

**Student Handbook for**  
**Master of Engineering in Systems Engineering**  
**and**  
**Master of Engineering in Engineering Management**

**2017-2018**

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. We advise you to review the Graduate College Handbook at <http://www.grad-college.iastate.edu/common/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  
3004 Black Engineering Building  
Ames, Iowa 50011-2164  
515.294.1682**

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## 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 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 IOWA STATE UNIVERSITY

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. ADMINISTRATION OF SYSTEMS ENGINEERING AND ENGINEERING MANAGEMENT PROGRAMS

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

*DIRECTOR OF GRADUATE EDUCATION FOR SYSTEMS ENGINEERING*

*DIRECTOR OF GRADUATE EDUCATION FOR ENGINEERING MANAGEMENT*

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Systems Engineering Email: [systems-eng@iastate.edu](mailto:systems-eng@iastate.edu)

Engineering Management Email: [eng-management@iastate.edu](mailto:eng-management@iastate.edu)

### 3. ADMISSION REQUIREMENTS

Unrestricted admission requires (1) a 3.0 grade point average from an ABET accredited undergraduate engineering program, (2) two years of engineering experience beyond completion of the undergraduate degree or current full-time employment as an engineer, (3) calculus, engineering statistics, and engineering economics. A GRE is not required for this program.

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

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

Applications should be submitted as early as possible before the beginning of the semester for which admission is sought. Individuals may also take up to 9 credits at Iowa State as a non-degree seeking student and then transfer them to the program when they are admitted.

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 here in the United States and taking courses part-time through our distance education program. The program is not intended for full-time students taking courses in residence at Iowa State University. Teaching or research assistantships are not available.

## 4. DEGREE REQUIREMENTS

### ***Systems Engineering Program Coursework-Only Option***

The complete requirements for the Systems Engineering program coursework-only option include the following:

#### Systems Engineering Program

##### **Intro/Core (required first year)**

|  |               |
|--|---------------|
| IE 563: Engineering & Systems Management | <b>Fall</b>   |
| IE 565: Systems Engineering and Analysis | <b>Spring</b> |

##### **Core (required)**

|  |                          |
|--|--------------------------|
| IE 564: Decision Analysis in System Design         | <b>Spring</b>            |
| IE 570: Systems Engineering and Project Management | <b>Spring</b>            |
| IE 585: Requirements & Architecture Engineering    | <b>Alt. Spring (Odd)</b> |

##### **Electives**

###### Manufacturing Courses

|   |                         |
|---|-------------------------|
| IE 448: Manufacturing Systems Engineering                 | <b>Summer</b>           |
| IE 561: Continuous Quality Improvement of Process         | <b>Alt. Fall (Even)</b> |
| IE 572: Design & Evaluation of Human-Computer Interaction | <b>Spring</b>           |
| IE 577: Human Factors                                     | <b>Fall</b>             |
| IE 541: Inventory Control & Production Planning           | <b>Spring</b>           |

###### Engineering Courses

|  |                           |
|--|---------------------------|
| IE 452: Introduction to Systems Engineering                                | <b>Summer/Fall</b>        |
| IE 560: Engineering Risk Analysis  | <b>Alt. Fall (Odd)</b>    |
| IE 581: E-Commerce Systems Engineering                                     | <b>Alt. Fall (Even)</b>   |
| IE 582: Enterprise Modeling & Integration                                  | <b>Alt. Spring (Even)</b> |
| IE/AerE 568: Large-Scale Complex Engineered Systems                        | <b>Fall</b>               |
| IE 503: Introduction to Sustainable Production Systems                     | <b>Alt. Spring (Odd)</b>  |
| ME 525: Optimization Methods for Complex Designs                           | <b>Spring</b>             |
| AerE 563: Intro to Multidisciplinary Design Optimization                   | <b>Spring</b>             |
| AerE 554: Metaheuristic Optimization & Modelling for Complex System Design | <b>Spring</b>             |

###### Software Courses

|  |                         |
|--|-------------------------|
| IE 581: e-Commerce Systems Engineering | <b>Alt. Fall (Even)</b> |
|--|-------------------------|

1 Other from any graduate program (optional)

\* Elective courses are subject to change by IMSE Department

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





## ***Systems Engineering Certificate Option***

The complete requirements for the Systems Engineering Certificate option include the following:

### Systems Engineering Certificate

#### **Intro/Core (required first year)**

|  |               |
|--|---------------|
| IE 563: Engineering & Systems Management | <b>Fall</b>   |
| IE 565: Systems Engineering and Analysis | <b>Spring</b> |

#### **Core (required to pick 2)**

|  |                          |
|--|--------------------------|
| IE 564: Decision Analysis in System Design         | <b>Spring</b>            |
| IE 560: Engineering Risk Analysis                  | <b>Alt. Fall (Odd)</b>   |
| IE 570: Systems Engineering and Project Management | <b>Spring</b>            |
| IE 585: Requirements & Architecture Engineering    | <b>Alt. Spring (Odd)</b> |

The student's major professor will be the Director of Graduate Education for Systems Engineering Certificate Option, and will also have responsibility for monitoring progress and providing guidance on coursework. The major professor approves each student's program of study (POS).

