MECHANICAL ENGINEERING, PH.D.

Admission Requirements

Descriptions of the Graduate School Admission Criteria and the College of Engineering General Admission requirements are listed below. See the Admission Criteria section of this catalog for more information.

A master’s degree applicant for a mechanical engineering program should normally have a baccalaureate degree in mechanical engineering from an ABET-accredited curriculum or a recognized international university. Applicants in related areas such as science and mathematics are encouraged; however, prerequisite undergraduate courses will be required that will not apply for graduate credit.

Admission to the PhD program usually requires completion of a master’s degree; however, exceptionally qualified applicants may be admitted directly to the PhD program from the bachelor’s degree.

The GRE is not required for graduates from ABET-accredited programs. All other applicants must submit GRE scores. International students generally must submit TOEFL or equivalent scores in English language proficiency.

Degree Requirements

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

Doctor of Philosophy

The following are the department’s requirements for the PhD degree:

- 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
- A minimum of 12 semester hours in any minor technical areas included in the student's program of study
- A comprehensive exam. A Ph.D. proposal or journal paper, as approved by the committee, can serve as a comprehensive exam.
- An approved dissertation and a minimum of 24 semester hours of ME 699.

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. 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 graduate work.

A defined field of specialization is required of all candidates for the doctor of philosophy degree. A minimum of 48 semester hours of non-dissertation coursework is required. Candidates should consult their departments or the appropriate section of this catalog for additional requirements. The doctoral course as a whole must be unified, and all its parts must contribute to an organized program of study and research. In addition, a student must complete a minimum of 24 hours of dissertation research.

Field of specialization

A defined field of specialization is required of all candidates for the doctor of philosophy degree. A minimum of 48 semester hours of non-dissertation course credit is required. Candidates should consult their departments or the appropriate section of this catalog for additional requirements. The doctoral course as a whole must be unified, and all its parts must contribute to an organized program of study and research. In addition, a student must complete a minimum of 24 hours of dissertation research.

Research skill/language requirements

There is no University-wide foreign language/research skill requirement for doctoral students; each college or department offering the PhD degree may set its own requirements. This policy reaffirms the importance of research skills and foreign languages in the highest academic degree granted by American universities, but it also recognizes that the departments offering the degrees are in the best position to determine the number and nature of such requirements in the interests
of their students. For further information about PhD foreign language/ research skill requirements, students may contact their departments or the Graduate School office (205-348-5921).

**Interdisciplinary Studies**
There is a PhD degree program in interdisciplinary studies, and it is administered by the Graduate School. In addition to the general requirements for the PhD degree, the program of study and the supervisory committee for the prospective interdisciplinary studies degree candidate must be approved by the dean of the Graduate School before the student is admitted to the program. See Interdisciplinary Studies (IDS) at the Graduate School’s website for information on prerequisites, admission procedures, course of study and other aspects of IDS programs.

**Doctor of Education Degree**
A minimum of two years of graduate study beyond the master’s degree is required for the completion of the EdD program. The student is required to complete 60 semester hours in approved graduate courses beyond the master’s degree, or 90 semester hours of approved graduate courses, and to defend a dissertation. The student must complete a minimum of 12 hours of dissertation research. In the College of Education section of the Graduate Catalog, there are specific regulations governing the EdD program.

**Doctor of Musical Arts Degree**
The DMA. degree requires a minimum of 48 semester hours beyond the master of music degree, plus recitals and other examinations as determined by faculty of the School of Music. Specific requirements for each major area are outlined in the School of Music section of the Graduate Catalog.

**Doctor of Nursing Practice**
The Doctor of Nursing Practice (DNP) is a joint program offered by the University of Alabama in Huntsville College of Nursing (UACHCON), the University of Alabama at Birmingham School of Nursing (UABSON), and The University of Alabama Capstone College of Nursing (UACCN). The DNP is a practice-focused degree that is detailed in the Nursing section of this Catalog.

