IOWA STATE UNIVERSITY

Department of Industrial and Manufacturing Systems Engineering

Graduate Student Handbook

MASTER OF ENGINEERING IN SYSTEM ENGINEERING AND MASTER OF ENGINEERING IN ENGINEERING MANAGEMENT

(2022-2023)

Graduate Student Services
3011 Black Engineering
http://www.imse.iastate.edu

Welcome to the Master of Engineering Programs in Systems Engineering and Engineering Management at Iowa State University! This student handbook will provide you with general guidelines regarding policies and procedures related to the programs. Please note that the Graduate College Handbook provides more detailed information on the graduate program policies. If for any reason there are inconsistencies between the Graduate College Handbook and this handbook, policies and procedures described in the Graduate College Handbook take precedence. We advise you to review the Graduate College Handbook at https://www.grad-college.iastate.edu/handbook/.

The Master of Engineering degree programs in Systems Engineering and Engineering Management are managed through the Department of Industrial and Manufacturing Systems (IMSE) at Iowa State University (ISU). Information on the department and degree programs is located at:

http://www.imse.iastate.edu

Please review this handbook periodically for any updates. We look forward to working with you and wish you the best of success in your studies.

Systems Engineering and Engineering Management Graduate Programs Office
Iowa State University
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Student Handbook for

Master of Engineering in Systems Engineering

and

Master of Engineering in Engineering Management

1. INTRODUCTION

1.1. WHAT ARE SYSTEMS ENGINEERING AND ENGINEERING MANAGEMENT?

The systems we are designing today are more complex than ever. Engineers with specialized skills in systems engineering and/or engineering management are called on to help deal with the challenges of managing these complex systems.

The International Council of Systems Engineering (INCOSE) defines systems engineering as follows:

"Systems Engineering is an engineering discipline whose responsibility is creating and executing an interdisciplinary process to ensure that the customer's and stakeholder's needs are satisfied in a high quality, trustworthy, cost efficient and schedule-compliant manner throughout a system's entire life cycle."

The American Society for Engineering Management (ASEM) defines engineering management as follows:

"Engineering Management (EM) bridges the gap between engineering and management. EM is the art and science of planning, organizing, allocating resources, and directing and controlling activities that have a technological component."

1.2. SYSTEMS ENGINEERING AND ENGINEERING MANAGEMENT PROGRAMS AT ISU

The Master of Engineering in Systems Engineering Program and the Master of Engineering in Engineering Management Program are designed to enable engineers, regardless of undergraduate discipline, to develop the analytical abilities needed to design and manage complex systems. The intent of these programs is to extend the ability of engineers to work across disciplinary boundaries and to develop their management and leadership capabilities for today's work environment.

Iowa State University offers several options in bringing these degree programs to you, so that you can fulfill your professional obligations and enhance your educational credentials. Delivery options include both on-line and on-campus courses.

2. ADMIN FOR SYSTEMS ENGINEERING AND ENGINEERING MANAGEMENT PROGRAMS

The following individuals at ISU are available to assist you with any problems or questions you may have.

<u>Director of Graduate Education</u>
Gary Mirka, Ph.D.
Department of Industrial and Manufacturing Systems Engineering
3025 Black Engineering
Iowa State University
Ames, Iowa   50011
Tel: 515-294-8661
Fax: 515-294-3524
Email: mirka@iastate.edu

<u>Graduate Coordinator</u>
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3011 Black Engineering
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3. ADMISSION REQUIREMENTS

To be considered for admission, the applicant should have a bachelor's degree in engineering or related field from a college, university, or technical school of recognized standing. Non-engineering backgrounds will be considered on a case-by-case basis. High academic achievement or other persuasive evidence of professional accomplishments is expected for admission to the program. The GRE is not required.

Applicants for admission to the Systems Engineering Program or the Engineering Management Program apply through the Graduate College at Iowa State University https://www.admissions.iastate.edu/apply/online/ . Each applicant must submit:

- Application and application fee
- Official academic transcripts
- Three letters of recommendation
- Resume

Application Deadlines:

- *Spring:*   *November 15*
- *Summer:*   *April 15*
- *Fall:*   *July 15*

Individuals may also take up to nine credits at Iowa State as a non-degree seeking student and then transfer them to the program when they are admitted. However, please note that you must apply again to the program if you begin as a non-degree student.

The Master of Engineering in Systems Engineering Program and the Master of Engineering in Engineering Management Program at Iowa State University are focused on supporting full-time working professionals and on-campus students. Courses are generally available both online ("WWW") or in-person ("face-to-face").

