

Academic Procedures for Doctoral Students

Department of Mechanical and Aerospace Engineering

The George Washington University

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Academic Procedures for MAE Doctoral Students

As explained in the GW Graduate Programs Bulletin, there are three distinct phases in all programs of doctoral study in the School of Engineering and Applied Science. These are (i) the period of preparation for the qualifying examination, (ii) the qualifying examination, and (iii) the period after admission to candidacy for the Ph.D. degree during which the student performs research leading to the doctoral dissertation. After admission to doctoral study, students in MAE will be subject to specific procedures as outlined below in each of these program phases.

A. PERIOD OF PREPARATION FOR THE QUALIFYING EXAMINATION

As early as possible after their admission students should identify the faculty member who will serve as their coursework and research advisor. For research assistants, the faculty member providing the financial support is also the advisor. At the beginning of each semester, the doctoral student will meet with the MAE faculty advisor to evaluate the progress towards taking the qualifying examination. Coursework consists of core courses and electives that are specific to the major area of research. The qualifying exam will be given twice each year, once during the first two weeks of the Fall semester and once during the first two weeks of the Spring semester. All students should take the exam as early as possible after they complete at least 6 credits of core courses and 6 credits of electives and maintain an average GPA at least 3.4 (see Appendix A for specifics on required courses). It is recommended that the exam should be taken no later than the beginning of their 3rd semester. In case a student does not fulfill the above requirement(s) then he/she should develop a plan of action with the academic advisor, which needs to be approved by the Department Chair. The student should be advised of any additional coursework to be undertaken, or any additional preparation.

B. THE DOCTORAL QUALIFYING EXAMINATION

All Ph.D. students are required to take the Doctoral Qualifying Examination (DQE) held in the first two weeks of each semester. They must submit the *DQE Notification* form provided by the MAE department by the end of the preceding semester. The exam will be distributed electronically. A written proposal and an oral presentation of the chosen problem are required. The goals of the exam include the following:

- i. To determine the student's aptitude and ability to do original and independent research at the doctoral level.
- ii. To assess the student's ability to review previous work from the literature.
- iii. To determine the student's ability to understand and apply fundamental concepts in his/her technical area.

Participation and subject areas: In consultation with his/her advisor (or faculty sponsor) the graduate student should notify the Graduate Curriculum Committee that he/she will be taking the DQE before the end of the preceding semester by filling the DQE Notification form. At this time the student will also a major subject area that reflect his/her background and dissertation fields. The date/time of the examination will be announced by the end of the preceding semester.

Exam Committee Selection: The committee will be comprised of the following persons: the student's advisor (or faculty sponsor), an exam committee chair, and a third member. Co-advisors will be allowed to participate as silent observers during the first attempt. The members of this committee will be selected by the Graduate Curriculum Committee in consultation with the student's advisor (or faculty sponsor). At least two out of three members of the committee should be regular faculty of the MAE department.

Topic selection: Ten calendar days before the date that the qualifying examination is to be held, each student will be assigned a research topic and one to two references related to one or more of the subject areas selected by the student. The topic will be selected by the chair of the examination committee in consultation with both the student's advisor (or faculty sponsor) and the third committee member. The topic may be relevant to the student's future doctoral work, but will be different for each student. The topic cannot be directly related to or be part of the student's ongoing doctoral work.

Written Proposal: The objective of the written proposal is to communicate how a specific research problem may be investigated. The proposal is not to exceed 5 pages using an 11pt Arial font, 1- inch margins, and 1.0 line spacing. The 5-page limitation covers the proposal body text, as well as any figures and tables. The title page and cited references are the only sections that do not count toward the 5-page limitation. A typical written proposal has the following structure (the proposal format has been adapted from the required standard NSF proposal format):

Title Page: The first page should include your name, title of your proposal, and signed academic integrity pledge (1 page).

Motivation and Objectives: Explain the importance of the problem, review the state of the art, and discuss critical barrier to progress in the field that the proposed project addresses. Outline the objectives of the proposed work.

Technical approach: This is the core of the proposal, where you will describe the overall methodology and analyses to be used to accomplish the objectives of the project. Include how the data will be collected, analyzed.

Cited References: Cite sources for background information and technical plan (does not count towards the 5-page limit).

Oral Exam: The student will prepare a brief PowerPoint presentation describing

his/her proposed approach. The exam will begin with a 20 minute presentation by the student, which will be the starting point for the oral exam discussion. The presentation may lead to questions (based on the chosen subject areas and sometimes unrelated to the assigned topic and of a broader nature) related to the goals of the exam. The duration of the exam will be two hours.

Exam outcome: Immediately after the end of the oral exam the committee will deliberate and reach a decision on the exam outcome, and convey it by email to the Graduate Curriculum Committee. All students will be notified in writing of the outcome of the exam by the chair of the Graduate Curriculum Committee, one week after all exams have been completed. The notification may include conditions that the student must fulfill prior to attaining candidacy or suggestions on certain skills or areas that may need strengthening. Passing the exam requires a unanimous decision from all three committee members. Students who fail the exam in their first attempt may, upon recommendation of the examination committee and review by the Graduate Curriculum Committee, take it again later in the semester.

C. PERIOD OF DISSERTATION RESEARCH

After successful completion of the qualifying examination the student is admitted to be a candidate for the Ph.D. degree program and begins specialized research under the supervision of his/her thesis advisor. Research direction may be shared by a full-time faculty member and an outstanding external scientist or engineer, but the final responsibility for the academic aspects of the dissertation work lies with the MAE faculty thesis advisor.