**Admission to Doctoral Degree Programs**
Admission to any doctoral program is limited to students whose scholastic records show distinct promise of success in doctoral study. Admission to the Graduate School and the earning of a master’s degree from The University of Alabama does not guarantee acceptance into a doctoral program. Students in doubt about their acceptance into doctoral programs should consult with departmental advisers and the Graduate School, which makes the final decision about admission. A department may terminate a student’s doctoral admission if there is documented unsatisfactory academic or other progress toward completion of the degree.

**Residency Requirements**
The intent of the residency requirement is to ensure that doctoral students contribute to and benefit from the complete spectrum of educational, professional and enrichment opportunities provided at The University of Alabama. Though not all-inclusive, the list below shows some of the primary reasons why best practices in U.S. graduate education and the graduate faculty on the UA Graduate Council have determined that a substantial residency experience must be included in a doctoral program:

- provide significant interaction between the student and the various UA graduate faculty in the student’s discipline
- provide ample opportunities for student exposure to and engagement with cognate disciplines and research scholars working in those disciplines
- provide significant opportunities for face-to-face peer interaction between and among graduate students in the student’s discipline and in other disciplines
- provide the opportunity for a mentor-apprentice relationship between the student and graduate faculty, as well as adequate time for in-depth and direct faculty evaluation of the student

There are two possible methods for meeting doctoral residency. The traditional method is the method of choice by the majority of UA departments. There also is an alternative method available, but only for doctoral students in specific departments or programs that have submitted a proposal for an alternative and had the faculty of the Graduate Council evaluate and approve the alternative. (Those departments and programs are in a bulleted list in the last paragraph of this section of the catalog).

**Traditional Doctoral Residency**
The residency requirement is that the student must spend an academic year in continuous residence on the campus of The University of Alabama as a full-time student in the Graduate School. Any one of the following 4 methods can be used to meet traditional residency:

- a full-time fall semester plus full-time enrollment the next spring
- a full-time summer (consisting of 9 or more graduate hours in the 13 weeks from Interim through the end of Summer II) plus the following full-time fall semester
- a full-time spring semester plus the next full-time summer semester as defined above
- a full-time spring semester plus the following full-time fall semester

To meet this requirement, only graduate-level, non-dissertation coursework can be applied. Dissertation or thesis research cannot be used. The Graduate Council, consisting of representatives of the UA graduate faculty, has established a policy that distance learning courses delivered online or by any other distance learning format may not be used to satisfy the traditional doctoral residency requirement.

As mentioned earlier, the majority of UA departments follow traditional residency as described above and do not permit any distance learning hours to be used to meet residency.

**Alternative Doctoral Residency**
For many years there has been an alternative for EdD students at the Gadsden Center. See the College of Education section of this Catalog for details.

For other doctoral students, in 2008 the Graduate School worked closely with the Graduate Council so that a department could apply for approval of an Alternative Doctoral Residency (ADR) option for its doctoral students. There is a brief ADR proposal template (available from the Graduate School) for departments to use to propose an ADR option for their department. It includes such things as demonstrating that the proposed ADR will assure that ADR doctoral students meet 5 "value constructs" that underpin doctoral education as well as do other students in the department who earn doctoral residency by the traditional method.

When a department or program receives Graduate Council approval to offer an ADR, the ADR provides a second possible way for students in that department or program to meet the residency requirement.
The approved ADR does not replace the traditional residency option, which is still available to students who choose it. Whether the student meets doctoral residency through the traditional method or an approved ADR method, dissertation (699) hours may not be used; only non-dissertation graduate hours may be used to satisfy the doctoral residency requirement.

In the specific departments or programs that have received Graduate Council approval to offer an ADR, students choosing the ADR option may be able to include up to a certain number of distance learning hours. The specific number is what was approved in the ADR proposal for that particular department. Contact the department for details. The following have been approved to offer an ADR:

- PhD in Counselor Education
- PhD in Aerospace Engineering and Mechanics
- PhD in Curriculum and Instruction
- PhD in Human Performance
- PhD in Instructional Leadership
- PhD in Instructional Leadership (Instructional Technology Concentration)
- PhD in Instructional Leadership (Social and Cultural Studies Concentration)

Graduate Credit
A student must be admitted to the Graduate School and must register as a graduate student in order to receive graduate credit. Approval for graduate registration must be obtained from program advisers prior to registration.

