

# **MECHANICAL ENGINEERING GRADUATE PROGRAM HANDBOOK**

**FOR STUDENTS WHO STARTED THEIR PROGRAM  
Between FALL 19 and Spring2021**

**UNIVERSITY OF SOUTH FLORIDA**

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## PREFACE

This handbook outlines the various departmental requirements and procedures that apply to all graduate students in the Mechanical Engineering Department and is subject to modification. **The contents of this booklet are supplementary to the rules and regulations of the Graduate School and the College of Engineering requirements and should be used only in that context.** Detailed information on Graduate School requirements and procedures can be found in the Graduate Catalog and the Graduate School website ([www.grad.usf.edu](http://www.grad.usf.edu))

## ENTRANCE REQUIREMENTS

Students entering the graduate programs must have completed the following courses in their undergraduate Mechanical Engineering curriculum: Calculus I, II, III, Differential Equations, Thermodynamics, Heat Transfer, Fluid Mechanics, Machine Design, and Solid Mechanics. Students entering from disciplines other than Mechanical Engineering will be required to make up any deficiencies before starting their graduate work.

**MASTERS DEGREE:** Only students with a B.S. in Mechanical Engineering or a closely related field from an accredited engineering program will be considered for admission. All applicants must take the General Test of the Graduate Record Examination (GRE). The student must have a grade point average (GPA) of 3.0/4.0 for the last two years of course work from an ABET-accredited engineering program. Additionally, a minimum percentile rank of 50% on the quantitative portion and a minimum average percentile rank of 50% in verbal of component of GRE is required for admission to the Master's Program. Graduates of non-ABET accredited programs are evaluated on a case-by-case basis. For admission to the accelerated Master's degree program (BSME-MSME), students need to have a minimum cumulative GPA of 3.5 at the time of admission. Exceptions may be considered concerning GPA or/and GRE with a written recommendation by a current departmental faculty member. International students must also meet the University Admission and English Proficiency requirements.

**Ph.D. DEGREE:** Only students with an M.S. in Mechanical Engineering or a closely related field from an accredited engineering program will be admitted into the Ph.D. Program. Students without an M.S. or with an M.S. in another field may also be admitted on a case-by-case basis. All applicants must take the General Test of the Graduate Record Examination (GRE). The student must have a grade point average (GPA) of 3.0/4.0 for the last two years of course work from an ABET-accredited engineering program. Additionally, a minimum percentile rank of 50% on the quantitative portion and a minimum average percentile rank of 50% in verbal component of GRE is required for admission to the Ph.D. Program. Graduates of non-ABET accredited programs are evaluated on a case-by-case basis. Exceptions may be considered concerning GPA or/and GRE with a written recommendation by a current departmental faculty member. International students must also meet the University Admission and English Proficiency requirements.

## PROGRAM OF STUDY

**MASTERS DEGREES:** The department offers two Master's degrees: (1) Master of Science in Mechanical Engineering (MSME), without thesis, and (2) Master of Science in Mechanical Engineering (MSME), with thesis. Both thesis and non-thesis options require 30 credit hours of graduate course work. The MSME degree is awarded to students who have been accepted by the program and completed the requirements as outlined below.

All MSME Program students must successfully complete EML 6105: Advanced Thermodynamics and Statistical Mechanics and EML 6653: Applied Elasticity courses. Students must also successfully complete one course each from Dynamical Systems and Controls, and Mathematics specialization areas as listed below

### **Fluid and Thermal Science**

**EML 6105: Advanced Thermodynamics and Statistical Mechanics (required)**

EML 6713: Advanced Fluid Mechanics

EML 6154: Advanced Conduction Analysis

### **Mechanics, Manufacturing, and Materials**

**EML 6653: Applied Elasticity (required)**

EML 6930: Advanced Manufacturing

EML 6930: Advanced Materials

EML 6570: Fracture Mechanics

EML 6290: Micro and Nano Manufacturing

### **Dynamical Systems and Controls (must select one)**

EML 6273: Advanced Dynamics

EML 6311: Advanced Controls

EML 6223: Synthesis of Vibrating Systems

EML 6801: Robotic Systems

### **Mathematics (must select one)**

EML 6069: Advanced Engineering Math I

EML 6060: Advanced Engineering Math II

In addition to these 12 credit hours, the MSME degree without thesis option requires a minimum of 18 credit hours of approved coursework, for a total of 30 semester hours. Students who select the MSME degree without the thesis option will not be eligible for Departmental Graduate Assistantships. The MSME with thesis option requires a minimum of 12 credit hours of approved coursework and a minimum of 6 thesis hours for a total of 30 semester hours. To graduate, MSME degree with thesis option candidates must also successfully defend an original thesis.

A minimum of six credit hours of additional coursework must be chosen from the four categories shown above. Independent Study is not considered a regular class and is not included in this group. A maximum of six credit hours of Independent Study course offered by the Mechanical Engineering Department and/or 6000-level non-EML coursework may be credited towards a degree. Undergraduate courses will not be count for graduate credit.

