Stress Analysis in ME
- ME 4143 Vibrations
- ME 7153 Advanced Vibrations
- ME 7163 Advanced Dynamics
- ME 7273 Advanced Stress Analysis in ME
- ME 7633 Advanced Engineering System Dynamics
- ME 7673 Advanced Mechanical Systems Control

Materials Science and Engineering

- ME 4723 Advanced Methods of Material Characterization
- ME 4733 Deformation and Fracture of Engineering Materials
- ME 7723 Electron Beam Characterization of Materials (TEM course)
- ME 7743 Defects, Diffusion, & Transformation in Solids*
- ME 7753 Thermodynamics of Solid Materials*

For the Materials Minor, we have:

- ME 4723 Advanced Methods of Materials Characterization
- ME 4743 Kinetics of Materials
- ME 4733 Deformation and Fracture of Engineering Materials

* Required for all Materials Majors

Graduate electives

Electives are offered both at the 4000 and 7000 level. Any upper-division undergraduate technical elective (not part of the core undergraduate curriculum) can be taken for graduate credit. For a list of courses offered, refer to the LSU General Catalog. Note: 4000 level classes need to be taught by graduate faculty to be eligible for graduate credit.

Mathematics course recommendations

- MATH 4038 Mathematical Methods in Engineering*
- MATH 4340 Partial Differential Equations
- MATH 4036 Complex Variables

- ME 7533 Numerical Methods in Applied Mechanics

* Partially covers material relevant to the PhD Qualifying Exam

Course Transfer Requests

If you have taken graduate-level courses from a previous university and want to transfer courses to LSU, you may be able to transfer up to 50% of credit hours required for the LSU degree. Per LSU Graduate School regulations, only courses with a grade better than "C" are eligible for transfer. For international degrees, you should consult web resources for commonly used grade conversions.
For each course, you must document equivalency by providing a syllabus for the course taken at the previous university as well as the corresponding course description at LSU. All course transfers need to be discussed with and approved by each member of your advisory committee. For any substituted core course, an additional approval is required by the last ME faculty to teach the equivalent course at LSU. The completed departmental course transfer request form should be submitted electronically together with all applicable documentation to the graduate coordinator (gradmie@lsu.edu).