Graduate Credit for Noncredit Experiences
All course credit used toward a UA graduate degree must be taught at the graduate level. No graduate credit may be earned by correspondence study or for experiential learning not conducted under the direct supervision of graduate faculty of The University of Alabama. UA does not offer graduate credit for noncredit workshops, seminars, continuing education experiences, professional development, internships, work/life experience and so forth.

Transfer of Credit
Graduate credit earned in the field of the doctoral degree from a regionally accredited institution in which the student was enrolled in the graduate school of that university may be considered for transfer and applied towards the requirements for a doctoral degree if approved by the department and the Graduate School. Evaluation of credit for transfer will not be made until after the student has enrolled in the Graduate School of The University of Alabama.

In some cases, foreign educational credentials may not meet the Graduate School's criteria for transfer of credit. It may be necessary for students in this situation to secure an evaluation of their credentials from World Education Services Inc. (WES), an external foreign credential evaluation service. Additional information on their services can be found at their website.

There are two options for possible transfer of graduate credit at the doctoral level.

1. All doctoral programs: Up to one-half of the required coursework (exclusive of dissertation research hours) for a doctoral degree may be transferred from another institution if the credit was in-field and was earned during the six-year period (18 fall, spring and summer semesters) preceding the semester of admission to the UA doctoral program. Revalidation (recertification) of credits more than 18 semesters old at the time of admission to a doctoral program is not an option. Only courses in which a student earned a "B" grade or better may be transferred. The student must have attained an overall graduate GPA of "B" or better on all graduate work attempted. Under this option, a Request for Transfer of Graduate Credit form must be submitted to and approved by the Graduate School.

2. PhD Programs Only: A student holding an earned, in-field master's degree and working in the field or a related field since earning the degree may request approval for up to 24 hours of credit to be applied to the PhD. To do this, the student must have earned at least a "B" overall graduate GPA from the awarding institution. If approved for transfer, these hours would count toward the minimum 48 coursework hours required for the PhD degree. For departments participating in this program, the use of this option must be indicated on the Plan of Study.

To participate in Option 2, the Plan of Study must be submitted during the first semester of enrollment. If any coursework from the in-field or related-field master's degree was earned more than six years prior to the date of admission, the graduate program director or department head/chair must submit to the Graduate School for evaluation a Field-Related Employment Since Earning Master's Degree form with the student's CV and a PhD Plan of Study.

Consideration of transfer of credit or the acceptance of an earned master's degree as credit toward a PhD program is subject to a final decision by the Graduate School. In either case the student must ensure that the Graduate School has an official transcript of all credit involved. This will ensure that the student and advisor are fully aware of course hours needed when submitting the required Plan of Study, which must be submitted by the time the student completes 30 hours of transfer plus UA coursework. Planning to transfer courses in the penultimate semester or the final semester typically will delay graduation.

Please note that some departments allow fewer than 24 hours of graduate transfer credit. Be sure to check with your department's graduate coordinator regarding your department's transfer policy.

Each department wanting its doctoral students to be able to choose Option 2 needs to "opt in" to this option by informing the graduate dean in writing that they wish to be among the approved departments.

Time Limits
All requirements for the doctoral degree must be completed within seven years (21 fall, spring, and summer semesters) following admission to the doctoral program, with the following specific exceptions approved by the Graduate Council: psychology, modern languages and classics, English and political science (eight years if entering the doctoral program with a baccalaureate, not master's, degree), and eight years from the time of first registration in PhD courses for students dually enrolled in the PhD program in political science and the JD program.

Previous graduate credit may be applied to the doctoral degree if the credit was earned during the six-year period (not seven years) prior to admission to the doctoral program or accepted by the Graduate School as part of Option 2. Such credit must be identified clearly on the Outline of PhD Program (Plan of Study) and requires Graduate School approval. Only those students graduating within the time limit for their doctoral program may apply previously approved graduate credit to the doctoral degree. Revalidation (recertification) of any expired course credit is not an option.