## **Engineering Management Coursework-Only Option**

The complete requirements for the Engineering Management program coursework-only option include the following:

### Engineering Management Program

#### **Intro/Core (required first year)**

|  |               |
|--|---------------|
| IE 563: Engineering & Systems Management | <b>Fall</b>   |
| IE 565: Systems Engineering and Analysis | <b>Spring</b> |

#### **Core (required)**

|  |               |
|--|---------------|
| SCM 524: Strategic Process Analysis & Improvement  | <b>Fall</b>   |
| IE 570: Systems Engineering and Project Management | <b>Spring</b> |
| MGMT 583: Strategic Management of Innovation       | <b>Spring</b> |
| ACCT 581: Advanced Managerial Accounting           | <b>Spring</b> |

#### **Electives**

##### Engineering Courses

|   |                         |
|---|-------------------------|
| IE 564: Decision Analysis in System Design        | <b>Spring</b>           |
| IE 560: Engineering Risk Analysis                 | <b>Alt. Fall (Odd)</b>  |
| IE 561: Continuous Quality Improvement of Process | <b>Alt. Fall (Even)</b> |
| IE 541: Inventory Control & Production Planning   | <b>Spring</b>           |
| ConE 380: Engineering Law                         | <b>Summer</b>           |

##### Business Courses

|  |                      |
|--|----------------------|
| FIN 501: Financial Valuation & Corporation Financial Decisions | <b>Spring (Even)</b> |
| MKT 501: Marketing   | <b>Fall (Even)</b>   |
| MGMT 503: Professional Responsibility in Business & Society    | <b>Fall (Odd)</b>    |

1 Other from any graduate program (optional)

\* Elective courses are subject to change by IMSE Department

The student's major professor will be the Director of Graduate Education for Engineering Management, and will also have responsibility for monitoring progress and providing guidance on coursework. The major professor approves each student's program of study (POS).

## 5. CHRONOLOGICAL LIST OF ITEMS THAT MUST BE COMPLETED TO OBTAIN THE DEGREE

All forms noted below can be found on the Graduate College website at [http://www.grad-college.iastate.edu/common/forms/student\\_forms.php](http://www.grad-college.iastate.edu/common/forms/student_forms.php)

| <i>Items</i>   | <i>Completion Date</i>  | <i>Form</i>   |
|--|---|---|
| Application for Graduate College   | Before the completion of nine credit hours of coursework at ISU (non-degree seeking students) | <a href="http://www.admissions.iastate.edu/apply/graduate.php">http://www.admissions.iastate.edu/apply/graduate.php</a> |
| Satisfy Graduate English Requirement<br><i>(for non-native speakers only, <a href="#">see details below</a>)</i> | Beginning of first semester of enrollment   |   |
| Program of Study Approval  | Before completing 12 credits of graduate work   | "Program of Study" online form  |
| Application for Graduation (Diploma Slip) Filed  | Before the semester of graduation begins  | "Application for Graduation (Diploma Slip)" online form   |
| Request for Graduation Check/Approval  | Before the semester of graduation begins  | "Request for Graduation Check/Approval" form  |

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\*\*Fill out a draft copy of each form and email to the Program Assistant. We will review and return to student for signature.\*\*

## 6. DESCRIPTION OF THE CHRONOLOGICAL LIST OF ITEMS THAT MUST BE COMPLETED TO OBTAIN THE 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 <http://www.admissions.iastate.edu/apply/>

### 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 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: <http://www.grad-college.iastate.edu/common/handbook/>

For more information on dates and locations of the exams, please contact the following:

TESL/Applied Linguistics  
226 Ross Hall  
Ames, IA 50011  
Phone: 515-294-6398  
Email: [ept@iastate.edu](mailto:ept@iastate.edu)

### 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. DIPLOMA SLIP

Completed and submitted before the semester of graduation begins.

#### 6.5. REQUEST FOR GRADUATION CHECK/APPROVAL LIST

Completed before the semester of graduation begins.

#### 6.6. 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 <http://www.grad-college.iastate.edu/common/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 online through the following website <https://accessplus.iastate.edu/NonAuth/R404/R4048.jsp> .

### 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.

### 7.4.TEXTBOOKS

Textbook information is available from

University Book Store

Phone: 1-800-478-0048

On-line: <http://www.isubookstore.com/>

### 7.5.TUITION AND FEES

Tuition and fees are subject to change. The latest updated information 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

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