A Guide to

GRADUATE STUDIES IN MECHANICAL AND AEROSPACE ENGINEERING

at

Department of Mechanical and Aerospace Engineering
LC Smith College of Engineering and Computer Science

Syracuse University

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Contents

1. Graduate Programs .......................................................................................................................... 3
   a. Admission Requirements ........................................................................................................ 3
   b. Application procedure ........................................................................................................... 3

2. Master of Science in Mechanical and Aerospace Engineering ................................................. 3
   a. Course requirements ............................................................................................................. 3
   b. Graduation requirements ...................................................................................................... 4

3. Master of Science in Engineering Management ......................................................................... 4
   a. Program requirements ........................................................................................................... 4
   b. Courses ................................................................................................................................. 4
   c. Exit Paper ............................................................................................................................. 5

4. Ph.D. in Mechanical and Aerospace Engineering ...................................................................... 6
   a. Program ................................................................................................................................. 6
   b. Ph.D. Qualifying Exam ......................................................................................................... 6
   c. Residency Requirement ........................................................................................................ 7
   d. Dissertation ........................................................................................................................... 7
   e. Evaluation of Ph.D. Student’s Progress ................................................................................ 7
1. Graduate Programs

The Department of Mechanical and Aerospace Engineering offers graduate programs leading to the following degrees:

- Master of Science (M.S.) in Mechanical and Aerospace Engineering
- Doctor of Philosophy (Ph.D.) in Mechanical and Aerospace Engineering

It also participates in a college-wide master program leading to the degree:

- Master of Science (M.S.) in Engineering Management

a. Admission Requirements

**Master of Science**

Admission to an M.S. degree program is granted on the basis of undergraduate preparation and performance, GRE scores, and letters of recommendation documenting the recent technical proficiency of the applicant. A grade-point average of 3.0/4.0 or equivalent, and a GRE -Quantitative score of 700 (155 on the new scale) are normally expected. If a student’s background is not particularly strong in mechanical or aerospace engineering, he/she may be required to take undergraduate courses (not counted towards the M.S. degree) as specified in the letter of admission.

**Ph.D.**

Admission to the Ph.D. program will be considered if three conditions are met. First, a sufficient level of academic and professional achievement must be documented by transcripts of the student’s prior academic performance (a GPA of 3.33/4.0 or better is expected), GRE Quantitative score of 700+ (155+ on the new scale) and an acceptable GRE verbal score, and letters of recommendation and other supporting information. Second, the focusing of the student’s efforts in one area of specialization should be clear from the student’s transcript and statement of purpose. Third, a faculty advisor must be willing to supervise research in the student’s area of specialization. Prior completion of a M.S. degree and/or an M.S. thesis may be required by individual faculty advisors.

b. Application Procedure

Online application is the preferred method of applying to graduate programs at Syracuse University. Applications submitted online can be processed faster and more efficiently than those filed on paper. [Access the online application.](#)

You will receive an e-mail or postcard from Syracuse University when your application has been received and processed. [Find out more information on the application process.](#)

2. Master of Science in Mechanical and Aerospace Engineering

a. Course requirements

Graduate courses can be found in the [Course Catalog](#), using the search engine.
M.S. students must complete 30 credits, including a capstone project (MAE 994: 0 credits; graded P/F), and must attend at least 3 semesters of the MAE graduate seminars (MAE 995: 0 credits; graded A/B/C/F, based on attendance)\(^1\).