Common Questions and Points of Note

The following points are questions and/or issues that arise frequently enough that they warrant calling out directly

- Teaching assistantships, research assistantships and other financial aid are not available via the IMSE Department.
- The elective courses for both programs listed in this handbook are pre-approved, meaning the Director of Graduate Education (DOGE) has approved them as electives already. Other elective courses may occasionally be accepted, subject to approval.
- Transfer credits from another institution must meet certain requirements. See the Graduate College Handbook for details.
- A limited number of undergraduate courses may count as part of a student's Program of Study under certain conditions. A 300-level course may be acceptable in some cases, but must be outside of the student's major. For example, IE 305 cannot be part of a student's Program of Study. See the Graduate College Handbook for details.
- Once admitted to the program, taking a course or courses not on the approved course list with the intent of satisfying program requirements is unacceptable if prior approval were not obtained. In other words, it is inappropriate for a student to ask for approval of a course to satisfy program requirements after the class has commenced or after the class has been completed.
- If a student is admitted to the program with a deficiency (needs to take a statistics course, as an example), then he or she must not complete any other courses *before* completing the deficiency. It is permissible for a student to take a deficiency course at the same time as taking another course, but beginning the program by taking core courses or electives without first completing deficiencies is not allowed. Deficiency courses must be completed with a grade of "C" or better in order to receive credit for making up the deficiency.
- Failure to achieve a grade of "C" or better for a deficiency course, and/or having an overall program grade point average below 3.0 will necessitate a review of student progress by the Director of Graduate Education (DOGE). A student may be required to take classes external to Iowa State University, dismissed from the program, or be put on academic probation, at the discretion of the DOGE.

4. DEGREE REQUIREMENTS

Master of Engineering in Systems Engineering

A. Intro/Core (required first year)

IE 563:	Engineering & Systems Management	**Fall**
IE 565:	Systems Engineering and Analysis	**Spring**

B. Core (required)

IE 564:	Decision Analysis in System Design	**Spring**
IE 570:	Systems Engineering and Project Management	**Spring**
IE 585:	Requirements & Architecture Engineering	**Alt. Spring (Odd)**

C. Electives

IE 448:	Manufacturing Systems Engineering	**Summer**
IE 452:	Introduction to Systems Engineering	**Summer/Fall**
IE 503:	Introduction to Sustainable Production Systems	**Alt. Spring (Odd)**
IE 560:	Engineering Risk Analysis	**Alt. Fall (Odd)**
IE 561:	Total Quality Management	**Alt. Fall (Even)**
IE 572:	Design & Evaluation of Human-Computer Interaction	**Spring**
IE 577:	Human Factors	**Fall**
IE 581:	E-Commerce Systems Engineering	**Alt. Fall (Even)**
IE 582:	Enterprise Modeling & Integration	**Alt. Spring (Even)**
IE/AerE 568:	Large-Scale Complex Engineered Systems	**Fall**
ME 525:	Optimization Methods for Complex Designs	**Spring**
AerE 554:	Metaheuristic Optimization & Modelling for Complex System Design	**Spring**
AerE 563:	Intro to Multidisciplinary Design Optimization	**Spring**
	One "free elective" from any graduate program (optional)	**Varies**

To submit a request for <u>NON</u>-IE courses please use the program's course request [eform](#).

The student's major professor will be the Director of Graduate Education for Systems Engineering, who is responsible for monitoring progress and providing guidance on coursework. The major professor approves each student's program of study and committee form (POS).

Certificate in Systems Engineering

A. Intro/Core (required first year)

       IE 563: Engineering & Systems Management   **Fall**

       IE 565: Systems Engineering and Analysis   **Spring**

B. Core (pick 2)

       IE 564: Decision Analysis in System Design   **Spring**

       IE 560: Engineering Risk Analysis   **Alt. Fall (Odd)**

       IE 570: Systems Engineering and Project Management   **Spring**

       IE 585: Requirements & Architecture Engineering   **Alt. Spring (Odd)**

The student's major professor will be the Director of Graduate Education for Systems Engineering Certificate Option, who is responsible for monitoring progress and providing guidance on coursework. The major professor approves each student's program of study and committee form (POSC).

Master of Engineering in Engineering Management

A. Intro/Core (required first year)

IE 563:	Engineering & Systems Management	**Fall**
IE 565:	Systems Engineering and Analysis	**Spring**

B. Core (required)

SCM 524:	Strategic Process Analysis & Improvement	**Fall**
IE 570:	Systems Engineering and Project Management	**Spring**
MGMT 583:	Strategic Management of Innovation	**Spring**
ACCT 581:	Accounting for Decision Making	**Spring**

C. Electives

1. Engineering Electives

IE 564:	Decision Analysis in System Design	**Spring**
IE 560:	Engineering Risk Analysis	**Alt. Fall (Odd)**
IE 561:	Total Quality Management	**Alt. Fall (Even)**
IE 572:	Design & Evaluation of Human-Computer Interaction	**Spring**
IE 577:	Human Factors	**Fall**
IE 581:	e-Comerce Systems Engineering	**Spring**
ConE 380:	Engineering Law	**Summer**

2. Business Electives (at most one from list)

FIN 501:	Financial Valuation & Corporation Financial Decisions	**Spring (Even)**
MKT 501:	Marketing	**Fall (Even)**
MGMT 503:	Professional Responsibility in Business & Society	**Fall (Odd)**

3. One other from any graduate program (optional)

To submit a request for <u>NON</u>-IE courses please use the program's course request eform.

The student's major professor will be the Director of Graduate Education for Engineering Management, who has responsibility for monitoring progress and providing guidance on coursework. Th e major professor approves each student's program of study and committee form (POSC).

