

## **Ph.D. Degree Requirements and Policies**

### **Admission Requirements**

For the M.S. degree, applicants should have a B.S. in aerospace engineering or in a related field (i.e., other engineering disciplines, physics, mathematics, etc.). The requirements are the same for admission into the thesis and non-thesis options of the M.S. program. At the time of application to the master's program, the student must specify his/her option (thesis or non-thesis) of choice.

For the Ph.D., a bachelor's or master's degree in aerospace engineering or in a related field (i.e., other engineering disciplines, physics, mathematics, etc.) is required. The Aerospace Engineering Program reserves its financial aid for graduate students in the Ph.D. program or in the thesis option of the M.S. program.

### **Ph.D. Degree Requirements**

The course of study leading to the Ph.D. degree in aerospace engineering requires the completion of 90 credits beyond the bachelor's degree, or 60 credits beyond the master's degree.

For students proceeding directly from B.S. degree to Ph.D. degree, the 90 credits should be distributed as follows:

- 30 graduate credits in coursework
  - 16 graduate credits in AE courses (incl. Special Topics and ISP)
  - 10 graduate credits in courses in or outside of AE
  - 4 graduate credits in applied mathematics (ME 5000, ME5001, or any other course with the approval of the AE Graduate Committee)
- 30 graduate credits in Dissertation Research (AE 699)
- 30 graduate credits in
  - Additional coursework
  - Additional Dissertation Research (AE 699)
  - Supplemental Research(AE 598, AE 698)

TOTAL 90 credits

For students proceeding from Master's to Ph.D. degree, the 60 credits should be distributed as follows:

- 12 graduate credits in AE courses (incl. Special Topics and ISP)
- 30 graduate credits in Dissertation Research (AE 699)
- 18 graduate credits in
  - courses in or outside of AE
  - Dissertation Research (AE 699)
  - Supplemental Research (AE 598, AE 698)

TOTAL 60 credits

In either case, the result of the dissertation research must be a completed doctoral dissertation. Only after admission to Candidacy may a student receive credit toward Dissertation Research under AE 699. Prior to admission to Candidacy, a student may receive up to 18 credits of pre-dissertation research under AE 698. All full-time students are required to register for the zero-credit Graduate Seminar (AE591) every term and must attend a minimum of one seminar per term in order to receive a Pass.

### **Academic Advising**

The schedule of advising ensures that students are well advised and actively engaged in their research at the early stages of their programs.

- Temporary Advisor: upon admission to the Doctoral Program, each student is assigned or may select a temporary advisor to arrange an academic plan covering the first 8-10 credits of study. This plan should be arranged before the first day of registration.
- Dissertation Advisor: selected by student prior to registering for more than 8-10 credits.
- Plan of Study and Dissertation Topic: arranged with Dissertation Advisor prior to registering for more than 8 credits.
- Dissertation Committee: formed by student prior to registering for more than 18 credits. Committee consists of the Dissertation Advisor, at least one faculty of the Aerospace Engineering Program, and at least one outside member.

### **Admission to Candidacy**

Admission to candidacy will be granted when the student has satisfactorily passed a written Qualifying Exam intended to measure fundamental ability in the three Core Areas of Study: fluids and propulsion; dynamics and control; materials and structures. The Qualifying Exam is given in January and if required a Retake Qualifying Exam is given in February. For students who enter the program with a bachelor's degree, the exam must be taken after three semesters if they began their studies in the fall, and after two semesters if they began in the spring. For students who enter the program with a master's degree, the exam must be taken after one semester if they began in the fall, and after two semesters if they began in the spring. Students in the M.S. program who plan to apply for fall admission to the Ph.D. program are strongly advised to take the candidacy exam in January before that fall. The Qualifying Exam is graded using a Pass/Fail system with Pass/Fail grading in each of the three Core Areas. A student must earn a Pass in all three Core Areas in order to earn a Pass in the Qualifying Exam. A student may attempt the Retake Qualifying Exam in February for the Core Areas failed during the Qualifying Exam given in January. If a student fails to earn a Pass in all three Core Areas of the Qualifying Exam and the Retake Qualifying Exam, he/she must withdraw from the Ph.D. program by end of D term of the year of the Exam. The details of the examination procedure can be obtained from the Aerospace Engineering Office.

### **Dissertation Proposal**

Each student must prepare a brief written proposal and make an oral presentation that demonstrates a sound understanding of the dissertation topic, the relevant literature, the techniques to be employed, the issues to be addressed, and the work done on the topic by the student to date. The proposal must be made a year before the completion of the Ph.D. Dissertation and after of admission to candidacy. Both the written and oral proposals are presented to the Dissertation Committee and a representative from the AE Graduate Committee. The prepared portion of the oral presentation should not exceed 30 minutes, and up to 90 minutes should be allowed for discussion. If the Dissertation Committee and the Graduate Committee representative have concerns about either the substance of the proposal or the student's understanding of the topic, then the student will have one month to prepare a second presentation that focuses on the areas of concern. This presentation will last 15 minutes with an additional 45 minutes allowed for discussion. Students can continue their research only if the proposal is approved.

### **Dissertation Defense**

Each Doctoral Candidate is required to defend the originality, independence and quality of research during an oral dissertation defense that is administered by an examining committee that consists of the Dissertation Committee and a representative of the AE Graduate Committee who is not on the Dissertation Committee. The defense is open to public participation and consists of a one-hour presentation followed by a one-hour open discussion. At least one week prior to the defense, each member of the examining committee must receive a copy of the dissertation. At the same time, an additional copy must be made available for members of the WPI community wishing to read the dissertation prior to the defense, and public notification of the defense must be given by the aerospace engineering graduate secretary. The examining committee will determine the acceptability of the student's dissertation and oral performance. The dissertation advisor will determine the student's grade.