All students must complete three (3) core courses:

- MAE 675 (Methods of Analysis)
- MAE 643 (Fluid Dynamics)
- MAE 635 (Advanced Mechanics of Materials)

Along with the aforementioned three core courses, all students must also complete four (4) more courses in the MAE department. Out of a required 30-credit M.S. degree, students should not take more than 9-credits at the 500-level. Furthermore, students intending to pursue a Ph.D. degree after the M.S. degree should plan to meet the Ph.D. admission requirements and Ph.D. qualifying examination requirements, and select M.S.-level courses accordingly.

b. Graduation requirements

The exit requirement for the M.S. degree includes MAE 994 Capstone Project. The student will review technical papers or reports in the technical literature related to the student’s field of interest. The student will prepare an oral presentation summarizing the technical content of the documents reviewed, and present his/her findings before a faculty committee. A hard copy of the presentation, signed by the student advisor, must be submitted to the MAE Graduate Office before the oral presentation. The committee will decide whether the student has passed or failed. The student should register for MAE 994 in his/her last semester for 0 credit hours.

3. Master of Science in Engineering Management

a. Program requirements

The degree requires a minimum of 36 credit hours at the graduate level. In addition, at least, one half of the course work must be at the 600, or above, level. To remain in good academic standing, a grade point average (GPA) of 3.0 must be maintained. A minimum GPA of 3.0 must be achieved to graduate. Full-time standing requires a minimum of 9-credit hours be taken and passed in the fall and spring semesters. All other requirements of the graduate school also apply to this program.

b. Courses

Graduate courses can be found in the [Course Catalog](#), using the search engine.

The program is composed of three sections. The specific requirements of each are listed below:

**Engineering Core (12 Credits)**

The following courses are required in this core:

\[^1\text{Part-time M.S. students may petition the Graduate Affairs Committee for partial exemption from seminar attendance.}\]
• ECS 526 Statistics for Engineers (3)
• MAE 548 Engineering Economics and Technology Valuation (3)
• CSE 581 Introduction to Database Management (3)
• MFE 634 Productivity and Quality Control (3)

Management Core (12 Credits)
The management core is comprised of four required areas. Completing one course from each area will satisfy the management core requirements:

Area-1 (select one course from those listed)
• SCM 702 Principles of Management (3)
• SCM 655 Customer Relationship Management with SAP (3)

Area-2 (select one course from those listed)
• SCM 721 Supply Chain Systems (3)
• SCM 701 Supply Chain and Logistics Management (3)

Area-3 (select one course from those listed)
• SCM 656 Project Management (3)
• MAR 757 Managing Product Development (3)
• SCM 721 Supply Chain Systems (3)

Area-4 (See Program Director for list of acceptable electives)
• Management Elective

Technical Specialization Cluster (12 credits)
The four courses which make up this cluster are selected from the programs offered by the College of Engineering and Computer Science. Specific courses are determined during a meeting with a technical advisor.

The courses for the technical cluster must come from within the College of Engineering and Computer Science offerings.

c. Exit Paper
An exit capstone paper is required for graduation. The paper must address issues of the management of technology. The paper can be an original paper or it can be a critical review of a journal article, which has been published. If the critical review option is selected, a copy of the paper being reviewed must be included with the capstone paper. The paper has a minimum length requirement of five pages and is completed during the last semester of graduation. A hard copy must be submitted along with an electronic version.
4. Ph.D. in Mechanical and Aerospace Engineering

a. Program

A program of study is individually designed by each student in consultation with his or her advisor. A student entering the Ph.D. program with a master’s degree or an equivalent degree (approved by the Graduate Affairs Committee) is expected to complete 18 credits of 600 or above level of course work and a Ph.D. dissertation (of 0-credits). Students wishing to proceed directly to the Ph.D. degree from a bachelor’s degree must complete a program of 48-credit course work (with no more than 9 credits of courses at 500-level)\(^2\) and a Ph.D. dissertation (of 0-credits). A GPA of 3.33 or better is expected for a Ph.D. student. Full-time Ph.D. students must also attend the MAE graduate seminars every semester (MAE 995: 0 credits; graded A/B/C/F, based on attendance)\(^3\). Graduate courses can be found in the Course Catalog, using the search engine.