Time Limits Extension Request
Only under compelling circumstances beyond the student's control a student may petition for a one-semester extension to the seven-year time
limit (or eight-year time limit for the selected programs noted above). The Graduate Council approved the following steps to request an extension:

- To begin the process, the student petitions the department head. In the petition the student
  a. describes the compelling circumstances,
  b. briefly describes the current status of the dissertation, then
  c. includes a timeline showing each important remaining step in the completion of the dissertation. The last step and date in the timeline are submission of the successfully defended dissertation on or before the published final date for submission of dissertations for the requested extension semester.

- If the department head supports the petition, it is forwarded to the college dean.

- If the college dean supports the petition, it is sent to the graduate dean.

- If the graduate dean or his designee approves the extension, it will not require the student to validate any out-of-date UA or transfer courses previously approved for the plan of study.

- If a student fails to complete all degree requirements within the time limit for the student’s doctoral program or within a one-semester extension approved as noted above, the student will be dropped (suspended) from the doctoral program. To complete a doctoral degree, the student would have to reapply for admission and be admitted by the department and Graduate School. Graduate Council policies do not provide the option for a student failing to complete within the time limit to revalidate (recertify) either UA or transfer courses completed more than six years prior to the date of admission. Thus, a readmitted student would be able to apply to the new admission only those courses approved by the department and Graduate School and completed within the six years (18 fall, spring, and summer semesters) prior to the new admission.

Repeating Courses When Given an Extension

When requests are made for extensions of the doctoral time limits, and it is deemed that an out-of-date course is integral to the degree program, the college dean may request permission of the Graduate School for such a course to be repeated. In this case, both grades are used in calculation of the GPA.

Plan of Study

Early in the graduate program, each student must confer with the appropriate departmental adviser or major professor 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 must be prepared and submitted to the Graduate School.

The PhD Plan of Study and DMA Plan of Study are available at the Graduate School website. The Plan of Study for other doctoral programs (EdD, DNP) are available from the student’s department, college or school. 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 toward the doctoral degree. Otherwise, a “hold” may be placed on future registrations.

An amended Plan of Study (if needed) must be submitted to the Graduate School when the student submits the form for Admission to Candidacy for Doctoral Degree.

Preliminary or Comprehensive Examination

A preliminary or comprehensive qualifying examination is required of all doctoral candidates. This examination is given after

- any foreign language/research skill requirements are met (PhD students only);
- two full years of graduate study are completed; and
- the supervisory committee deems the student to have adequate preparation in the major and minor fields of study.

The examination is conducted by the student’s supervisory committee or other committee established in the program area. Whereas one of the purposes of the preliminary examination is to determine the student’s research competence to begin work on a dissertation, the examination should be completed at least nine months before the degree is to be awarded. A student may take the oral or written examination only twice. Failing the examination twice results in dismissal from the degree program and the Graduate School.

Admission to Candidacy

The requirements for advancing to candidacy include passing the qualifying (major or preliminary) examination; completion of all coursework as listed on the approved program of study; receiving departmental approval of the dissertation subject (although some departments require the defense of a dissertation proposal and/or writing one or more preliminary sections of the dissertation as well); and having the committee recommend the student for Admission to Candidacy for the Doctoral Degree. The completed candidacy form is submitted to the Graduate School well in advance of the final semester.

Continuous Dissertation or Document Registration

Once a student has met the requirements for admission to candidacy, received approval for the dissertation research proposal, or initiated enrollment in 699 (dissertation research for a doctoral degree), the student must pursue completion of the dissertation without interruption by enrolling each fall and spring semester of the academic year for at least 3 hours of dissertation research. Summer enrollment for 699 Dissertation Research is expected if the student is working on the dissertation and using any University facilities or resources, including faculty time, but the only time summer registration is required for dissertation research (3 hours minimum) is when a doctoral student is graduating in August or defending the dissertation during the summer semester. This is true whether or not the student has formally submitted an Application for Admission to Candidacy.

Each PhD student must have completed a minimum of 24 hours of such dissertation work upon completion of the degree. The amount of dissertation research for which a student enrolls in any given semester should be commensurate with the progress a student is expected to make on the dissertation, as well as reflective of the extent to which University facilities and faculty time are invested in the proposed activities.

