

# Doctor of Philosophy in Mechanical Engineering (BS Entry)

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## About This Program

The doctoral program in Mechanical **Engineering** provides opportunities for professional development in such forms as: instructional courses to enhance technical competence in areas of mechanical engineering practice; training through a variety of experiences in design, development, research, experimentation, and/or analysis in joint efforts with faculty and peers; specialized courses of study required for entry into career fields allied to the mechanical engineering discipline; guided individual study under faculty supervision; and supportive coursework for programs leading to careers that require interdisciplinary competence.

A student with aid from a faculty advisor plans a program consistent with the student's technical interests and the available facilities and course offerings. Typically, programs are classified as:

- Thermal Science
- Fluid Science
- Mechanical Design and Manufacturing
- Solid Mechanics and Structures
- Controls and Systems

## Competencies

1. Upon completion, students are expected to attain mastery of theoretical concepts applicable to mechanical engineering.
2. Upon completion, students are expected to attain the ability to effectively use the modern techniques and tools applicable to mechanical engineering.
3. Upon completion, students are expected to attain the ability to communicate effectively.
4. Upon completion, students are expected to attain the ability to perform independent research studies in mechanical engineering that require knowledge of the literature and demonstrate critical thinking and analysis.
5. Upon completion, students are required publish the results of their research at appropriate technical conferences and/or refereed journals.

## Admissions Criteria

Applicants must present a bachelor's degree in mechanical engineering or a closely related discipline.

### UNCONDITIONAL ADMISSION

The BS-entry PhD is an accelerated program in which the student bypasses the master's thesis and proceeds directly to dissertation research. Requirements for unconditional admission include:

1. An overall GPA, as calculated by the Graduate School, of 3.3 or higher in undergraduate coursework.
2. A GRE scores of at least 150 on the Verbal and 159 on the Quantitative subtests.
3. Three satisfactory written recommendation forms from prior professors or supervisors.
4. A written essay on the student's goals and reasons for pursuing graduate studies.
5. For applicants whose native language is not English: All students admitted in the program must meet the minimum university English language requirements as detailed in the general admission requirements section of the catalog. However, meeting the minimum requirement does not guarantee admission. The program will give preference to students with IELTS score of 6.5, or TOEFL-iBT total score of 84.

### PROBATIONARY ADMISSION

Probationary admission may be permitted under the following conditions:

1. If an applicant meets any three of the items 1, 2, 3, and 4 above for the doctoral program or BS to PhD track.
2. For applicants whose native language is not English: All students admitted in the program must meet the minimum university English language requirements as detailed in the general admission requirements section of the catalog. However, meeting the minimum requirement does not guarantee admission. The program will give preference to students with IELTS score of 6.5, or TOEFL-iBT total score of 84.

### PROVISIONAL ADMISSION

An applicant who is unable to supply all required documentation prior to the admission deadline, but who otherwise appears to meet admission requirements, may be granted provisional admission.

## DEFERRED ADMISSION

If an applicant does not present adequate evidence of meeting admission requirements, the admission decision may be deferred until admission records are complete or the requirements are met.

## DENIAL OF ADMISSION

Admission may be denied admission if the candidate has less than satisfactory performance in two out of the first three admission criteria.

## CRITERIA FOR AWARD OF FELLOWSHIPS AND ASSISTANTSHIPS

Applicants who demonstrate skills, experience or interests that meet the needs of the AE Graduate Program will be considered for fellowships or assistantships

## Curriculum

The BS-entry PhD requires a combination of graduate-level course work beyond the bachelor's degree and research effort that will include a scholarly dissertation that provides a significant original contribution to Mechanical Engineering.

