

**Received by the Graduate Council December 2, 2019**

GRADUATE COUNCIL CURRICULUM COMMITTEE (GCCC)  
Second Meeting/ 2019-20 Academic Year  
November 11, 2019

**SECTION B – Recorded, but further approval beyond the GC, is needed before inclusion in the Graduate Catalog** p. 1 of 9

**COLLEGE OF ENGINEERING AND ENGINEERING TECHNOLOGY**

Other Catalog Change    2019-2020 Graduate Catalog    **CEET19.20.04.01**

Dean: Donald R. Peterson, Ph.D., FAIMBE  
Senior Associate Dean, Research and Graduate Programs: Mansour Tahernehadi, Ph.D., P.E.  
Acting Associate Dean, Undergraduate Programs: Abul K. M. Azad, Ph.D.

Department of Electrical Engineering  
Department of Industrial and Systems Engineering  
Department of Mechanical Engineering  
Department of Technology

Display programs for this school/college.



**Master's Programs**

• ~~Master of Science in Integrated Systems Engineering~~ [LINK](#)



~~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.~~

~~Check departmental information for additional requirements.~~

**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**

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~~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 3.00 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:~~

#### **Thesis Option**

~~30 semester hours~~

~~6 semester hours of integrated systems engineering core courses~~

~~18 semester hours in a specialization area~~

~~6 semesters of the following:~~

- ~~• [IEET 699 – Master's Thesis](#) Credits: 1-6~~

#### **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 the following:~~

- ~~• [IEET 697 – Independent Study](#) Credits: 1-3~~
- ~~• The project report needs to be examined by a project committee.~~

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**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 the following:~~

- ~~• [IEET 697 – Independent Study](#) Credits: 1-3~~
- ~~• 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](#) Credits: 3~~
- ~~• [IEET 592 – Integrated Systems Engineering II](#) Credits: 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)**

- ~~• [ELE 689 – Introduction to Neural Networks](#) Credits: 3~~
- ~~• [ISYE 630 – Advanced Quality Control](#) Credits: 3~~
- ~~• [MEE 523 – Mechanical Reliability](#) Credits: 3~~

**Select 9 semester hours in one department as listed below (9)**

*Mechanical Engineering Discipline Specific Courses*

- ~~• [MEE 521 – Dynamic Systems and Control II](#) Credits: 3~~

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- ~~[MEE 526 – Mechatronics System Design](#) Credits: 3~~
- ~~[MEE 625 – Robot Programming and Control](#) Credits: 3~~

~~*Electrical Engineering Discipline Specific Courses*~~

- ~~[ELE 651 – Random Signal Processing](#) Credits: 3~~
- ~~[ELE 659 – Adaptive Signal Processing](#) Credits: 3~~
- ~~[ELE 685 – Control Laws and Strategies for Multilink Manipulators](#) Credits: 3~~

~~*Industrial and Systems Engineering Discipline Specific Courses*~~

- ~~[ISYE 553 – Integrated Product and Process Design](#) Credits: 3~~
- ~~[ISYE 640 – Advanced Production and Inventory Control](#) Credits: 3~~
- ~~[ISYE 650 – Advanced Lean Manufacturing Systems](#) Credits: 3~~

~~Specialization in Biomedical and Health Systems Engineering (18-19)~~

**Required Courses (9)**

- ~~[ELE 687 – Fuzzy Logic in Engineering](#) Credits: 3~~
- ~~[ISYE 531 – Reliability Engineering](#) Credits: 3~~
- ~~[ISYE 675 – Advanced Decision Analysis for Engineering](#) Credits: 3~~

~~Select 9-10 semester hours in one department as listed below (9-10)~~

~~Electrical Engineering Discipline Specific Courses~~

- ~~[ELE 520 – Biomedical Instrumentation](#) Credits: 4~~
- ~~[ELE 521 – Biomedical Sensor Engineering](#) Credits: 3~~
- ~~[ELE 651 – Random Signal Processing](#) Credits: 3~~

~~Industrial and Systems Engineering Discipline Specific Courses~~

- ~~[ISYE 593 – Contemporary Topics in Industrial Engineering](#) Credits: 1-3~~

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- ~~Students must take 3 semester hours in this course.~~
- ~~[ISYE 671 – Linear Programming and Network Flows](#) Credits: 3~~
- ~~[ISYE 691 – Occupational Ergonomics](#) Credits: 3~~

*Rationale:* Considering the demand and strategic direction of the college, these programs are no longer needed.

Other Catalog Change      [LINK](#) 2019-2020 Graduate Catalog      **CEET19.20.04.02**

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↓

~~Master's Programs~~

- ~~Master of Science in Teaching~~ [LINK](#)

↓

~~The M.S.T. is designed for licensed teachers seeking teaching endorsements at the master's level in disciplines approved by the university. All students pursuing the degree will be required to complete core experiences in which they demonstrate knowledge, skills, and dispositions related to assessment, diversity and special needs, human development and learning, and pedagogy in their content area.~~

~~Check departmental information for additional requirements.~~

~~The student learning outcomes for this degree are located at <http://www.niu.edu/assessment/clearinghouse/outcomes/index.shtml>.~~

*Admission*

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All applicants for the M.S.T. program must meet requirements for admission to the Graduate School and be accepted for admission by the faculty of the specialization.

