Master of Science in Integrated Systems Engineering
Product and process innovation is critical in maintaining the United States’ competitive edge in the global market place. As products and processes are becoming increasingly more complex in nature, there is a growing need for engineers who can manage the interplay of integrated subsystems of these products and processes to ensure overall long term system viability. The College of Engineering and Engineering Technology recognizes the increasing need for engineers who can integrate and analyze various subsystems in product and process design, testing, manufacturing and engineering services. A Master of Science in Integrated Systems Engineering prepares skilled engineers to meet such needs.

Student Learning Outcomes
The program leading to the Master of Science in Integrated Systems Engineering is designed to prepare students to: (1) develop innovative solutions to complex integrated systems engineering problems; (2) collect, analyze, and interpret data relevant to integrated systems engineering problems; and (3) apply analytical and computational skills to model, analyze, and design integrated engineering systems.

Admission
Students seeking admission to the M.S. program in Integrated Systems Engineering must hold an accredited B.S. degree in engineering, engineering technology, or a science field with a minimum GPA of 2.75. Although applicants are required to submit GRE scores for admission to the Graduate School, for NIU students with a GPA of 3.0 or better, the GRE may be waived by recommendation of the college.

Advising Committee
A college-wide advising committee assists in placement of students in appropriate specialization areas. The advising committee is chaired by the Associate dean of research and graduate programs and shall have a representative from each engineering department. The advising committee also provides directions for students’ capstone course projects, master’s theses, master’s projects, or master’s papers to ensure a high quality of integrated systems engineering content.

Curriculum
The Master of Science in Integrated Systems Engineering curriculum features the following specialization areas:
- Mechatronics and Intelligent Systems
- Biomedical and Healthcare Systems

Students in either specialization can enroll either in thesis, project, or course option as described below:
SECTION C – Items previously in Section B, now reported for inclusion in the 2015-16 Graduate Catalog

Thesis Option
30 semester hours
6 semester hours of integrated systems engineering core courses
18 semester hours in a specialization area
6 semester hours of IEET 699 Master’s Thesis

Project Option
30 semester hours
6 semester hours of integrated systems engineering core courses
18 semester hours in a specialization area
3 semester hours of 600-level electives as approved by the advising committee
3 semester hours of IEET 697 Independent Study. The project report needs to be examined by a project committee.

Course Option
33 semester hours
6 semester hours of integrated systems engineering core courses
18 semester hours in a specialization area
6 semester hours of 600-level electives as approved by the advising committee
3 semester hours of IEET 697 Independent Study. This requirement may be met by a company internship report or master’s paper. The report or paper needs to be examined by a graduate committee.

Core Courses (6)
IEET 591 - Integrated Systems Engineering I (3)
IEET 592 - Integrated Systems Engineering II (3)

Specialization Areas
Students holding a B.S. degree in mechanical engineering, electrical engineering, or industrial and systems engineering can select from the following specialization areas:
Mechatronics and Intelligent Systems
Biomedical and Health Systems Engineering
Students from other engineering or science majors should fulfill deficiency requirements in order to meet the needed prerequisites for courses in each specialization area.

Specialization in Mechatronics and Intelligent Systems (18)
Required Courses (9)
MEE 523 - Mechanical Reliability (3)
ISYE 630 - Advanced Quality Control (3)
ELE 689 - Introduction to Neural Networks (3)
SECTION C – Items previously in Section B, now reported for inclusion in the 2015-16 Graduate Catalog

Select 9 semester hours in one department (9)

Mechanical Engineering Discipline-Specific Courses
MEE 521 - Dynamic Systems and Control II (3)
MEE 526 - Mechatronics System Design (3)
MEE 625 - Robot Programming and Control (3)

Electrical Engineering Discipline-Specific Courses
ELE 651 - Random Signal Processing (3)
ELE 659 - Adaptive Signal Processing (3)
ELE 685 - Control Laws and Strategies for Multilink Manipulators (3)

Industrial and Systems Engineering Discipline-Specific Courses
ISYE 553 - Integrated Product and Process Design (3)
ISYE 640 - Advanced Production Planning and Inventory Control (3)
ISYE 650 - Advanced Lean Manufacturing Systems (3)

**Specialization in Biomedical and Health Systems Engineering (9-10)**
Required Courses (9)
ELE 687 - Fuzzy Logic in Engineering (3)
ISYE 531 - Reliability Engineering (3)
ISYE 675 - Advanced Decision Analysis for Engineering (3)

Select 9-10 semester hours in one department

Electrical Engineering Discipline-Specific Courses
ELE 520 - Biomedical Instrumentation (4)
ELE 521 - Biomedical Sensor Engineering (3)
ELE 651 - Random Signal Processing (3)

Industrial and Systems Engineering Discipline-Specific Courses
ISYE 593 - Contemporary Topics in Industrial Engineering (3)
ISYE 671 - Linear Programming and Network Flows (3)
ISYE 691 - Occupational Ergonomics (3)