Dissertation Proposal

The dissertation proposal aims to show the appropriateness, manageability and significance of the projected research. The student formally presents the written proposal to the dissertation committee and defends it in a meeting with the committee. The proposal normally includes an introduction giving an overview and stating the significance of the proposed research, review of the literature, and methodology. Departments determine the details of the dissertation proposal’s format with respect to such things as the length of the introduction and detail of the review of the literature.
Once the student and dissertation chair have developed a proposal, and the graduate dean has approved the dissertation committee, the student schedules the dissertation proposal meeting that includes all committee members. The student cannot propose a dissertation and have its final defense in the same semester.

**Dissertation**

A dissertation showing the ability to conduct independent research and skill in organization, writing and presentation must be prepared on a topic in the major field. It must constitute an original contribution to knowledge. Early in the process, the subject of the dissertation must be approved by the dissertation committee of the major department or division and by the dean of the Graduate School.

A dissertation committee, with the director of the dissertation as its chairperson, supervises the preparation of the dissertation. The committee shall have not fewer than five members, all of whom are appointed by the dean of the Graduate School. The graduate dean's approval of the proposed dissertation committee is expected to be obtained before significant progress is made on the dissertation—typically just before or just after the dissertation proposal meeting. For this purpose, the student submits the form for Appointment/Change of a Dissertation Committee.

All members of a dissertation committee must be members of the UA Graduate Faculty. The committee chair must be a full member of the Graduate Faculty, as described in the Catalog’s section on Qualifications of the Graduate Faculty. One member must be from outside the student’s major department. If the outside member is not a full or associate member of the UA Graduate Faculty (e.g., a highly qualified person from another university, a business or industry), the graduate dean needs to appoint that member by approving Temporary Graduate Faculty status for the specific purpose of serving on the student’s dissertation committee.

The final oral dissertation defense is the culminating experience in the doctoral program. As such, all members of the dissertation committee are expected to attend and participate in real time. Virtual attendance via interactive video or teleconference is permitted for off-campus external committee members, but Tuscaloosa campus faculty should attend in person unless extraordinary circumstances dictate the need for virtual attendance.

The dissertation must comply with the regulations in A Student Guide to Preparing Electronic Theses and Dissertations. Graduate School deadlines, including each semester's dissertation deadline, are available at the Graduate School's homepage. Consult the ETD website for details of ETD submission, including information on what needs to be submitted to the Graduate School. The graduate dean must approve the dissertation before the student can be cleared for graduation.

The Catalog section on Continuous Dissertation Registration for Doctoral Students states that once a student qualifies for doctoral candidacy, the student must enroll each semester for at least 3 hours of dissertation (699) research. If certain conditions are met for the student’s final semester, the student may qualify to enroll for fewer than 3 hours of 699 dissertation research. A zero-hour or one-hour 699 registration is permitted only in the final semester. This exception applies only to students who registered for at least 3 hours of dissertation (699) research in the preceding semester and only under the conditions described in the table below:

---

**Final-Semester Dissertation (699) Minimum Registration Hours**

<table>
<thead>
<tr>
<th>When was the *completed electronic dissertation submitted to ProQuest/the Graduate School?</th>
<th>Minimum hours of 699 registration required in the final semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>By 4:45 p.m. on the last-possible day for instructors to post grades for the semester before the student’s final semester (date published in the University Academic Calendar)</td>
<td>0</td>
</tr>
<tr>
<td>After 4:45 p.m. on the last-possible day for instructors to post grades for the semester before the student’s final semester, but before 4:45 p.m. on the last-possible day to register or add a course for the student’s final semester (both dates published in the University Academic Calendar)</td>
<td>1</td>
</tr>
<tr>
<td>After 4:45 p.m. on the last-possible day to register or add a course for the student’s final semester (date published in the University Academic Calendar)</td>
<td>3</td>
</tr>
</tbody>
</table>

"Completed" means submitted at ProQuest after being successfully defended; being carefully edited following the defense meeting; and having the Committee Acceptance Form (CAF) signed by all committee members, department chairperson and graduate dean. At the time of ProQuest submission, the student also must submit the Survey of Earned Doctorates through the NORC website.

