Industrial and Systems Engineering

Department Head: Dr. John M. Usher, PE
Graduate Coordinator: Dr. Kari Babski-Reeves, CPE
260 McCain Building
Box 9542
Mississippi State, MS 39762
Telephone: 662-325-3865
E-mail: grad@ise.msstate.edu

The Department of Industrial and Systems Engineering offers the Doctor of Philosophy in Industrial and Systems Engineering. In addition, the Department offers the Master of Science in Industrial Engineering with both thesis and non-thesis options. The M.S. (thesis option) is a research-oriented degree and serves to prepare students for positions in industry or government or for further graduate study in industrial and systems engineering or related areas. The M.S. (non-thesis option) is designed to prepare students for positions in business and industry that require a graduate education.

Concentrations offered at the master's level are:

Human Factors and Ergonomics Concentration (HFE)

This concentration is designed for students who wish to increase their understanding of Human Factors and Ergonomics (HFE). Students will be exposed to both a breadth and depth of HFE principles and practices including but not limited to physical ergonomics, cognitive ergonomics, and occupational safety and health.

Industrial Systems Concentration (SYS)

This concentration prepares students for general Industrial and Systems Engineering (ISE) work. It is designed to allow the student a high degree of flexibility in selecting a program that meets his/her needs. For example, the student might choose to specialize in one or more areas of ISE (e.g., quality engineering) or choose a very broad program covering several ISE fields.

Management Systems Engineering Concentration (MGTS)

This concentration is designed for students who wish to increase their understanding and capability in the areas of management systems engineering and general engineering management. The philosophy behind this option is that students can be provided with knowledge that will enable them to apply an engineering approach to problems involved in the design and operation of management systems.

Manufacturing Systems Concentration MFGS)

This concentration is designed for students who wish to increase their understanding of the design, analysis and control of manufacturing systems and processes.

Operations Research Concentration (OPRS)

This concentration is designed for students who wish to increase their understanding of and use of Operations Research (OR) skills for systems analysis and design.

Admission Criteria

Typically, an entering M.S. student should have a grade point average of 3.00 out of 4.00 for the junior and senior years. Likewise, an entering Ph.D. student with an M.S. degree should have a 3.50 out of 4.00 grade point average on the M.S. work, while a Ph.D. student entering with only a B.S. degree is expected to have a 3.50 out of 4.00 on the last two years of the undergraduate program. A student with a lower GPA may still be eligible for admission based on outstanding qualifications in other areas. All entering students must submit GRE general-test scores. International students must have a minimum TOEFL score of 550 PBT (213 CBT or 80 iBT) or IELTS score of 6.5.

The department reviews completed applications four times a year: February 15, May 15, August 15, and November 15. Incomplete or not fully processed applications will be reviewed during the next cycle.

Provisional Admission

If a student does not fully meet the admission requirements of the program, it may be possible for that student to be provisionally admitted. If provisionally admitted, the student must attain a 3.00 GPA on the first 9 hours of graduate courses at Mississippi State University after admission to the program. Courses with an S grade, transfer credits, or credits earned while in Unclassified status cannot be used to satisfy this requirement. If a 3.00 GPA is not attained, the student will be dismissed from the graduate program.

Academic Performance

In addition to the criteria defined in the current Bulletin of the Graduate School, unsatisfactory performance in the graduate program in Industrial and Systems Engineering is defined as any of the following:

- failure to maintain a 3.00 average in the M.S. program or 3.30 in the Ph.D. program,
- failure of the qualifying exam (Ph.D. students only),
- failure of the preliminary exam (Ph.D. students only);
- failure of the comprehensive final exam (M.S. non-thesis option only),
- unsatisfactory evaluation of thesis or dissertation, or
- a failure of the required component of the program of study.

Any one of these will constitute the basis for review for possible dismissal. If the students drops six or more quality points below the required average (3.00 for M.S. or 3.30 for Ph.D.), the graduate coordinator will review the record along with the student's graduate committee and will recommend a final course of action, which will be immediate dismissal or the establishment of a probationary period in which corrective action must take place.

While on probation, the student is not eligible to receive an assistantship and is required to raise his/her cumulative GPA to 3.00 for M.S. or 3.30 for Ph.D. by the end of the following semester of enrollment. During that semester, the student must enroll in 9 credit hours of coursework; Directed Individual Study courses are excluded.