### Core Courses

Select 3 courses, one from each of three different core areas. 9

#### Thermal Science

ME 5316	THERMAL CONDUCTION
ME 5317	CONVECTION HEAT TRANSFER
ME 5318	RADIATIVE HEAT TRANSFER
ME 5321	ADVANCED CLASSICAL THERMODYNAMICS

#### Fluid Science

ME 5313	FLUID DYNAMICS
ME 5325	COMBUSTION
ME 5342	GAS DYNAMICS

#### Structural Mechanics

ME 5310	FINITE ELEMENT METHODS
ME 5311	STRUCTURAL DYNAMICS
ME 5312	CONTINUUM MECHANICS
ME 5339	INTERMEDIATE MECHANICS OF MATERIALS

#### Controls and Systems

ME 5303	CLASSICAL METHODS OF CONTROL SYSTEMS ANALYSIS AND SYNTHESIS
ME 5305	DYNAMIC SYSTEMS MODELING
ME 5341	CONTROL SYSTEM COMPONENTS

#### Design and Manufacturing

ME 5320	DESIGN OPTIMIZATION
ME 5326	MANUFACTURING PROCESSES AND SYSTEMS
ME 5349	POLYMER SCIENCE AND ENGINEERING
ME 5350	COMPUTER AIDED DESIGN AND MANUFACTURING

#### Analysis Courses

ME 5331	ANALYTIC METHODS IN ENGINEERING	3
ME 5332	ENGINEERING ANALYSIS	3

#### Electives

Select 3 graduate courses in a mechanical engineering speciality. Courses outside ME require prior approval of the faculty advisor. 9

### PhD Didactic Courses

Didactic courses sufficient to obtain in-depth knowledge in at least two core areas of mechanical engineering.

Select at least 18 hours in consultation with faculty research advisor. 18

ME 5101	GRADUATE SEMINAR (repeat at least two times)	2
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### Research Hours

Select at least 3 hours from the following each semester in the first 2 years of study. 12

ME 6197	RESEARCH IN MECHANICAL ENGINEERING
ME 6297	RESEARCH IN MECHANICAL ENGINEERING

ME 6397	RESEARCH IN MECHANICAL ENGINEERING	
ME 6697	RESEARCH IN MECHANICAL ENGINEERING	
<b>Dissertation</b>		
Select at least 9 hours from the following:		9
ME 6399	DISSERTATION	
ME 6699	DISSERTATION	
ME 6999	DISSERTATION	
ME 7399	DOCTORAL DEGREE COMPLETION	
<b>Total Hours</b>		<b>65</b>

## Program Completion

### MILESTONES

#### Research Advisor and PROgram of Work

Students must have a faculty research (dissertation) advisor prior to the start of their second full semester and an approved program of work in the second full semester of after 12 hours are completed.

#### Qualifying Exam

BS-entry students must take the Qualifying Exam immediately after the first two semesters of the PhD program. This exam is offered twice per year, during the week preceding the start of classes for the fall and spring semesters. Possible outcomes of this evaluation are:

- continuation in the doctoral program
- approval to continue with certain specified remedial work,
- failure with approval to retake
- termination in the program.

#### Comprehensive Exam

Students are eligible to take the comprehensive examination after satisfying all requirements stipulated by the Qualifying Exam Committee and giving evidence to their doctoral committee of adequate academic achievement by having completed all or most coursework requirements. The comprehensive examination is used to determine if the student has the necessary background and specialization required for the dissertation research and if the student can organize and conduct the research. An applicant must pass this examination to be admitted to candidacy for the PhD degree.

## Advising Resources

Advising can be conducted in person or remotely via Teams. Please email your advisor to schedule an appointment. The advising form can be downloaded from the MAE Grad Advising Canvas page. First consult with your advisor if you are planning a Leave of Absence, Grade Forgiveness, or Change of Program.

#### Location:

306 Woolf Hall

#### Email:

MAEGradAdvising@uta.edu

#### Phone:

817-272-2500

#### Web:

Graduate Advising Webpage (<https://www.uta.edu/academics/schools-colleges/engineering/academics/departments/mechanical-aerospace/students/gradadvising/>)