University of Virginia
Department of Engineering Systems and Environment
Systems Engineering

MASTER OF SCIENCE HANDBOOK

Any student enrolled in the ME program prior to the Fall 2019 semester has the option of adhering to either (a) the curriculum presented below or (b) the underlined curriculum that was effective when the student first enrolled in the ME program.

1. *Program Description*
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1. PROGRAM DESCRIPTION

MASTER OF SCIENCE (M.S.) is a graduate degree for those wishing not only to acquire fundamental knowledge, but also to contribute to the advancement of knowledge through independent, original research. The program prepares students for careers as practicing systems engineers or research engineers and serves as a steppingstone towards the doctorate. The program consists of five components.

- ***Core courses*** supplying the fundamentals of systems and decision sciences.
- ***Elective courses*** through which the student can expand and deepen the knowledge relevant to his/her research.
- ***Colloquium***, a regular meeting of graduate students and faculty for presenting and discussing research methods and contemporary systems problems and research.
- ***Research*** conducted individually, under the guidance of a faculty advisor, and leading to a master's thesis and a technical paper.
- ***Participation*** in the intellectual life of the University.

2. DEGREE REQUIREMENTS

A candidate for the Master of Science degree must fulfill the general requirements of the School of Engineering and Applied Science and the following specific requirements.

- **Complete an approved plan of study** consisting of at least 32 credit hours.

- **Author or coauthor** at least one technical manuscript under review or accepted to a conference or journal.
- **Defend satisfactorily a thesis**.

3. FACULTY ADVISOR

Upon admission to the program, the student is assigned a faculty advisor by the Graduate Programs Director. The student should meet with the advisor to initiate a planning effort. [Once the student identifies a research topic, the faculty advisor may be changed].

4. PLAN OF STUDY

4.1 The Planning Process

Immediately upon entering the program, the student should engage in a thorough and intensive planning effort in order to
  (i)   crystallize academic and career objectives,
  (ii) formulate a research topic, and
  (iii) establish a working relationship with the faculty advisor who agrees to direct the research, and with faculty members in the area of the student's interests.

This planning effort culminates in a plan of study.

The plan of study must be prepared under the guidance of the faculty advisor by the end of the first semester of study. Then it must be approved by the Graduate Programs Director.

The approved plan of study may be revised if necessary; the new plan must be submitted for approval.

4.2 The Nominal Plan

The nominal plan of study is shown in the exhibit. A full-time student, who meets all the prerequisites (calculus, linear algebra, probability and statistics, computer programming) and enters the program in the Fall semester, should be able to fulfill the degree requirements in 18 – 24 months.

The student serving as a Graduate Teaching Assistant (GTA) or a Graduate Research Assistant (GRA) must carry at least 12 credit hours in a semester and 6 credit hours in summer. To meet this requirement, the GTA should register for

SYS 8997   Graduate Teaching Instruction, in the section of the instructor they are assisting.

whereas the GRA should register for

SYS 8999 Thesis, in their advisor's section or
SYS 8995 Supervised Project Research, in their project mentors section.

depending on the presence or absence of a relationship between the research performed and the thesis topic.

NOMINAL PLAN OF STUDY FOR MASTER OF SCIENCE

Fall Semester 1   <u>Credit</u>

      SYS 6001   Introduction to Systems Engineering   3
      SYS 6003   Mathematical Programming   3
      SYS 6005   Stochastic Systems   3
      SYS xxxx   Teaching or Research   *3
      SYS 7096   Systems Engineering Colloquium   <u>1</u>
                                                              10

Spring Semester 1

      SYS xxxx   Systems Engineering Elective   3
      ...   .   Elective   3
      ...   .   Elective   3
      SYS xxxx   Teaching or Research   3*
      SYS 7096   Systems Engineering Colloquium   <u>1</u>
                                                              10

Summer Session 1

      SYS xxxx   Teaching or Research   3*
      SYS 8999   Thesis   <u>3</u>
                                                              3

Fall Semester 2

      ...   .   Elective   3
      ...   .   Elective   3
      SYS xxxx   Teaching or Research   3*
      SYS 8999   Thesis   <u>3</u>
                                                              9

      Minimum total number of credit hours   32
      *excluding graduate teaching and research hours

4.3 The Required Credits

The plan of study must include at least 32 credit hours of graduate-level work and must satisfy the following requirements.

9 credit hours of *core courses*: SYS 6001 + 6 hours from the following SYS 6003, SYS 6005, SYS 6007 and SYS 6021.

15 or more credit hours of *elective courses* distributed thusly:

- At least 6 credit hours of systems engineering courses at the 6000 or 7000 level. [These credit hours cannot be earned through Independent Study SYS 6993 and SYS 7993, Supervised Project Research SYS 6995 and SYS 8995, Graduate Teaching Instruction SYS 8997 and SYS 9997, Thesis SYS 8999, and Dissertation SYS 9999.]

