MECHANICAL ENGINEERING, PH.D.

While pursuing a Doctor of Philosophy (PhD) degree in mechanical engineering, the student will take graduate-level courses and conduct research with a faculty advisor and observe how these studies will lead to key engineering innovations and societal impacts in the field of mechanical engineering. Equipped with complementary and state-of-the-art computational and experimental facilities, the Mechanical Engineering Department has active research programs in the following three disciplinary groups; Dynamic Systems & Control (DSC), ThermoFluids Science (TFS), and Materials Processing & Manufacturing (MPM). Faculty teach graduate-level courses and conduct research in cross-disciplinary research thrust areas that include: automotive systems, robotics and human systems, automation and mechatronic systems, energy and building efficiency, internal combustion engines, manufacturing systems, additive manufacturing, and materials processing and modeling. Graduate courses in these areas, in addition to the general core graduate courses, provide the foundation for earning a PhD degree in mechanical engineering. Additionally, the student demonstrates mastery of the selected study area through qualifying exams, the proposal of a research topic, and the defense of a research-based dissertation.

In addition to traditional on-campus degree offering, our PhD program is also offered via the distance option. For more information on online PhD in Mechanical Engineering see UA Online Degree Programs. We are confident that distance education students will have a great opportunity to obtain their degrees with minimal travel or job disruption. Applicants interested in the distance approach are encouraged to contact faculty members in the area of research interest to inquire about the formulation of a research project that is suitable for completion via distance. Note that the distance option is restricted to students residing within the borders of the United States or serving on a U.S. military installation.

Students and faculty in the Department of Mechanical Engineering have access to state-of-the-art computational facilities and experimental capabilities. On-campus assets include numerous commercially available computational modeling software packages. In addition, high performance computing capabilities are accessible through The University of Alabama’s Office of Information Technology. The department also has many state-of-the-art experimental facilities available for daily use by graduate students.

Qualified students in the Mechanical Engineering undergraduate program at The University of Alabama are eligible for early admission into the PhD program through the Accelerated Masters Program (AMP). This program allows students to double-count up to 9 hours of graduate credit toward their undergraduate degree.

Admission Requirements

For admission to the PhD Program, a prospective graduate student should have:

- a Master’s degree in Mechanical Engineering,
- a grade point average of at least 3.0 on a 4.0 scale

or

- a Bachelor’s degree in Mechanical Engineering or related area (see below),
- a grade point average of at least 3.3 on a 4.0 scale, and
- a combined verbal and quantitative GRE requirement of 300 or greater.

There is no minimum score on the writing section of the GRE for admission to the PhD Program. The GRE requirement is automatically waived for those applicants holding an MSME degree from an accredited program. BSME applicants with 5 or more years of field-related work experience may contact the ME Graduate Program Director to inquire about a GRE waiver request. A short Statement of Purpose describing possible research/study interests and a Resume are required for each application. Applicants should also submit three letters of recommendation.

Current MSME students with a grade point average of at least 3.5 on 4.0 scale and 9 or more graduate credit hours may also apply for admission to the PhD program with the recommendation of his or her major advisor. Applicants in related areas such as science and mathematics are encouraged to apply; however, prerequisite undergraduate courses will be required that will not apply for graduate credit.

International applicants whose first language is not English may be required to submit TOEFL scores of 92 or higher.

Accelerated Masters Program (AMP) – PhD Direct Admit

Current Mechanical Engineering (ME) undergraduate students at The University of Alabama with a 3.3 or higher GPA and 90 or more hours of undergraduate course credit are eligible to apply for the PhD direct admit program via the Accelerated Masters Program (AMP). AMP allows undergraduate students to earn admission to the PhD program and to simultaneously count up to 9 hours of graduate coursework toward both the undergraduate and graduate degrees. The GRE test requirements are automatically waived for AMP applicants.

Application Deadlines

There are no formal deadlines for graduate applications. Once an application is complete, the internal review process typically only takes a couple of weeks. However, international applicants should consider the time required to obtain any necessary travel documents. Only after the student has been accepted and the University has provided the appropriate paperwork can an applicant apply for appropriate travel documents. This process can take between two and six months, depending on the country of origin. Students must complete this process and arrive on campus prior to the first day of class. All of these steps should be considered by international students when planning to apply.