Dissertation Research Proposal: During the research phase, each doctoral candidate will be required to give a research proposal presentation to the Dissertation Committee. The student's research progress will be assessed by the committee and appropriate suggestions for continuing research directions will be solicited from those in attendance. Scheduling of the research proposal presentation will be done at a minimum of one year before the final PhD defense by the student's director of research in consultation with the MAE chairman. Under no circumstances will a doctoral thesis defense be allowed to proceed prior to one year after the research proposal presentation. The committee helps the student to define the research topic, and ultimately approves the research proposal. **The dissertation advisor should propose the membership of the dissertation research committee, which must be approved by the department chair. Final approval rests with the Dean's office. At least three individuals should serve on the committee; the research advisor is the dissertation director (also called the advocate) and two others. Two of the committee members must be full-time faculty.** Students are required to present the written dissertation proposal to the committee (two of the members must be full-time faculty) and to successfully defend the proposal in an oral defense subsequent to performing the bulk of their dissertation research. The "*Request for Proposal Defense form*" must be filed and approved two weeks prior to the defense. The "*Form 5*

Dissertation Form” will be presented at the proposal defense and, after a successful defense, will be signed by all committee members. After the proposal defense, the student will submit the revised proposal, complying with all suggestions, clarifications, and corrections, as required by the dissertation committee, along with the signed Form 5 to the director of doctoral research, i.e. thesis advisor and to the departmental advanced degree program coordinator for the Ph.D program. They will forward the Form 5 to the department chair for signature.

Dissertation Defense: The research advisor may decide that the research achieved by the doctoral student is sufficient to satisfy the requirement of the degree. He/she proposes an examining committee for the purpose of administering the final dissertation examination (dissertation defense). **The committee of examiners must consist of no fewer than five members, at least three of whom will normally be full-time faculty members with scholarly specialties within the area of concentration; at least one member will normally be from an academic specialty outside the area of concentration. It is required that an external examiner be invited. The research advisor serves on the examining committee both as advocate and as a non-voting committee member. The committee will elect its own chairman, who should not be the research advisor, or if different, the student’s faculty advisor, as its first order of business. The dissertation examining committee must be approved by the department chairperson prior to the date of the defense.** Each member of the examination committee, no later than 3 weeks prior to the defense, should receive a copy of the dissertation. At the same time, the candidate must provide a 350 word long abstract and other information to the department office for the purpose of preparing an announcement of the defense.

The dissertation defense is an oral examination, which is open to the public. When the dissertation is accepted as complete, it should be submitted electronically no later than the date specified by the Registrar's Office.

D. GRADUATION (from SEAS handbook)

Graduation application forms may be obtained from the departmental advance degree program coordinators, and are due **October 1** for graduation at the end of the **Fall semester**, and **February 1** for graduation at the end of the **Spring semester**. Before applying, the student has to contact the advance degree program coordinator to ascertain that all graduate courses have been completed satisfactorily, and all other requirements for the degree are satisfied.

Graduation clearance / Checklist:

- *Graduation clearance form*
signed by the person responsible for the validity of the data (designated faculty and Graduate Records Coordinator) of the department.
- *Dissertation Completion Certificate*
signed by committee members and department chair.

If any revision to the dissertation was required at the time of the defense, then the advisor should approve that the revisions are made and accepted

- A copy of the *dissertation defense announcement* should be in the students folder
- *ETD approval form*
properly filled out (list of uploaded FINAL files, filenames, date of upload of the *final* dissertation)
This is a *legal* form, and must be signed by the research advisor and the graduating student, and initialed by the SEAS ETD representative (Marilyn Shazier-Shields), certifying that the uploaded files are the final version of the dissertation
- *Application for graduation form*
- *Dissertation Form (Form 5)*
- *FORM 1*
- *BANNER Course Summary list*
(student record), number of credit hours, GPA. Courses credited toward the degree should be marked (deficiencies do not count)
- *Supplemental Grade change form(s)*
(for research courses)

When proper documentation is provided, permission for the SEAS ETD representative (Marilyn Shazier-Shields) to submit the dissertation will be given by the ADAA, and the clearance package is returned to the department for final submission to the Registrar. After the Office of the Registrar receives the clearance form, the degree will be awarded and the diploma will be ordered.

Appendix A

Sample coursework prior to the DQE

1. AEROSPACE ENGINEERING

Core courses: MAE6221, MAE6229

Electives: MAE6255, MAE6226, MAE6277, MAE6280

2. DESIGN & MANUFACTURING OF MECHANICAL AND AEROSPACE SYSTEMS

Core courses: MAE6243, MAE6287

Electives: MAE6251, MAE6210

3. FLUID MECHANICS, THERMAL SCIENCES, AND ENERGY

Core courses: MAE6221, MAE6280

Electives: MAE6226, MAE6282, MAE6225, MAE6286, MAE6228, MAE6263, MAE6284

4. SOLID MECHANICS, MATERIALS SCIENCE, AND TISSUE ENGINEERING

Core courses: MAE6210, MAE6238, MAE6239

Electives: MAE6255, MAE6204, MAE6260, MAE6287, MAE6288, MAE6207, MAE6232

5. ROBOTICS, MECHATRONICS & CONTROLS

Core courses: MAE6245, MAE6246, MAE6194

Electives: MAE6240, MAE6242, MAE6244, MAE6254, MAE6257, MAE6248, MAE6277

Prior to the DQE exam all students should take a minimum of 2 core courses + 1 elective + 1 math course (APSC 6212, APSC 6213, or equivalent). In certain areas one of the electives can replace the math course requirement (e.g. MAE6254). The *minimum number* of credits to be eligible for the DQE exam is 12.