Ph.D. in Mechanical Engineering

Daytona Beach Program Requirements

Graduate Mathematics Course	3
Electives	15
Dissertation	24
Total Credits	**42**

Program Details

The Ph.D. in Mechanical Engineering is a terminal degree program designed to demonstrate a student's mastery in the field and ability to perform original research. The degree program is research-oriented and will prepare graduates for careers in research and development in the corporate, government, or academic arenas. Students will be expected to conduct guided independent research culminating in a dissertation that contributes to the body of knowledge in the discipline. Successful students will be self-motivated, have a high level of academic knowledge, and be excellent critical thinkers.

Degree Requirements

The awarding of the degree of Ph.D. is intended to signify recognition of an individual's expertise in a field of study and their ability to conduct original research that adds to the state-of-the-art of knowledge in the field. Therefore, the requirements for the Ph.D. in Mechanical Engineering are focused heavily towards enabling and requiring the student to establish, complete, and defend a program of original research.

To earn a Ph.D. in Mechanical Engineering, a student is required to:

- Define and complete a plan of study of coursework in the field
- Pass a qualifying examination to be admitted to degree candidacy
- Pass a preliminary examination that includes the presentation of a dissertation proposal
- Define and complete a program of original research
- Prepare and defend a dissertation that demonstrates mastery in the student's area of research
- Present the research findings at a National or International conference and publish the results at the conference proceedings
- Submit the research work for publication at a peer-reviewed scientific journal

Credit Hour Requirements

All Ph.D. students will be required to complete a minimum of 72 credit hours of graduate work beyond their baccalaureate degree or a minimum of 42 credit hours beyond their master's degree. Students entering the program with a B.S. must also fulfill the requirements of the Master of Science in Mechanical Engineering program. The Master of Science in Mechanical Engineering degree will be awarded upon completion of the M.S. requirements, independent of the Ph.D.

Beyond the requirements of the M.S. degree, Ph.D. students must complete a minimum of 18 credit hours of coursework and 24 credit hours of dissertation research. This work must be completed is in compliance with transfer and residency requirements of academic policy APD-04. Of the 18 hours of coursework, at least one course must be ME501, ME548, ME601, ME523, or a 500, 600, or 700-level mathematics course with advisor approval and the remaining must be 500, 600, or 700-level courses in the COE or a field closely related to the individual student's research. All students will be required to complete an approved plan of study outlining the courses to be taken in support of their individual research topics. The plan of study must be approved by the student's advisor and submitted to the Ph.D. Program Coordinator within the first year of enrollment in the program.

All Ph.D. students will be required to maintain a minimum GPA of 3.0 throughout their tenure in the program. Standard course load for a Ph.D. student is expected to be 6 credit hours per semester, although higher loads may be permitted with approval of the student's advisor. Students entering the program with a B.S. degree will be expected to complete 9 credit hours of lecture coursework per semester during their first year in the program. Students will be limited to a maximum of 6 credit hours of dissertation research per semester and a total of 6 credit hours in the summer.

Qualifying Examination

All Ph.D. students will be required to pass a qualifying examination to demonstrate the student's aptitude and mastery of the fundamentals of engineering and mathematics. The exam will be administered at least once per year. Students who fail to pass the qualifying exam within two attempts will be dismissed from the program at the end of the semester in which they fail a second time. Students who pass the qualifying exam are eligible to schedule a preliminary examination.

The qualifying exam is defined and administered by the Mechanical Engineering department Ph.D. committee. Due to the broad portfolio of subject areas within Mechanical Engineering, the qualifying exam will require students to demonstrate mastery within mathematics and a subset of the Mechanical Engineering core disciplines.

Dissertation Committee

All Ph.D. students will be required select an advisor from among the College of Engineering Ph.D. faculty and to form a dissertation committee consisting of not less than four additional Embry-Riddle Aeronautical University Ph.D. faculty. The committee must include at least two members from Mechanical Engineering, with the advisor serving as chair of the committee and the majority of the members must be from the College of Engineering. Qualified non-Embry-Riddle Aeronautical University personnel and ex-officio members may be appointed to the committee in compliance with university policies. The advisor must be selected within one year of matriculation and the committee must be established within one year of the student passing the qualifying examination.