*Specialization in Engineering Education*

The Master of Science in Teaching (M.S.T.) with specialization in Engineering Education prepares teachers with mathematics or science licensure to infuse traditional content with the 21st century knowledge and skills associated with emerging critical technologies such as nanotechnology, fuel cells, and modern manufacturing technology. The program integrates mathematics and science standards for teaching and learning into the middle school and high school industrial technology endorsements. The central goal of the program is to empower teachers to implement generative and transformative pedagogy by using research-based instructional practices and emerging engineering content. Four strands permeate the program: (1) active learning through such approaches as project-based learning and guided inquiry, (2) adolescent identity development, (3) action research, and (4) teacher leadership. The program is only offered at the request of a school district.

*Mission*

The Master of Science in Teaching (M.S.T.) with specialization in Engineering Education prepares licensed middle and high school teachers of mathematics and the sciences to engage their students in authentic engineering content and processes. Such engagement will stimulate interest in mathematics, the sciences, and engineering among adolescent students at a formative time in their academic development.

*Educational Objectives*

The program leading to the Master of Science in Teaching (M.S.T.) with specialization in Engineering Education is designed to: (1) improve teaching and learning of mathematics, the sciences, and engineering by increasing the knowledge and skills of teachers; (2) implement quality action research, focusing on inquiry and problem-solving skills; and (3) integrate research-based pedagogical practices and content.

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**Program Requirements**

Students must complete at least 33 semester hours of graduate work consisting of the following courses:

- ~~IEET 590 – Topics in Engineering and Engineering Technology Credits: 1-3~~
- ~~TECH 532 – Disaster Preparedness Credits: 3~~
- ~~TLCI 537 – Improvement of Instruction Credits: 3~~
- ~~UEET 601 – Introduction to Emerging Technologies Credits: 3~~
- ~~UEET 602 – Nanotechnology and Applications Credits: 3~~
- ~~UEET 603 – Introduction to Energy Engineering Credits: 3~~
- ~~UEET 604 – Introduction to Fuel Cell and Fuel Cell Power Generation Credits: 3~~
- ~~UEET 605 – Nanoelectronics and Applications Credits: 3~~
- ~~UEET 606 – Applied Modern Manufacturing and Quality Control Credits: 3~~
- ~~UEET 607 – Internship Credits: 3~~
- ~~UEET 608 – Master's Project Credits: 1-3~~

*Rationale:* Considering the demand and strategic direction of the college, these programs are no longer needed.

Other Catalog Change

[LINK](#) 2019-2020 Graduate Catalog

**CEET19.20.04.03**

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Certificates of Graduate Study

- Integrated Systems Engineering (10-12) [LINK](#)



**Certificate of Graduate Study**

The certificate program requires four courses:

Requirements

- ~~IEET 590 – Topics in Engineering and Engineering Technology Credits: 1-3~~
- ~~IEET 591 – Integrated Systems Engineering I Credits: 3~~
- ~~IEET 592 – Integrated Systems Engineering II Credits: 3~~
- ~~MEE 523 – Mechanical Reliability Credits: 3~~
- ~~— OR ISYE 531 – Reliability Engineering Credits: 3~~

*Rationale:* Considering the demand and strategic direction of the college, these programs are no longer needed.

Other Catalog Change      2019-20 Graduate Catalog      [LINK](#) **CEET19.20.04.05**

Master of Science in **I**ndustrial **M**anagement **& Technology**

Check departmental information for any additional requirements.

The Department of Engineering Technology offers graduate studies leading to the M.S. in **I**ndustrial **M**anagement **& Technology**. The objective of this graduate program is to build upon the competencies achieved at the baccalaureate level and to prepare students to assume managerial and leadership positions.

Admission to the graduate program in **I**ndustrial **M**anagement **& Technology** requires a baccalaureate degree in engineering, technology, or industrial education. Consideration may also be given to applicants with degrees in related areas who have appropriate industrial experience. The department requires competencies in trigonometry/pre-calculus and statistics completed during undergraduate studies;



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deficiencies in these requirements must be satisfied prior to admission. Students should review the admission and graduate degree requirements in this catalog.

A student pursuing the M.S. in **Industrial Management & Technology** must complete a minimum of 30 semester hours in 500-level and above courses with TECH 694 - Industrial Project Management being the capstone course of the academic program. Students are not allowed to repeat the graduate level course of any 400 level course previously taken.

Students in this program may apply no more than 6 semester hours of relevant course work from the following courses: TECH 598 (3), TECH 699A (1-6), TECH 609 (3), or any other practicums, independent studies, directed studies, internships, seminars, and workshop courses from any department within the university.

*Rationale: The proposed name change better reflects the areas that are included in the MS program. The proposed name change is more consistent with College of Engineering and Engineering Technology and will allow for additional areas of study to be easily developed.*

Course Revision:

Graduate Catalog 2019-20

[LINK](#)

**CEET19.20.04.07**

TECH 600 - Master's Project (1)

Capstone project for the M.S. in **Industrial Management and Technology** which focuses on a relevant subject area of particular interest to the student and emphasizes one of areas with the degree. Student must have completed more than 27 semester hours in the program or be in the final semester of the program

*Rationale: The proposed name change better reflects the areas that are included in the MS program. The proposed name change is more consistent with College of Engineering and Engineering Technology and will allow for additional emphases/areas of study to be easily developed.*