Mechanical Engineering

Degree Offered:	Master of Science in Mechanical Engineering
Website:	https://www.uab.edu/engineering/mme/graduate/ms-mechanical
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Mechanical engineering is a broad-based discipline, and graduate students will have opportunities to explore a number of research areas where they will work alongside nationally and internationally known faculty mentors. The Department of Mechanical and Materials Engineering offers a Master of Science in Mechanical Engineering degree, including both Thesis and Non-Thesis options, as well as a Doctor of Philosophy degree in Mechanical Engineering.

Additional Information

Deadline for Entry Term(s):	Fall: August 1; Spring: December 1; Summer: Mayl 1
Deadline for All Application Materials to be in the Graduate School Office:	Six weeks before term begins

Master of Science in Mechanical Engineering Admissions Requirements

- A bachelor's degree from an accredited (or equivalent) program in engineering or the physical sciences is required for admission to graduate study in mechanical engineering with not less than B-level scholarship overall or over the last 60 semester hours of earned credit.
- International applicants must submit English proficiency scores in accordance with UAB Graduate School requirement. Click here for details
- Original transcripts from all colleges and universities attended since high school must be sent directly to the UAB Graduate School (detailed instructions are included during the online application process)

A student with an undergraduate degree in a field of engineering other than mechanical or in the physical sciences may also be accepted into the mechanical engineering program. However, such a student will normally have to take additional, preparatory coursework as part of an expanded plan of study (see "Preparatory Courses" later in this section).

Special Topics (590/690/790) courses and Independent Study (591/691/791) courses are reviewed for degree applicability for each program in the School of Engineering. No more than 6 combined hours of Special Topics and/or Independent Study courses will be applied to the degree without appeal to and approval from the Program Director.

The School of Engineering offers similar courses at the 400/500 and 600/700 levels. While the higher numbered course has more advanced content, there is a significant overlap in topics. Therefore, students are not allowed to take a 500-level or 700-level course for credit if they have previously taken the related 400-level or 600-level course, respectively.

UAB offers Accelerated Bachelor's / Master's and Early Acceptance. To learn more about these programs, including requirements and how to apply, visit the Graduate School's ALO page.

Accelerated Bachelor's / Master's

Accelerated Bachelor's / Master's

Mechanical Engineering offers an accelerated Bachelor's / Master's (ABM) option for high-achieving undergraduate students pursuing a BS degree in Mechanical Engineering at UAB. Once enrolled in the program, students may take up to 12 credit hours of 500-level Mechanical Engineering graduate courses for shared credit. A successful graduate of ABM will earn both a bachelor's degree and a master's degree in ME from the University of Alabama at Birmingham in an accelerated time-frame compared to the independent completion of the two degrees.

Plan I (Thesis Option)

1. Upon admission to the program, the Graduate Program Director will advise the student on courses for the first semester. During the first semester, the student will be assigned a Committee Chair, based on research interest, who will assist the student in forming their graduate study committee. The committee will consist of the Chair and two graduate faculty members with experience or expertise related to the student's thesis topic. The Chair, in coordination with the committee, will aid the student in course selection.
2. In addition to the general Graduate School requirements, the student must successfully complete at least 24 semester hours of coursework, including:
   - 6 semester hours in committee-approved mathematics courses
   - 18 semester hours in committee-approved mechanical engineering courses or approved related courses, including at least 2 semester hours of MME 601 Mechanical and Materials Engineering Seminar and 3 semester hours in a course outside the student's research or specialization area.
3. A student is eligible for admission to candidacy after (1) a written thesis has been orally presented to and approved by the committee and (2) successful completion of Responsible Conduct in Research training.
4. After admission to candidacy, the student must register for at least 6 hours of ME 699 Thesis Research in addition to the 24 semester hours of coursework.
5. The student must successfully complete and defend a thesis.

Plan II (Non-thesis Option)

Generally, Plan II will be approved for students working full-time and attending UAB on a part-time basis or when the student demonstrates that Plan II offers superior educational benefits. After 15 credit hours of coursework are completed, the student should select a project director and begin work on the final project. The election of Plan II must be approved by the student's graduate advisor.

1. The student must successfully complete at least 33 semester hours of coursework, including:

- 6 semester hours in approved mathematics courses
- A minimum of 27 semester hours in approved mechanical engineering courses or approved related courses. Of these 27 semester hours, students must enroll in:
  - at least 3 semester hours in a course outside the student's research or specialization area
  - at least 2 semester hours of MME 601 Mechanical and Materials Engineering Seminar
  - at least 3 hours of ME 698 Non-Thesis Research involving design or research

2. The student must make a presentation on the research project and submit a final report which must be approved by the project director.

Early Acceptance

Early Acceptance Programs are designed for academically superior high school students. Early Acceptance Programs allow high-achieving students to be conditionally admitted into a graduate program at the same time they are admitted to an undergraduate program.

Eligible students are required to maintain a 3.50 undergraduate GPA and complete the following prerequisite courses: ME 241, ME 321, ME 364, and ME 371.

Preparatory Courses

The following courses and their prerequisites are required preparation for the graduate program in mechanical engineering. Students will be required to successfully complete the courses below or present equivalent prior coursework. Additional courses may be required depending on the research interest.

