# INDUSTRIAL AND SYSTEMS ENGINEERING (MS)

**Master of Science in Industrial and Systems Engineering (ISE MS)**
Unit: Speed School of Engineering  (http://engineering.louisville.edu)(GS)

Department: Industrial and Systems Engineering (https://engineering.louisville.edu/academics/departments/industrial/)
Academic Plan Code(s): IE_ _MS, IE__MSO

## Program Information

*This program can be completed* 100% online *(*http://louisville.edu/online/programs/masters/online-master-of-science-in-industrial-engineering/*).* *(*http://louisville.edu/online/programs/masters/online-master-of-science-in-industrial-engineering/*)*

### General Information

The MS degree program is suitable for individuals with an accredited baccalaureate degree in engineering or from any other discipline (e.g. mathematics, business, psychology, physics, and alike). Applicants with a baccalaureate degree other than Industrial Engineering should consult with the Director of the MS program in the Department of Industrial and Systems Engineering on their readiness and necessary remedial work in order to succeed.

### Degree Requirements

The program of study must be completed with a 3.00 GPA or better for all graduate courses used to satisfy degree requirements. Additionally, the program of study must be completed with a 3.00 GPA or better for all academic work attempted in graduate studies.

The requirements for the Master of Science degree are discussed in more detail in the section of this catalog.

## Admission Standards

The admission standards for the Master of Science program in Industrial and Systems Engineering are as follows:

1. All admission applications for the program shall include:
   a. A completed graduate application (https://graduate.louisville.edu/admission/apply/) for the Graduate School
   b. An application fee
   c. Resume
   d. At least two letters of recommendation
   e. Official transcript(s) for all previous post-secondary coursework. All transcripts not in English must be certified as authentic and professionally translated verbatim into English.
2. The minimum requirement for admission is the baccalaureate degree or its equivalent from an accredited institution.
3. Calculus I or higher required.
4. The successful applicant will typically have an undergraduate grade point average of 2.75 or above (on a 4.00 scale). Applicants with a GPA between 2.5 and 2.75 may be considered for admission and will be required to submit additional application materials, including recommendation letters, a resume or personal statement, and prior academic performance in specific classes. Such applicants may be considered for conditional admission, and we may require that specific academic standards be met in the first semester to achieve admission in good standing.
5. International students whose primary language is not English must show English language proficiency by either TOEFL/IELTS/Duolingo score or demonstration of a degree awarded from an acceptable English language institution.  The successful applicant will typically have a TOEFL score of 79 or higher or overall IELTS score of 6.5 or higher or a Duolingo score of 105 or higher.

## Program Requirements

Remedial work may be specified for those applicants who, in the opinion of the faculty, do not have a sufficient background. The minimum curricular requirements for the master's program are:

| Code | Title | Hours |
|------|-------|-------|
| **Core Courses** | | |
| ISE 560 | Probability and Statistics for Engineers | 3 |
| ISE 664 | Experimental Design in Engineering | 3 |
| Focus Area Courses [1,2] | | 9 |
| 5XX and/or 6XX Technical Electives [3,4] | | 9 |
| **Select one of the following:** | | **6** |
| *Course Only Option* | | |
| 5XX and/or 6XX Technical Electives [3,4] | | |
| *Thesis Option* | | |
| ISE 690 | Master of Science Thesis in Industrial Engineering [5] | |
| *Project Option* | | |
| ISE 699 | Industrial Engineering Master's Degree Project | |
| 5XX and/or 6XX Technical Elective [3,4] | | |
| **Minimum Total Hours** | | **30** |

[1] See Focus Area Options below with the courses included in each area.
[2] Focus area is not required. Student could plan a "General" MS Industrial and Systems Engineering degree if coursework does not fit into a specific focus area.
[3] Electives must be chosen so that at least one-half of the credits counted toward the degree, exclusive of thesis, are 600-level.
[4] Electives must be chosen so that at least fifteen (15) credit hours of coursework are in ISE.
[5] For the thesis option, a student is required to select both an approved MS thesis topic and the thesis director and members of the thesis committee. The thesis director must give approval for enrollment in ISE 690.

## Focus Areas
### Data Analytics and Operations Research

| Code | Title | Hours |
|------|-------|-------|
| ISE 561 | Decision Support Systems | 3 |
| ISE 645 | Systems Simulation | 3 |
| ISE 646 | Operations Research Methods | 3 |
| ISE 662 | Predictive Analytics for Decision Making I | 3 |

## Logistics and Supply Chain

| Code | Title | Hours |
| --- | --- | --- |
| ISE 621 | Facility Location and Layout | 3 |
| ISE 646 | Operations Research Methods | 3 |
| ISE 625 | Production and Inventory Systems | 3 |
| ISE 655 | Supply Chain Engineering | 3 |
| ISE 657 | Models for Design and Analysis of Logistical Systems | 3 |

## Advanced Manufacturing

| Code | Title | Hours |
| --- | --- | --- |
| ISE 600 | Additive Manufacturing Processes | 3 |
| ISE 629 | Quality Control | 3 |
| ISE 619 | Digital and Advanced Manufacturing Systems | 3 |

## Human Factors

| Code | Title | Hours |
| --- | --- | --- |
| ISE 669 | Introduction to Human Factors Engineering and Ergonomics | 3 |
| ISE 671 | Advanced Topics in Human Factors Engineering | 3 |
| ISE 675 | Usability Engineering | 3 |
| ISE 682 | Quality of Care and Patient Safety | 3 |
| ISE 684 | Health IT and Clinician Support | 3 |