In case of a dismissal from the graduate program, a student may appeal his/her academic dismissal according to the following procedure:

- Within four weeks of being notified of the official dismissal, the student must present the request and related explanation in writing to the graduate coordinator. The graduate coordinator will review the appeal with the appropriate departmental committee and render a recommendation.
- If the appeal at the departmental level is unsuccessful, a student may then appeal to the Associate Dean for Research and Graduate Studies in the college.
- If the appeal at the college level is unsuccessful, the student may then appeal to the Office of the Provost.

Doctor of Philosophy in Industrial & Systems Engineering

Industrial Engineering courses		30
Courses in discipline other than Industrial Engineering		6
IE 6623	Engineering Statistics II (or equivalent)	3
IE 6773	Systems Simulation I (or equivalent)	3
Additional Graduate-level coursework		6
Research		20
Total Hours		68

A preliminary examination, a dissertation, and an oral examination in defense of the dissertation are required.

Additional requirements are:

1. No ISE graduate student may list ST 8114 or IE 6613 on his/her graduate program
2. No program can contain more than 9 hours of courses that are required in the bachelor's degree curriculum
3. No program can contain more than 6 hours of Directed Individual Study (IE 7000).

Doctoral students must complete at least 48 hours of coursework beyond the B.S. level.

Master of Science in Industrial Engineering with Human Factors and Erognomics Concentration (HFE) - Thesis

Prerequisites (foundational courses) are:

- MA 1713
- MA 1723
- MA 2733
- MA 2743
- IE 3123
- IE 4613/6613

IE 6773	Systems Simulation I	3
IE 6623	Engineering Statistics II	3
At least 3 HFE ISE courses		9
IE 8000	Thesis Research/ Thesis in Industrial Engineering	6
At least one non-HFE ISE course		3
At least one course from Mathematics (MA) or Statistics (ST)		3
At least one course from a supporting area (Biological Engineering [ABE], Psychology [PSY], Kinesiology [KI], Mechanical Engineering [ME], Mathematics [MA], Statistics [ST], etc.)		3
Total Hours		30

A thesis and an oral comprehensive examination in defense of the thesis are required.

Additional requirements are:

1. A minimum of 12 hours coursework must be at the 8000-level or higher.
2. No ISE graduate student may list ST 8114 or IE 6613 on his/her graduate program
3. No program can contain more than 9 hours of courses that are required in the bachelor's degree curriculum
4. No program can contain more than 6 hours of Directed Individual Study (IE 7000).

The thesis-option Master of Science in Industrial Engineering requires at least 24 credit hours of coursework above the baccalaureate degree. IE 9000 does not apply to M.S. students.

Master of Science in Industrial Engineering with Human Factors and Ergonomics Concentration (HFE) - Non-Thesis

Prerequisites (foundational courses) are:

- MA 1713
- MA 1723
- MA 2733
- MA 2743
- IE 3123
- IE 4613/6613

IE 6773	Systems Simulation I	3
IE 6623	Engineering Statistics II	3
At least three HFE ISE courses		9
At least two non-HFE ISE courses		6
At least two courses from Mathematics (MA) or Statistics (ST)		6
At least one course from a supporting area (Biological Engineering [ABE], Psychology [PSY], Kinesiology [KI], Mechanical Engineering [ME], Mathematics [MA], Statistics [ST], etc.)		3
Course to be selected by the academic advisor and graduate program committee		3
Total Hours		33

A written and oral comprehensive final exam on the coursework. At least 15 hours for the M.S. non-thesis degree must be from 8000-level courses or above. The specific courses required depend upon the student's area of concentration. IE 8000 Research/Thesis does not apply to non-thesis students.

Additional requirements are:

1. No ISE graduate student may list ST 8114 or IE 6613 on his/her graduate program.
2. No program can contain more than 9 hours of courses that are required in the bachelor's degree curriculum.
3. No program can contain more than 6 hours of Directed Individual Study (IE 7000).

The non-thesis Master of Science requires at least 33 credit hours of coursework above the baccalaureate degree. IE 9000 does not apply to M.S. students.

Master of Science in Industrial Engineering with Industrial Systems Concentration (SYS) - Thesis

Prerequisites (foundational courses) are:

- MA 1713
- MA 1723
- MA 2733
- MA 2743
- Computer programming proficiency
- IE 3123
- IE 3913
- IE 4333
- IE 4613/6613

IE 6773	Systems Simulation I	3
IE 8000	Thesis Research/ Thesis in Industrial Engineering	6
All other courses to be selected by the student along with the academic advisor and graduate program committee		21
Total Hours		30

A thesis and an oral comprehensive examination in defense of the thesis are required.