Requirements		Hours
ME 241	Thermodynamics I	3
ME 321	Introduction to Fluid Mechanics	3
ME 322	Introduction to Heat Transfer	3
ME 360	Introduction to Mechatronic Systems Engineering	3
ME 370	Kinematics and Dynamics of Machinery	3
ME 371	Machine Design	3
CE 220	Mechanics of Solids	3

Degree Offered	Mechanical Engineering PhD
Website	https://www.uab.edu/engineering/mme/graduate/phd-mechanical-engineering
Program Director	Roy Koomullil, PhD
Email	rkoomul@uab.edu

Program Objectives

The PhD degree in Mechanical Engineering prepares students to become productive engineering researchers in industry, academia, government, or other organizations. Students will be equipped with the skills necessary to define, formulate and solve novel problems in the mechanical engineering field. The program emphasizes the mechanical engineering sciences with a strong foundation in mathematics. Graduates will be well prepared for research roles to serve their organizations, their communities, and contribute to the UAB mission of having an economic impact in the region.

Graduates will be well prepared for positions as academic, government and industrial researchers. They will be equipped with the knowledge and skills to develop quality research proposals and carry out research to develop new and innovative theories, models, products and ideas in mechanical engineering intended to advance the state-of-the-art. Entry-level roles at academic institutions would include assistant professor or research engineer, and in government and industry research engineer or laboratory associate. Graduates will also be well prepared to compete for post-doctoral studies at other universities and laboratories across the world.

Students in the Mechanical Engineering PhD program will:

- Develop the ability to identify, formulate and solve complex Mechanical Engineering problems by applying principles of engineering, science and mathematics.
- Be able to explain experimental/theoretical approaches and limitations associated with his/her dissertation project.
- Be able to summarize the relevant literature, identify its limitations, and formulate an original research plan.
- Be able to communicate and defend his/her research results and conclusions in oral and written form.

Admission Requirements

Admission decisions are made on the basis of prior education, GPA, test scores, personal statement, professional experience, and recommendations.

In addition to the Graduate School admission requirements, admission to the Mechanical Engineering PhD program includes the following:

- Undergraduate or graduate degree in Mechanical Engineering or related engineering field from an ABET (or equivalent) accredited program. Applicants who do not meet this criterion but who have an outstanding academic record in a related field outside of engineering may be admitted, but will be required to complete a sequence of undergraduate courses (including prerequisites as appropriate) in addition to the normal requirements of the ME PhD degree
- Minimum GPA of 3.0 on a 4.0 scale for most recent degree
- GRE is not required
- Personal statement identifying research interest
- CV/Résumé
- 3 academic or professional recommendations
- International applicants must submit English proficiency scores in accordance with UAB Graduate School requirement. Click here for details
- Original transcripts from all colleges and universities attended since high school must be sent directly to the UAB Graduate School (detailed instructions are included during the online application process);

Entry Term	Deadline
Deadline for Entry Term(s)	Fall: August 1; Spring: December 1; Summer: May 1
Deadline for All Application Materials to be in the Graduate School Office	Seven days before term begins

Degree Requirements

Graduate Committee

The graduate study committee (dissertation committee) is an important part of the student's program. The committee will oversee the selection

of courses and direction of research. Students must form a graduate committee within the first year of study and must meet with the committee no less than once per academic year. Committees must have at least five members. A minimum of three committee members must have a primary appointment in the School of Engineering. It is recommended that at least one committee member have an appointment outside of the engineering field.

Coursework

The ME PhD promotes a research-based curriculum with a set of core courses required of all students in the program. Additional coursework is directed by the student's graduate study committee based on the student's area of interest.

Students entering the PhD program with a baccalaureate degree must, in keeping with UAB Graduate School policies, complete at least 48 hours of coursework prior to admission to candidacy. Up to 16 of the 48 credits can be non-dissertation research, and up to 10 credits can be a combination of laboratory rotations, seminars, and directed study.

Students entering the PhD program with a Master's degree in ME or a related field must complete at least 27 credit hours of coursework prior to candidacy. Up to 6 credits of the 27 can be non-dissertation research credits, and up to 6 credits can be as lab rotations, seminars, or directed study credits.

For all students, at least 24 hours of dissertation research are required and must be taken over at least two semesters after admission to candidacy.

Curriculum

Requirements		Hours
Requirements		
GRD 717	Principles of Scientific Integrity	3
MME 701	Mechanical and Materials Engineering Seminar [1]	4
ME 661	Math Methods in EGR I	3
ME 662	Math Methods in EGR II	3
Program Electives [2, 3]		35
ME 799	Dissertation Research (Program Electives) [4]	24
Total Hours		**72**

1. 4 enrollments of 1 hour each; Students may substitute a different graduate-level seminar/journal club with permission of his/her faculty mentor and the program director
2. Elective options include: ME 511, ME 521, ME 530, ME 531, ME 547, ME 575, ME 580, ME 611, ME 613, ME 614, ME 615, ME 650, ME 665, ME 670, ME 672, ME 677, ME 679, ME 688, ME 731, ME 732, ASEM 610, ASEM 611, ASEM 612, ASEM 613, ASEM 615, ASEM 617, ASEM 628, MSE 635
3. Students who have earned a Master of Science in Mechanical Engineering are required to successfully complete 14 credit hours of electives from the list above
4. Dissertation hours must be taken over a minimum of 2 terms

In addition to the ME PhD program core courses (above), course selection is based on the research and career goals of the student, and curricula will vary between students. Students are guided by their faculty mentor (committee chair) and a graduate study committee composed of faculty representing a transdisciplinary team in the student's area of research interest. Non-dissertation research and dissertation research hours will be taken through the department of the student's faculty mentor.

Specifics of coursework would be tailored to the individual research thrusts of the student and may differ from the lists given below. While no formal options/concentrations are listed as part of the program, the specifics of the student's curriculum (beyond the core requirements) will be tailored to the individual. Please contact the program director for more information about specific areas of specialization.