Preliminary Examination

The core of the Mechanical Engineering Ph.D. will be original research conducted by the student under the guidance of the dissertation committee. Within one year after completion of the qualifying exam, each student will be required to pass a preliminary examination. The student will prepare a written research proposal outlining the proposed topic of research, a review of literature, an outline of the proposed approach, an estimate of resources required, and a schedule of milestones and events. The student will then orally defend this proposal to the dissertation committee.

If the proposal is accepted, the student will be passed and admitted to Ph.D. candidacy. If the proposal fails to meet the committee's expectations, the student will be given one chance to revise and retake the preliminary examination. The retake must occur within 6 months of the failed examination. Students who fail to successfully complete the preliminary examination will be dismissed from the program at the end of the semester in which the second failed attempt occurs.

Dissertation and Defense

Each Ph.D. student will be required to complete a research program and individually prepare an original dissertation that significantly contributes to the state-of-the-art of knowledge in Mechanical Engineering. The dissertation should be prepared according to Mechanical Engineering, College of Engineering and University guidelines and contain an outline of the problem and its significance, a review of the relevant literature, a description of the methodology, a presentation of results, and a set of conclusions emphasizing the original contributions made by the work. The dissertation must meet all requirements of university policy.

Students will be required to defend the dissertation subject to Mechanical Engineering, College of Engineering, and University oral defense guidelines. A minimum of 6 months must elapse between the preliminary and final examinations. The examination and submission of the dissertation will be administered in compliance with university policy. Students who pass their defense are eligible for degree conferral upon completion of all other program requirements. Students who fail the defense may be asked to revise their work and re-defend or may be dismissed from the program according to the committee's judgment and recommendations.

Annual Progress Review

All Ph.D. students will be subject to an annual progress review by the dissertation committee. The committee will review the student's academic and research progress to assess the achievements and make recommendations for improvement. If the committee fails to meet, the student's advisor may perform the progress review on their behalf. Students who fail to demonstrate satisfactory progress towards a degree as judged by the committee or in accordance with university policy may be recommended to the department chair for dismissal from the program.

Graduate Mathematics Course

Choose One of the Following:		3
MECH 501	Modeling Methods in Mechanical Engineering	
MECH 523	Linear Systems	
MECH 548	Introduction to Continuum Mechanics	
MECH 601	Advanced Modeling Methods in Mechanical Engineering	

Electives

500, 600, 700 courses in COE or closely related field approved by advisor and program coordinator	15

Dissertation

Dissertation		24
MECH 800	Dissertation	
Total Credits		**24**

Suggested Plan of Study

Year One

Requirements	Credits
Elective	3
MECH 501 - Modeling Methods in Mechanical Engineering, 548 - Introduction to Continuum Mechanics, 601 - Advanced Modeling Methods in Mechanical Engineering, or 523 - Linear Systems	3
or	
MATH 500-, 600-, or 700-Level	
Semester Hours	**6**

Requirements	Credits
Elective	3
Elective	3
Semester Hours	**6**

Total Credits

Total Hours for All Requirements: 12

Year Two

Requirements	Credits
Elective	3
Elective	3
Semester Hours	**6**

Requirements	Credits
MECH 800 - Dissertation	6
Semester Hours	**6**

Total Credits

Total Hours for All Requirements: 12

Year Three

Requirements	Credits
MECH 800 - Dissertation	6
Semester Hours	**6**

Requirements	Credits
MECH 800 - Dissertation	6
Semester Hours	**6**

Total Credits

Total Hours for All Requirements: 12

Year Four

Requirements	Credits
MECH 800 - Dissertation	6
Semester Hours	**6**

Total Credits

Total Hours for All Requirements: 6