Additional requirements are:

1. A minimum of 12 hours coursework must be at the 8000-level or higher.
2. No ISE graduate student may list ST 8114 or IE 6613 on his/her graduate program
3. No program can contain more than 9 hours of courses that are required in the bachelor's degree curriculum
4. No program can contain more than 6 hours of Directed Individual Study (IE 7000).

The thesis-option Master of Science in Industrial Engineering requires at least 24 credit hours of coursework above the baccalaureate degree. IE 9000 does not apply to M.S. students.

Master of Science in Industrial Engineering with Industrial Systems Concentration (SYS) - Non-Thesis

Prerequisites (foundational courses) are:

- MA 1713
- MA 1723
- MA 2733
- MA 2743
- Computer programming proficiency
- IE 3123
- IE 3913
- IE 4333
- IE 4613/6613

At least 15 hours of 8000-level courses selected by the student along with the academic advisor and grade program committee.	15
Other courses to be selected by the student along with the academic advisor and grade program committee.	18
Total Hours	33

A written and oral comprehensive final exam on the coursework. At least 15 hours for the M.S. non-thesis degree must be from 8000-level courses or above. The specific courses required depend upon the student's area of concentration. IE 8000 Research/Thesis does not apply to non-thesis students.

Additional requirements are:

1. No ISE graduate student may list ST 8114 or IE 6613 on his/her graduate program.
2. No program can contain more than 9 hours of courses that are required in the bachelor's degree curriculum

3. No program can contain more than 6 hours of Directed Individual Study (IE 7000).

The non-thesis Master of Science requires at least 33 credit hours of coursework above the baccalaureate degree. IE 9000 does not apply to M.S. students.

Master of Science in Industrial Engineering with Management Systems Engineering Concentration (MGTS) - Thesis

Prerequisites (foundational courses) are:

- B.S. in engineering from an ABET-accredited program or permission from the MSE Technical Committee
- IE 3913
- IE 4613/6613

IE 6513	Engineering Administration	3
IE 6533	Project Management	3
IE 6573	Process Improvement Engineering	3
IE 8583	Enterprise Systems Engineering	3
IE 8913	Engineering Economy II	3
IE 8000	Thesis Research/ Thesis in Industrial Engineering	6
At least two non-MSE ISE courses		6
Course to be selected by the student along with academic advisor and graduate program committee		3
Total Hours		30

A thesis and an oral comprehensive examination in defense of the thesis are required.

Additional requirements are:

1. A minimum of 12 hours at the 8000-level is required.
2. No ISE graduate student may list ST 8114 or IE 6613 on his/her graduate program
3. No program can contain more than 9 hours of courses that are required in the bachelor's degree curriculum
4. No program can contain more than 6 hours of Directed Individual Study (IE 7000).

The thesis-option Master of Science in Industrial Engineering requires at least 24 credit hours of coursework above the baccalaureate degree. IE 9000 does not apply to M.S. students.

Master of Science in Industrial Engineering with Management Systems Engineering Concentration (MGTS) - Non-Thesis

Prerequisites (foundational courses) are:

- B.S. in engineering from an ABET-accedited program or permission from the MSE Technical Committee
- IE 3913
- IE 4613/6613

IE 6513	Engineering Administration	3
IE 6533	Project Management	3
IE 6573	Process Improvement Engineering	3
IE 8583	Enterprise Systems Engineering	3
IE 8913	Engineering Economy II	3
At least two non-MSE ISE courses		6
Other courses to be selected by the student along with the academic advisor and graduate program committee		12
Total Hours		33

A written and oral comprehensive final exam on the coursework. At least 15 hours for the M.S. non-thesis degree must be from 8000-level courses or above. The specific courses required depend upon the student's area of concentration. IE 8000 Research/Thesis does not apply to non-thesis students.

Additional requirements are:

1. No ISE graduate student may list ST 8114 or IE 6613 on his/her graduate program
2. No program can contain more than 9 hours of courses that are required in the bachelor's degree curriculum
3. No program can contain more than 6 hours of Directed Individual Study (IE 7000).

The non-thesis Master of Science requires at least 33 credit hours of coursework above the baccalaureate degree. IE 9000 does not apply to M.S. students.

Master of Science in Industrial Engineering with Manufacturing Systems Concentration (MFGS) - Thesis

Prerequisites (foundational courses) are:

- B.S. in engineering from an ABET-accredited program or permission from the Manufacturing Systems Technical Committee
- Computer programming proficiency
- IE 4333/6333
- IE 4613/6613

IE 6653	Industrial Quality Control	3
IE 8333	Production Control Systems II	3
IE 8353	Manufacturing Systems Modeling	3
IE 8000	Thesis Research/ Thesis in Industrial Engineering	6
At least two Manufacturing Systems ISE courses		6
At least two non-Manufacturing Systems ISE courses		6
Course to be selected by the student along with the academic advisor and graduate program committee		3
Total Hours		30

A thesis and an oral comprehensive examination in defense of the thesis are required.