- No more than 3 credit hours of Independent Study SYS 6993 or SYS 7993.

- No more than 3 credit hours of Supervised Project Research SYS 8995.

- No more than 3 credit hours at the 5000 level from the School of Engineering and Applied Science. [The 5000-level courses in the Graduate School of Arts and Sciences are nominally equivalent to 6000-level courses in the School of Engineering and Applied Science.]

- 2 or more credit hours of Systems Engineering Colloquium, SYS 7096.
    The student should register for one credit hour in each semester of the first year of study.

- 6 or more credit hours of Thesis, SYS 8999.

4.4 Special Circumstances

Prerequisites. The student who does not have the prerequisites (calculus, linear algebra, probability and statistics, computer programming) should take articulation courses. These courses cannot be used to satisfy the degree requirements.

Equivalent Courses. The student who, prior to enrolling in our graduate program, has already taken a course equivalent to a core course, may petition the Graduate Programs Director for the substitution of the core course by an elective course.

Transfer Credit. Up to 6 credit hours of graduate courses may be transferred. Only courses with a grade of B or better which have not been applied towards another degree may be transferred. The request for credit transfer must include the following documents: a description of course content and level, an official transcript, and a statement by the student certifying that the course has not been used to satisfy requirements for another degree. If the student is already admitted into a program at the University of Virginia, then the request for credit transfer must be pre-approved before the course is taken.

5. THESIS

5.1 The advisory committee must consist of at least 3 members of the University faculty. At least 2 members (the thesis advisor and the committee chair) must have their primary appointments (not   joint   appointments) in the Engineering Systems and Environment Department. One member may be from outside the department. The request to appoint the advisory committee must be submitted at least 14 days before the proposed presentation date. The request must be approved by the Graduate Programs Director.

5.2 A written thesis documents the research. The research contribution should be of the caliber and scope sufficient for producing at least one technical paper for a refereed journal (or for conference proceedings approved by the advisor). The manuscript of such paper must be submitted along with the thesis to the advisor.

5.3 The thesis should be prepared in accordance with the instructions from the advisory committee.

5.4 The thesis must be submitted to the examining committee at least 7 days prior to the defense.

6. THESIS DEFENSE

6.1 The final examination consists of an oral presentation and defense of the thesis in a public forum. It is designed to assess the student's contribution to a field of research and to test the student's knowledge of that field.

6.2 The final examination can be offered only after the student has submitted the thesis to the examining committee with sufficient lead time and has met all other degree requirements. It should be planned and conducted in accordance with the following guidelines.

- The examining committee must be composed of at least 3 members and must include the student's advisory committee. The request to appoint the examining committee must be submitted to the department at least 14 days prior to the examination date.   The request must be approved by the Graduate Programs Director and by the Office of the Dean.
- The examination should be scheduled when the University is in regular session, and enough time remains for thesis submission. The last dates are: November 15

in Fall semester, April 15 in Spring semester, and July 15 in Summer session. At least 1.5 hours must be allotted for the examination.

- The announcement of the examination to all ESE faculty and graduate students must be submitted to the department at least 7 days prior to the examination.
- A copy of the thesis must also be sent to the student's committee and the graduate coordinator 7 days prior to the examination.
- The student should prepare an oral presentation of the research lasting about 30 minutes.
- A student who does not give a satisfactory performance on the examination may, upon the recommendation of the examining committee, be granted a further examination.

7. THESIS SUBMISSION

7.1 After the defense, the student must revise the thesis in accordance with the report of the examining committee.

7.2 After the final version of the thesis is approved by the examining committee, the student must prepare Thesis/Dissertation Cover and Approval pages, which then must be scanned and inserted in front of the thesis in one consolidated .pdf. Please use the University of Virginia Registrar's Dissertation Title Guidelines for capitalization and punctuation.

7.3 The thesis .pdf must be submitted electronically to Libra Electronic Thesis and Dissertation (ETD) repository by the date specified by the Office of the Dean.

8. APPLICATION FOR THE DEGREE

8.1 Students must apply for graduation in SIS (Deadlines: February 1 for spring, June 1 for summer or October 1 for fall).

8.2 The student must be enrolled during the semester in which the application for the degree is submitted.

8.3 The student wishing to enter the doctoral program in systems engineering at the University of Virginia should request admission.

9. ADMINISTRATIVE FORMS

All forms that must be completed in the course of study may be found at

https://engineering.virginia.edu/departments/systems-and-information-engineering/academics/sie-current-graduate-students#accordion11071

All administrative requirements that must be met before graduation in the School of Engineering and Applied Science may be found at

August 2019

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