b. Ph.D. Qualifying Exam

The MAE Department requires that each Ph.D. student pass a qualifying examination. The qualifying examination will have both written and oral components. The objective of the qualifying exam is to test the student’s knowledge of fundamentals and preparedness to conduct dissertation research. As a prerequisite to the qualifying examination, a Ph.D. student must complete a minimum of 39 credits after B.S. or 9 credits after M.S. and must have a cumulative 3.33 GPA or better at the time of taking the qualifying exam. Full-time students with a B.S. degree must take the written component of the qualifying examination at or before the completion of the fifth semester of their graduate study. Full-time students who transfer into the Ph.D. program with an M.S. degree (or an equivalent degree) from another institution must take the written component of the qualifying examination at or before the completion of three semesters of first registration in the program. Part-time students should take the exam after they have taken 39 credits after B.S. or 9 credits after M.S. and within 1 year of completion of these credits. The oral component of the qualifying examination must be taken no later than one year after passing the written examination.

The written component of the qualifying examination will test the student’s competency at the level of SU’s 600 level courses in mathematics (e.g., MAE 675), plus any two of the following topics: Fluid Dynamics (e.g., MAE 643), Solid Mechanics (e.g., MAE 635), Heat Transfer (e.g., MAE 655 or MAE 657), Thermodynamics (e.g., MAE 651), Design, Manufacturing, Dynamics and Control, and Special Topics in a selected area. If a student selects Special Topics, s/he must inform the MAE Graduate Affairs Committee in writing of the special area in which s/he wants to be examined.

In consultation with the student and his/her advisor, the Graduate Affairs Committee will form a committee of oral examination consisting of 3 to 5 members with a minimum of 2 to 3 members from the MAE Department, including the advisor. The student must provide a proposal for dissertation research to the members of the oral examination committee at least two weeks before the scheduled date of examination. The examination will typically take 2 hours to complete, in which the student will first make

\(^2\) Of the 48-credit course work, 30 credits should be equivalent to our M.S. degree requirements.

\(^3\) Part-time M.S. students may petition the Graduate Affairs Committee for partial exemption from seminar attendance.
a 20-minute presentation of the research proposal followed by questions from each individual members of the committee. Based on the quality of dissertation proposal, presentation, and answers to the questions, the committee will deliberate and inform the student of the outcome of the examination, and report the outcome to the MAE Graduate Committee in writing.

In consultation with the advisor, a Ph.D. student must formally apply to take the qualifying examination by petitioning the chair of the Graduate Affairs Committee on or before October 15 in the fall semester or March 15 in the spring semester in order to take the exam during the following academic semester. The written part of the Ph.D. qualifying exam will be given twice a year; one at the end of the fall semester and the other at the end of the spring semester. In the application letter, the student should specify his/her field of study/interest and include a copy of his/her transcript showing the current GPA. The Graduate Affairs Committee determines whether the student has passed the qualifying examination. In the event of failure, the Graduate Affairs Committee may permit the candidate to retake the written and oral examinations only once. No one will be permitted to go beyond the above mentioned time limits as stipulated in the first paragraph under Qualifying Examinations. Failure to pass the examination in a timely fashion will result in dismissal from the Ph.D. program.

c. Residency Requirement

The residency requirement is set by Academic Rules and Regulations of the Graduate School, section 46.3.

d. Dissertation

Each student is required to prepare a dissertation of high quality in terms of substance, originality and relevance, on a topic chosen in consultation with the dissertation advisor. The dissertation defense shall be conducted according to the rules of the Graduate School. In preparing the dissertation, the student should comply with accepted standards of style and format. The examination committee may refuse to hold the examination until such standards are met.

e. Evaluation of Ph.D. Student’s Progress

In the spring semester, the status of every Ph.D. student will be reviewed by the MAE faculty. The review will include a brief summary by the advisor of the progress made by the student and any current or potential problems. If the progress is unsatisfactory, the student will be given six months to address issues of concern. If the situation has not improved, the student will not be allowed to continue in the program and will be so informed in writing.