1 International students on F-1 or J-1 student visas are not permitted to use the zero-credit hour exception above as the basis of maintaining minimum enrollment requirements as active students. Please see "USCIS" section under "Minimum Hours—Other Policies and Regulatory Bodies" on page 3 of this policy.

2 The University Calendar is available at the Academics tab of the website of the University Registrar.

**Article-Style Dissertations**

This approach is intended for doctoral students whose dissertation will consist of a number of related manuscripts or articles that represent independent research or creative activity. It is an option available only to students in certain fields in which the faculty have received Graduate Council approval from the Graduate Council. A complete list of these fields is below:

- Accountancy
- Aerospace Engineering and Mechanics
- Applied Statistics
- Biological Sciences
- Chemical Engineering
- Chemistry
- Civil Engineering
- Computer Science
- Economics
- Education (all departments)
- Electrical and Computer Engineering
Article-style dissertations must be based upon research completed while the student is enrolled at The University of Alabama. For each article used, the student must be the first author, or equivalent, as defined by the discipline.

As with traditional dissertations, the article-style dissertation must be the student’s original idea. It must be a unified work and include a sequence of articles of publishable quality around a cohesive theme, with a comprehensive review of literature demonstrating an in-depth understanding of the unifying framework.

- In article-style dissertations there will be introductory material to describe the studies, show how they are related, and explain their significance;
- connecting language to bridge each study to the next; and
- a summary making clear the importance of the studies, integrating the major findings, and discussing the implications for the overall topic.

These components do not have to be separate sections or chapters. They may be parts of the manuscripts or may be accomplished in an abstract.

All parts of both traditional and article-style dissertations must conform to the provisions set forth in A Student Guide to Preparing Electronic Theses and Dissertations, except when the circumstances of a specific project or discipline’s style manual require deviation. Students considering the article-style approach should contact the Graduate School before beginning their work if they have questions concerning specific problems or deviations from traditional procedure.

All doctoral candidates must give members of the dissertation committee a minimum of two weeks to read the dissertation before the date of the required final oral examination.

Electronic submission of dissertations: August 15, 2009, is the date when electronic submission began to be required and paper submission no longer was accepted. Consult the ETD website for details of ETD submission, including information on what needs to be submitted to the Graduate School. The graduate dean must approve the dissertation before the student can be cleared for graduation.

Protection of Human Subjects for Research
Scientific research involving human subjects has produced substantial benefits for society, but it also has significant ethical questions. The mission of the University's Institutional Review Board (IRB) for Protection of Human Subjects is to ensure that research involving human subjects is conducted ethically. University and federal policies require that review and approval to use human subjects in research precede the research, no matter how great or small the involvement of the human subjects. In the case of dissertation research that involves the use of human subjects, the principal investigator is responsible for contacting the college Human Research Review Committee to obtain approval for the planned research. The university's IRB approval form is available at the IRB website.

Final Examinations
When the dissertation has been completed, the candidate will be given a final oral examination by a committee of not fewer than five members, one of whom must be from outside the student's major department or, for students in the College of Education, outside the student's area (not program), and appointed by the dean of the Graduate School. This examination will focus primarily on the candidate’s research work, as embodied in the dissertation, and the field in which the dissertation lies, but it may encompass the complete program for the degree. The results of the examination must be reported to the Office of the Graduate School at least six weeks before the commencement at which the degree is to be conferred.

Application for Graduation
Each candidate for a doctoral degree must submit an Application for Degree via myBama not later than the last day to register or add a course of the semester or the first term of the summer session in which requirements for the degree are to be completed. That day is published for each semester at the website of the University Registrar.

Clearing the Academic Record for Commencement
At least one week before commencement, the candidate's record must have been cleared for graduation.

Attendance at Commencement
A candidate for a doctoral degree must be present at a scheduled commencement to receive the diploma and hood, unless excused by the graduate dean.

Withholding or Withdrawing an Advanced Degree
The University of Alabama reserves the right to withhold or withdraw an advanced degree on the recommendation of the graduate faculty.