Degree Requirements

Graduate School Degree Requirements and College of Engineering PhD degree requirements are detailed below. Also refer to the online Graduate Handbook on the departmental homepage.

Doctor of Philosophy

The doctorate requires 48 credit hours of coursework beyond the Bachelor’s degree, a comprehensive qualifying exam, and a dissertation. Students with a Master’s degree will usually count up to 9 hours of undergraduate course credit are eligible to apply for the PhD direct admit program via the Accelerated Masters Program (AMP). AMP allows undergraduate students to earn admission to the PhD program and to simultaneously count up to 9 hours of graduate coursework toward both the undergraduate and graduate degrees. The GRE test requirements are automatically waived for AMP applicants.

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Doctor of Philosophy

The doctorate requires 48 credit hours of coursework beyond the Bachelor’s degree, a comprehensive qualifying exam, and a dissertation. Students with a Master’s degree will usually receive credit for 24 hours of course work. The dissertation must sufficiently document original research that makes a significant contribution to the profession. Note that additional requirements may be stipulated by the UA Graduate School.

- A minimum of 48 semester hours (excluding ME 699 Dissertation Research) of approved courses that together satisfy all other course requirements for the degree
• A minimum of 24 semester hours of coursework in the major technical area, of which 9 hours may be in closely related supporting areas and of which 3 hours may be graduate research seminar.
• A minimum of 12 semester hours in any minor technical areas included in the student’s program of study.
• The student must pass a qualifying examination and present a research proposal.
• An approved dissertation and a minimum of 24 semester hours of ME 699. Note that once ME 699 hours are started, there is a continuous registration requirement as described elsewhere in the graduate catalog.
• The student must provide a course portfolio to the dissertation committee. Refer to the online Graduate Handbook on the departmental web page for additional details.

Early in the graduate program, each student confers with a faculty adviser to select courses, discuss when and by which method the doctoral residency requirement will be completed, discuss research interests, and so forth. Then a Plan of Study is prepared and submitted to the Graduate School. The PhD Plan of Study is available at the Graduate School website under the forms section. All doctoral students must have a completed Plan of Study approved by the Graduate School no later than the semester during which the student will complete 30 semester hours of UA and/or transfer credit for the doctoral degree. Otherwise, a “hold” may be placed on future registration. If later there are changes in the Plan of Study, the student simply submits an amended PhD Plan of Study to the Graduate School at the time that the form for Admission to Candidacy for Doctoral Degree is submitted. A department-approved Admission to Candidacy for the Doctoral Degree is submitted to the Graduate School as soon as possible after passing the comprehensive (preliminary) examination.

See the online Graduate Catalog for details on Plan of Study, Admission to Candidacy, and all other Degree Requirements.

**Faculty**

**Professors**
- Jalili, Nader, Department Head
- Agrawal, Ajay K.
- Balasubramanian, Bharat
- Krishnan, Sundar Rajan
- Shen, Xiangrong
- Shepard Jr., W. Steve
- Srinivasan, Kalyan Kumar

**Associate professors**
- Amini, Shahriar (Sean)
- Ashford, Marcus D.
- Bittle, Joshua A.
- Fonseca, Daniel J.
- Khandelwal, Bhupendra
- Mahmoodi, S. Nima
- Momeni, Kasra
- Puzinauskas, Paulius V.
- Todd, Beth Ann
- Volkov, Alexey N.
- Williams, Keith A.
- Yoon, Hwan-Sik

**Assistant professors**
- Carpenter, Joseph
- Cousin, Christian A.
- Davami, Keivan
- Kasemer, Matthew
- Kim, Hyun Jin
- Martelli, Dario
- Pakniyat, Ali
- Patiballa, Sree Kalyan
- Samadi, Forooza
- Shah, Krishna
- Vikas, Vinish

**Instructors**
- Hill, Lawrence
- Koutahzadeh, Negin
- Scott, Radley

**Adjunct professor**
- Daniewicz, Steve

**Adjunct assistant professor**
- Rasoulzadeh, Mojdeh

**Professor emeritus**
- Woodbury, Keith A.