A GPA of 3.0 or higher is required for graduation, and no grade below a “C” can be applied towards the graduation. Students should be aware that only courses approved by their graduate advisor and Graduate Program Coordinator will count towards graduation.

**Ph.D. DEGREE:** This degree requires a minimum of 72 credit hours beyond the baccalaureate degree, of which there must be a minimum of 36 hours of coursework at the 6000 levels without counting Independent Study and a minimum of 20 hours of dissertation. Courses completed for a Master’s degree from another institution may count towards a maximum of 24 credit hours of coursework for the Ph.D. degree only if the transcript shows that the degree requirements were similar to USF, and the student did not already get credit for the same courses at USF. A minimum of 18 hours of coursework is required in the student’s area of concentration, and there must be at least 6 hours of mathematics or statistics and 6 hours of coursework outside the primary area of concentration. All Ph.D. students must successfully complete EML 6105: Advanced Thermodynamics and Statistical Mechanics and EML 6653: Applied Elasticity courses. Students must also successfully complete one course from Dynamical Systems and Controls specialization areas, and both Mathematics courses as listed below

**Fluid and Thermal Science**

**EML 6105: Advanced Thermodynamics and Statistical Mechanics (required)**

EML 6713: Advanced Fluid Mechanics

EML 6154: Advanced Conduction Analysis

**Mechanics, Manufacturing, and Materials**

**EML 6653: Applied Elasticity (required)**

EML 6930: Advanced Manufacturing

EML 6930: Advanced Materials

EML 6570: Fracture Mechanics

EML 6290: Micro and Nano Manufacturing

**Dynamical Systems and Controls (must select one)**

EML 6273: Advanced Dynamics

EML 6311: Advanced Controls

EML 6223: Synthesis of Vibrating Systems

EML 6801: Robotic Systems

**Mathematics (both required)**

EML 6069: Advanced Engineering Math I

EML 6060: Advanced Engineering Math II

**Qualifying Examination:** The qualifying examination must be passed before admission to doctoral candidacy. The purpose of the Qualifying Examination is to determine if the student has acquired sufficient mastery of the subject matter in all relevant fields on his/her program of Study to warrant admission to candidacy for the Ph. D. degree. It should be taken as soon as a student has completed a significant portion of the coursework requirements. Students must apply to take the qualifying examination no later than the fourth semester after admission into the doctoral program.

To take the qualifying examination, a doctoral student must satisfy the following requirements:

1. Satisfactorily complete (C or better) in departmental coursework on Mathematics and two other areas of specialization (one major and one minor) as described below.
  - a) Mathematics:
    - a. Graduate courses - Advanced Mathematics, Advanced Mathematics II
  - b) Heat Transfer:
    - a. Undergraduate courses - Heat Transfer
    - b. Graduate courses - Conduction Heat Transfer, Convection Heat Transfer
  - c) Fluid Mechanics:
    - a. Undergraduate courses – Fluid Systems
    - b. Graduate courses - Advanced Fluids
  - d) Thermodynamics:
    - a. Undergraduate courses – Thermo I, Thermal Systems
    - b. Graduate courses - Advanced Thermodynamics
  - e) Dynamics:
    - a. Undergraduate courses – Dynamics, Vibrations, Kinematics and Dynamics of Machinery
    - b. Graduate courses - Advanced Dynamics of Machinery, Synthesis of Vibrating Systems
  - f) Solid Mechanics:
    - a. Undergraduate courses – Mechanics of Solids, Machine Design
    - b. Graduate Courses - Applied Elasticity
  - g) Materials:
    - a. Undergraduate courses – Materials I
    - b. Graduate courses - Advanced Materials
  - h) Controls:
    - a. Undergraduate courses – Controls
    - b. Graduate courses - Advanced Controls
2. Apply in writing to the Graduate Program Coordinator for permission to take the examination. The application must include a detailed statement of the courses taken, major and minor areas of specialization and must be submitted before October 15th.

3. Students may request an exemption from any required coursework if they have satisfactorily completed (B or better) equivalent coursework at an accredited institution other than USF.

No student will be allowed to take the examination if the cumulative GPA of all courses taken at USF is below 3.0, have not chosen a major professor and formed a supervisory committee, or is holding conditional or provisional admission status in the program. The examination will be administered by a Departmental Qualifying Examination Committee once a year (typically during February), as needed.

1. Written Examination

- a. Examinations will be given on Mathematics, and student's chosen major and minor areas of specialization. Examinations will be prepared by the qualifying examination committee and will be administered by the Graduate Program Coordinator. The composition of the committee will be rotated among all faculty members and determined by the exam areas to be offered. If at all possible, a Ph.D. advisor will not be involved in the evaluation of her/his students. The length of each examination will be approximately three hours of duration.
- b. The type of written examination, i.e., open book, etc., is at the discretion of the assessor.

