MS in Industrial Engineering

Admission

In order to be admitted into the MSIE program, applicants must:

1. Possess an undergraduate degree in engineering, science, business or other related discipline;
2. Have satisfactorily completed MATH 243 and IME 255;
   a. Students from non-engineering majors may be required to complete 9-15 credit hours of undergraduate coursework including but not limited to MATH 243, IME 222, IME 254, IME 255, IME 258, IME 550 and IME 553.
3. Have a minimum GPA of 3.000, on a 4.000 scale. (Students with a lower GPA may be considered only for probationary or nondegree admission.) *In addition,*
4. Applicants whose native language is not English must submit official, acceptable scores for either the TOEFL, the Academic Module of the IELTS examination, or the PTE-Academic test. Please visit the Graduate School website to check English proficiency requirements (https://www.wichita.edu/GradEnglishProficiency/)[1]; and
5. Department prefers and strongly encourages the submission of GRE scores.

[1] Link opens new window.

Program Requirements

- Students must select one of the following options for completion of MSIE degree: all coursework, directed project or thesis;
- A plan of study should be submitted during the first year of enrollment;
- At least 50 percent of the total credit hours must be from ISME department;
- Students may take at most three 500- or 600-level courses (9 credit hours);
- No more than one independent study course from the ISME department may be used toward the degree hours;
- No more than two courses (6 credit hours) may be taken from outside department. In addition:
  - They must be preapproved in writing by the ISME chair or graduate coordinator;
  - They may not be approved unless required for research or project;
  - The courses listed under concentrations do not count towards this limit;
- Co-op/internship credit hours cannot be counted toward degree hours;
- The professional and scholarly integrity training requirement must be completed, preferably during the first semester of the program.

Course Distribution

Thesis Option

Course	Title	Hours
Prerequisites [1]		
IME 255	Engineering Economy	
MATH 243	Calculus II	
Core Courses		
IME 724	Statistical Methods for Engineers	3
IME 777	IME Colloquium (one semester)	0
Additional Courses		
Minimum 15 credit hours distributed as follows		15
Courses selected from at least two and at most three concentration areas (see below for details)		
Technical Electives		**6**
Technical electives: courses from the concentrations below are preapproved to be used as electives. In addition, industrial engineering (IME 500-999) and other courses from college of engineering at the 600+ level (with preapproval in writing or on plan of study by the chair or graduate coordinator of the ISME department) can be used as electives.		
Thesis		
IME 876	Thesis	6
Total Credit Hours		**30**

Directed Project Option

Course	Title	Hours
Prerequisites [1]		
IME 255	Engineering Economy	
MATH 243	Calculus II	
Core Courses		
IME 724	Statistical Methods for Engineers	3
IME 777	IME Colloquium (one semester)	0
Additional Courses		
Minimum 15 credit hours distributed as follows		15
Courses selected from at least two and at most three concentration areas (see below for details)		
Technical Electives		**12**
Technical electives: courses from the concentrations below are preapproved to be used as electives. In addition, industrial engineering (IME 500-999) and other courses from college of engineering at the 600+ level (with preapproval in writing or on plan of study by the chair or graduate coordinator of the ISME department) can be used as electives.		
Directed Project		
IME 878	Master's Directed Project	3
Total Credit Hours		**33**

All Coursework Option

Course	Title	Hours
Prerequisites [1]		
IME 255	Engineering Economy	
MATH 243	Calculus II	
Core Courses		
IME 724	Statistical Methods for Engineers	3
IME 777	IME Colloquium (one semester)	0
Additional Courses		
Minimum 15 credit hours distributed as follows		15
Courses selected from at least two and at most three concentration areas (see below for details)		
Technical Electives		**15**
Technical electives: courses from the concentrations below are preapproved to be used as electives. In addition, industrial engineering (IME 500-999) and other courses from college of engineering at the 600+ level (with preapproval in writing or on plan of study by the chair or graduate coordinator of the ISME department) can be used as electives.		
External Certification		
Please see the external certification section for acceptable certifications		
Total Credit Hours		**33**

[1] These courses must be completed with a minimum of *B* or better grade (3.000 or higher GPA on a 4.000 scale) if a specific deficiency exists. Students may have an exit test option to satisfy IME 255 requirement (typically offered immediately before the start of fall and spring semesters).

Concentration Areas

Students must select two to three concentrations. The concentrations, with representative coursework, are as follows:

Course	Title	Hours
Data Analytics		
IME 734	Introduction to Data Mining and Analytics	
IME 780AN	Big Data Analytics in Engineering	
IME 780AP	Neural Networks and Machine Learning	
IME 794	Applied Quantum Computation	
IME 869	Bayesian Statistics and Uncertainty Quantification	
IME 880Y	Forecasting and Analytics	
CS 770	Machine Learning	
CS 746	Perspectives on Data Science	
CS 771	Artificial Intelligence	
CS 898AX	Foundations of Data Science	
CS 898BD	Deep Learning	
Operations Research and Systems Engineering		
IME 550	Operations Research I	
IME 650	Operations Research II	
IME 664	Engineering Management	
IME 764	Systems Engineering and Analysis	
IME 765	Modeling and Analysis of Manufacturing Systems	
IME 780AL	Energy Analytics & Management	
IME 780AQ	Simulation Modeling and Applications	
IME 851	Stochastic Modeling and Analysis	
Production and Supply Chain Analytics		
IME 553	Production Systems	
IME 563	Facilities Planning and Design	
IME 783	Supply Chain Management	
IME 767	Lean Manufacturing	
IME 880K	Advanced Facilities Planning and Material Handling	
IME 883	Supply Chain Analytics	
Quality and Reliability		
IME 754	Reliability and Maintainability Engineering	
IME 755	Design of Experiments	
IME 854	Quality Engineering	
IME 960F	Statistical Process Control	
Manufacturing Engineering and Automation		
IME 561	Applied Control Systems	
IME 558	Manufacturing Methods and Materials II	
IME 676	Aircraft Manufacturing and Assembly	
IME 758	Analysis of Manufacturing Processes	
IME 761	Robot Programming and Applications	
IME 762	Smart Manufacturing	
IME 775	Computer Integrated Manufacturing	
IME 780AM	Advanced Cyber-Physical Systems	
IME 788	Rapid Prototyping and 3D Printing	
Human Systems Engineering		
IME 549	Industrial Ergonomics	
IME 749	Ergonomic Assessment Methods	
IME 759	Ergonomic Interventions	
BME 752	Applied Human Biomechanics	
BME 757	Clinical Biomechanics Instrumentation	
ME 709	Injury Biomechanics	
PHS 808	Managerial Epidemiology	
PHS 816	Environmental Health	

Students should also note that some courses may require programming skills or math courses as a prerequisite (e.g. Linear Algebra or Calculus III).

External Certifications

Terminal activity for the all coursework option can be satisfied by receiving any of the following external certificates:

- Any of the following IISE certifications:
  - Six Sigma Green Belt;
  - Six Sigma Black Belt;
  - Lean Six Sigma Green Belt;
  - Lean Six Sigma Black Belt;
  - Lean Green Belt; or
  - Lean Black Belt.
- Any of the following ASQ certifications:
  - Certified Quality Engineer (CQE);
  - Reliability Engineer (CRE);
  - Six Sigma Black Belt (CSSBB);
  - Six Sigma Green Belt (CSSGB); or
  - Software Quality Engineer (CSQE).
- Any of the following modules or certifications from APICS/ASCM:
  - One module from the Certified Planning and Inventory Management (CPIM):
    - Basics of Supply Chain Management;
    - Master Planning of Resources;
    - Detailed Scheduling and Planning;
    - Execution and Control of Operations; or
    - Strategic Management of Resources;
  - Certified Supply Chain Professional (CSCP); or
  - Certified Logistics, Transportation and Distribution (CLTD).
- Any of the SME certifications:
  - Additive Manufacturing Fundamentals Certification;
  - Certified Manufacturing Engineering (CMfgE) Certification;
  - Lean Certification; or
  - Six Sigma Certification.

- Any of the following certifications from INCOSE - International Council on Systems Engineering:
    - Associate Systems Engineering Professional (ASEP);
    - Certified Systems Engineering Professional (CSEP); or
    - Expert Systems Engineering Professional (ESEP).
- Any of the following certifications from Association of Energy Engineers (AEE):
    - Certified Energy Auditor (CEA);
    - Certified Energy Manager (CEM); or
    - Certified Carbon Reduction Manager (CRM).
- Any of the following certifications from U.S. Green Building Council (USGBC):
    - LEED Green Associate; or
    - LEED AP with specialty.
- Following certification from Microsoft:
    - Certified Data Analyst Associate (Power BI or Azure Enterprise).
- Following certificate from INFORMS:
    - Certified Analytics Professional (CAP).

Credit for Prior Learning

Industry recognized external certifications are valued by our department and may be used to satisfy up to 6 credit hours of the curriculum requirements. These credits will follow the Credit for Prior Learning (CPL) policy described in the Graduate Catalog (http://catalog.wichita.edu/graduate/academic-information/degree-certificate-completion/credit-prior-learning/). The details of such credits are as follows:

- Preapproved external certifications (with active certification status):
    - ASQ Certified Quality Engineer (CQE): as IME 960F;
    - ASQ Six Sigma Black Belt (CSSBB) or higher level: as IME 767;
    - ASQ Certified Manager of Quality/Organizational Excellence (CMQ/OE): as IME 854;
    - SME Lean Certification at Silver or Gold level: as IME 767;
    - AEE Certified Energy Auditor (CEA) or Certified Energy Manager (CEM): as IME 780AL;
    - APICS Certified Supply Chain Professional (CSCP): as IME 783;
    - PMI Project Management Professional (PMP): as IME 664; and
    - INCOSE Certified Systems Engineering Professional (CSEP) or Expert Systems Engineering Professional (ESEP): as IME 764.
- If a certification is equivalent to a specific course, the student cannot repeat that course and receive additional course credits towards the degree.
- CPL credits may be earned through certificates awarded until completion of no more than 75 percent of the curriculum. This includes certificates awarded before joining the program.
- CPL credits defined here will only count towards their degree for students within this program.
- CPL credits are included in the total transfer credits allowed toward a degree.

Applied Learning

Students in the MS in industrial engineering program are required to complete an applied learning or research experience to graduate from the program. The requirement can be met by completion of a thesis, project, applied learning course or external certification (evaluated by external experts).