5. CHRONOLOGICAL LIST OF TASKS TO OBTAIN DEGREE

All forms noted below can be found on the Graduate College website at https://www.grad-college.iastate.edu/student/forms/

Items	Completion Date	Form
Application for Graduate College	Before the completion of nine credit hours of coursework at ISU (non-degree seeking students)	https://www.admissions.iastate.edu/apply/online/
Program of Study Approval	Before completing 12 credits of graduate work	"Program of Study" online form https://www.grad-college.iastate.edu/posc/
Application for Graduation Filed	Before the semester of graduation begins	"Application for Graduation" online form https://www.grad-college.iastate.edu/student/forms/graduation-application/
Request for Graduation Check/Approval	Before the semester of graduation begins	"Coursework Only Final Check" online form https://www.grad-college.iastate.edu/student/forms/coursework-only/

6. DESCRIPTION OF TASKS TO OBTAIN DEGREE

6.1. COMPLETE APPLICATION FOR GRADUATE SCHOOL

- **You must be admitted to the Graduate College before you complete more than nine hours of coursework at ISU.** That is, if you are taking courses as a non-degree

(undeclared) student, do not take more than nine credits at ISU before you formally apply to the Systems Engineering program. **Only nine credits taken before admission may be applied to the total number of credits required for graduation**.

- You may apply online at https://www.admissions.iastate.edu/apply/online/

6.2. SATISFY GRADUATE ENGLISH REQUIREMENT, IF APPLICABLE

- Non-native speakers or international students who do not have undergraduate degrees from U.S. universities must take the English Placement Test (EPT) at the beginning of their first semester of enrollment. Students who do not pass the exam will be assigned to take one or more English courses. Please refer to the following link for additional details: https://www.grad-college.iastate.edu/handbook/

  For more information on dates and locations of the EPT:

  Applied Linguistics Program
  239 Ross Hall
  Ames, IA 50011
  Email: ept@iastate.edu
  https://apling.engl.iastate.edu/english-placement-test/

6.3. APPROVAL OF PROGRAM OF STUDY (POS)

- Accomplish during the first semester of admission and absolutely before completing 12 credits of graduate work. If necessary, changes may be made to the POS at a later date by completing the "Modifications to the POS" form on Access Plus.
- List all courses applicable to the program.
- The Director of Graduate Education for Systems Engineering and Engineering Management will assist you with development of your POS.

6.4. REQUEST FOR GRADUATION CHECK/APPROVAL LIST

- Completed before the semester of graduation begins.

6.5. GRADUATE COLLEGE HANDBOOK

- For detailed information regarding the items described above, please consult the "**Graduate Handbook.**" The handbook describes Graduate College guidelines and procedures. It is a valuable reference for ISU students. You can also access the latest version of the handbook on the WEB at **https://www.grad-college.iastate.edu/handbook/.**

7. COURSES

7.1. SCHEDULE OF COURSES

- A schedule of courses provided for each semester can be found on the Engineering-LAS Online Learning webpage at http://www.elo.iastate.edu/
- Tentative course rotations can be found online at http://www.elo.iastate.edu/tentative-course-rotations/

7.2. REGISTERING FOR COURSES

- There are several options to register for courses. The student can register for many courses through AccessPlus. If the course is offered by the College of Business the student must request enrollment by notifying the Systems Engineering and Engineering Management Graduate Programs Coordinator via the following eform: https://www.imse.iastate.edu/graduate-program/eforms/emsecourserequest/

7.3. TRANSFER COURSES

- You may not transfer more than nine hours of coursework to be applied to your program of study if those courses were taken at ISU, and no more than eight hours from another accredited institution. In other words, at least twenty-two credits must be taken at ISU. The certificate program does not allow for transfer credits from outside ISU. You must receive a "B" or better on any transfer course. It is advisable to get the course approved with your major professor before you take the course. Provide a description of the course numbering system (in order for ISU to confirm that the course is a graduate level course) or some other type of evidence that the institution at which you took the course considers it to be a graduate course. Also provide a copy of the course syllabus, a catalog description of the course, the name of textbook(s) used for the course, and the name and telephone number of the course instructor. See the Graduate College Handbook for details.

7.4. TEXTBOOKS

- Textbook information is available from the University Book Store

  - Phone: 1-800-478-0048
  - On-line: http://www.isubookstore.com/

7.5. TUITION AND FEES

- The latest information on tuition and fees can be found on the Engineering-LAS Online Learning Web page at http://www.elo.iastate.edu/how-elo-works/tuition-and-fees/.

8. IMPORTANT TELEPHONE NUMBERS AND LINKS

What	Telephone	Website
University Bookstore	1-800-433-3451, or 515-294-5684	http://www.isubookstore.com/
College of Engineering		http://www.engineering.iastate.edu/
Engineering-LAS Online Learning	1-800-854-1675 or 515-294-7470	http://www.elo.iastate.edu/
Graduate Admissions	515-294-0818	
Graduate College	515-294-4531	http://www.grad-college.iastate.edu/