2. Passing and Advancement to Candidacy

- a. A student is required to pass the written examination in all three areas (Mathematics, a major area of specialization, minor area of specialization) for advancement to candidacy.
- b. In case a student passes in 2 areas and fails in 1 area, a make-up written or the student may request oral examination. The make-up examination will be given during the second half of the spring semester.
- c. In case a student fails the written examination in more than one area or fails the written or oral make-up examination, he or she will need to re-take the entire qualifying examination in the following year.
- d. Students will be given a maximum of two attempts to pass the qualifying examination. Failure in the second year will result in being dropped from the doctoral program.

## **MAJOR PROFESSOR AND SUPERVISORY COMMITTEE**

**The course of Study for all graduate students must be approved by their major professor.** Consequently, all graduate students need to meet the faculty, determine their fields of interest, and select one faculty member as a major professor and others as supervisory committee members. The committee must be approved and appointed by the department chairman or his representative. For the Master's degree with a thesis option, a major professor and two committee members are required. For a Ph.D. degree, a major professor and a minimum of four additional members are required, one of which must be from a different engineering department and one from another college. All students that chose their major professor outside of the department must have a M.E. faculty member as a co-major professor.

**The formation of the supervisory committee must be completed during the first academic year of Study. Failure to comply with this requirement may result in the loss of financial aid. Students may make changes to the supervisory committee up until the semester before the graduation semester.**

## **NON-DEGREE SEEKING STUDENTS**

Students who are qualified to enroll in specific graduate courses, but who do not intend to work toward a graduate degree may enroll as non-degree seeking students. Non-degree students may enter classes on a space-available basis during the first week of each semester by obtaining the consent of the course instructor and Graduate Program Coordinator. Students must meet pre-requisites of courses in which they wish to enroll. **MAXIMUM FIFTEEN HOURS OF CREDIT EARNED AS A NON-DEGREE STUDENT MAY BE APPLIED TO SATISFY GRADUATE DEGREE REQUIREMENTS.** The degree-granting college must approve any application of such credit, students must earn a grade of B or better, and the course must be suitable for the program. This track for entering graduate study has been found especially helpful to students in the industry who seek specialized training in specified areas of graduate instruction but are uncertain as to pursuing a degree. Students who miss the deadline for admission to the Graduate Program may also take courses as a non-degree seeking student while their admission to the Graduate Program is being evaluated.

## **COMPLETION OF THE PROGRAM**

All degree-seeking graduate students, excluding students admitted to candidacy, must be enrolled in at least one term (Fall, Spring, Summer) during the previous 12 months. Students who have not enrolled in any of the last three terms will be dropped from their degree program and changed to inactive. Students may reapply to the University by submitting a new application. Applicants will be subject to the admission criteria in effect at that time. Students may request exceptions to this policy, for legitimate and valid reasons, through their Department, College, and the Graduate School.

**It is the student's responsibility to apply for graduation through the Mechanical Engineering Department by the posted College of Engineering deadline. Students must also submit a defense announcement to the department at least two weeks before the scheduled defense date.** Graduate students must be registered for a minimum of two hours the semester they graduate.

## **MASTERS DEGREE**

- Before graduating, the MSME with thesis track students must prepare a thesis and present it to the Supervisory Committee. **The student must present a typed final draft to the Supervisory Committee and Graduate Advisor one week before the final oral examination.**
- MSME without thesis track students must submit two project reports completed as part of the EML coursework requirement to the Graduate Program Coordinator during the semester of graduation for evaluation and assessment. Failing to respond to a request will prevent students from graduating.
- All work applicable to the Master's degree requirements must be completed within five years from the time the student is first admitted into his/her program.

## **Ph.D. DEGREE**

- Students must be admitted to candidacy before they register for dissertation hours. See the USF Graduate Catalog for requirements for admission to candidacy.
- The student must conduct an investigation resulting in an original and significant contribution to the knowledge in the chosen field of research. Students in the Ph.D. program must take a minimum of 20 hours of doctoral dissertation credits.
- Once admitted to candidacy, students must enroll for a minimum of 2 credit hours each semester of the academic year until completion of the program.
- Before graduating, the Ph.D. students must prepare a dissertation and present it to the Supervisory Committee. **The student must present a typed final draft to the Supervisory Committee and Graduate Advisor two weeks before the final oral examination.**
- All work applicable to the Ph.D. requirements must be completed within seven years from the time the student is first admitted into his/her program.

## MECHANICAL ENGINEERING FACULTY AND AREAS OF SPECIALIZATION

**Rajiv Dubey** (Professor/Chair) Ph.D.; Clemson University, 1986; Rehabilitation Robotics; Prosthetics and Orthotics; Dynamic Systems and Controls; [dubey@usf.edu](mailto:dubey@usf.edu)

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## **IMPORTANT CONTACTS FOR GRADUATE STUDENTS**

### GRADUATE ADMISSIONS

SVC 1036  
(813) 974-3350

### GRADUATE STUDIES

ALN 226  
(813) 974-2846

### USF TAMPA BOOKSTORE

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### INTERNATIONAL SERVICES

BEH 255  
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### OFFICE OF FINANCIAL AID

SVC 1102  
(813) 974-4700

### ENGINEERING DEAN'S OFFICE

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## **DEPARTMENT OF MECHANICAL ENGINEERING CONTACTS**

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