Additional requirements are:

1. A minimum of 12 hours coursework must be at the 8000-level or higher.
2. No ISE graduate student may list ST 8114 or IE 6613 on his/her graduate program
3. No program can contain more than 9 hours of courses that are required in the bachelor's degree curriculum
4. No program can contain more than 6 hours of Directed Individual Study (IE 7000).

The thesis-option Master of Science in Industrial Engineering requires at least 24 credit hours of coursework above the baccalaureate degree. IE 9000 does not apply to M.S. students.

Master of Science in Industrial Engineering with Manufacturing Systems Concentration (MFGS) - Non-Thesis

Prerequisites (foundational courses) are:

- B.S. in engineering from an ABET-accredited program or permission from the Manufacturing Systems Technical Committee
- Computer programming proficiency
- IE 4333/6333
- IE 4613/6613

IE 6653	Industrial Quality Control	3
IE 8333	Production Control Systems II	3
IE 8353	Manufacturing Systems Modeling	3
At least two Manufacturing Systems ISE courses		6
At least two non-Manufacturing Systems ISE courses		6
Other courses to be selected by the student along with the academic advisor and graduate program committee		12
Total Hours		33

A written and oral comprehensive final exam on the coursework. At least 15 hours for the M.S. non-thesis degree must be from 8000-level courses or above. The specific courses required depend upon the student's area of concentration. IE 8000 Research/Thesis does not apply to non-thesis students. IE 9000 does not apply to M.S. students.

Additional requirements are:

1. No ISE graduate student may list ST 8114 or IE 6613 on his/her graduate program
2. No program can contain more than 9 hours of courses that are required in the bachelor's degree curriculum
3. No program can contain more than 6 hours of Directed Individual Study (IE 7000).

The non-thesis Master of Science requires at least 33 credit hours of coursework above the baccalaureate degree.

Master of Science in Industrial Engineering with Operations Research Concentration (OPRS) - Thesis

Prerequisites (foundational courses) are:

- MA 1713
- MA 1723
- MA 2733
- MA 2743
- Computer programming proficiency
- IE 4613/6613

IE 6733	Linear Programming	3
IE 6773	Systems Simulation I	3
IE 8000	Thesis Research/ Thesis in Industrial Engineering	6
At least two OR ISE ccourses		6
At least two non-OR ISE courses		6
At least one course from Computer Science (CSE), Mathematics (MA), or Statistics (ST)		3
Course to be selected by the student along with the academic advisor and graduate program committee		3
Total Hours		30

A thesis and an oral comprehensive examination in defense of the thesis are required.

Additional requirements are:

1. A minimum of 12 hours coursework must be at the 8000-level or higher.
2. No ISE graduate student may list ST 8114 or IE 6613 on his/her graduate program
3. No program can contain more than 9 hours of courses that are required in the bachelor's degree curriculum
4. No program can contain more than 6 hours of Directed Individual Study (IE 7000).

The thesis-option Master of Science in Industrial Engineering requires at least 24 credit hours of coursework above the baccalaureate degree. IE 9000 does not apply to M.S. students.

Master of Science in Industrial Engineering with Operations Research Concentration (OPRS) - Non-Thesis

Prerequisites (foundational courses) are:

- MA 1713
- MA 1723
- MA 2733
- MA 2743
- Computer programming proficiency
- IE 4613/6613

IE 6733	Linear Programming	3
IE 6773	Systems Simulation I	3
At least two Operations Research ISE courses		6
At least two non-Operations Research ISE courses		6
At least one course com Computer Science (CSE), Mathematics (MA), or Statistics (ST)		3

Courses to be selected by the student along with the academic advisor and graduate program committee	12
Total Hours	33

A written and oral comprehensive final exam on the coursework. At least 15 hours for the M.S. non-thesis degree must be from 8000-level courses or above. The specific courses required depend upon the student's area of concentration. IE 8000 Research/Thesis does not apply to non-thesis students. IE 9000 does not apply to M.S. students.

Additional requirements are:

1. No ISE graduate student may list ST 8114 or IE 6613 on his/her graduate program
2. No program can contain more than 9 hours of courses that are required in the bachelor's degree curriculum
3. No program can contain more than 6 hours of Directed Individual Study (IE 7000).

The non-thesis Master of Science requires at least 33 credit hours of coursework above the baccalaureate degree.