

Industrial Engineering

2018-2019 Catalog: Suggested Course Sequence

Degrees	Semester 1	Semester 2	Semester 3	Semester 4	Semester 5	Semester 6	Semester 7	Semester 8
B.S. in IE 122 credits	MATH 165 Calc I 4 cr Placement Exam or C- or better in Math 143	MATH 166 Calc II 4 cr C- or better in MATH 165	MATH 265 Calc III 4 cr C- or better in MATH 166 or MATH 166H	MATH 267 Diff Eq/Lap 4 cr C- or better in MATH 166 or MATH 166H	I E 305 Engr Econ Analysis 3 cr MATH 166	I E 348 Solidif Processes 3 cr IE 248 MAT E 273 <i>Spring Only</i>	I E 413 Stoch Modeling 4 cr Math 267 Stat 231 <i>Fall Only</i>	I E 441 IE Design 3 cr IE 248, IE 271, IE 361, Credit/Enrollment in IE 341, IE 413, IE 448
	Social Sciences and Humanities Elective 3 cr	PHYS 221 Classical Phys I 5 cr Credit/enrollment in MATH 166	I E 248 Intro Mfg Processes 3 cr MATH 166, PHYS 221, Credit/enrollment in IE 101, MAT E 273 <i>Fall Only</i>	STAT 231 Prob & Stat 4 cr Credit/enrollment in MATH 265 or MATH 265H	I E 312 Optimization 3 cr Credit/enrollment in MATH 267 <i>Fall Only</i>	I E 361 Quality Assurance 3 cr STAT 231	ENGL 314 Tech Comm 3 cr Junior Classification ENGL 250	I E 448 Manuf Sys Engr 3 cr IE 248 IE 305 <i>Spring Only</i>
	CHEM 167 Engr Chem 4 cr MATH 143 & CHEM 50 or HS Equivalent	Social Sciences and Humanities Elective 3 cr	MAT E 273 Principles of Materials Science 3 cr CHEM 167 or 177, MATH 165	I E 222 Design & Analysis Sys Improvements 3 cr IE 248, Credit/ enrollment in IE 271 <i>Spring Only</i>	I E 341 Production Systems 3 cr STAT 231, Credit/enrollment in IE 312 <i>Fall Only</i>	Engineering Topic Elective 3 cr	M E 231 Engineering Thermodynamics I 3 cr MATH 166, CHEM 167, PHYS 221	Focus Elective 3 cr
	IE 148 Information Engr 3 cr Credit/enrollment in MATH 143	ENGL 150 Comp I 3 cr Credit/enrollment in LIB 160	PHYS 222 Classical Phys II 5 cr PHYS 221 MATH 166	I E 271 Appl Ergonomics 3 cr PHYS 221 <i>Spring Only</i>	E M 274 Statics 3 cr PHYS 221, Credit/enrollment in MATH 166	Social Sciences and Humanities Elective 3 cr	Focus Elective 3 cr	Management Elective 3 cr
	ENGR 101 Orientation R cr	LIB 160 Library 1 cr	ENGL 250 or ENGL 250H Comp II 3 cr C or better in ENGL 150 or placement, Credit/enrollment in LIB 160		SP CM 212 Fund of Public Speaking 3 cr	E E 442 Intro to Circuits 2 cr MATH 267 PHYS 222	Social Sciences and Humanities Elective 3 cr	Engineering Topic Elective 3 cr
		I E 101 I E Orient R cr						
122 Total Credits	14 cr	16 cr	18 cr	14 cr	15 cr	14 cr	16 cr	15 cr

Applicable prerequisites and co-requisites are listed under each course.

Note: Please verify all prerequisites and semester offerings with current course catalog

Elective List can be found on the IMSE website at <http://www.imse.iastate.edu/undergraduate-program/advising/>

Course Descriptions can be found at: <http://catalog.iastate.edu/azcourses/>

Light blue shading indicates Basic Program classes for all Engineering Majors; Dark blue indicates the IE core, course descriptions on the back of this page

Last Updated

5/21/18 HMR

Industrial Engineering Core Courses

I E 101. Industrial Engineering Profession

Introduce students to the industrial engineering profession, its scope, industrial engineering tools, and future trends.

I E 148. Information Engineering

Development of information solutions for engineering problems. Fundamentals of the software development process. Engineering computations and the human/computer interface. Data models and database development. Program connectivity and network applications.

I E 222. Design & Analysis Methods for System Improvements

Study of system improvement methods and strategies. Specific areas of lean system improvements include continuous improvement, setup reduction, workplace organization, inventory and waste minimization. Methods and strategies to analyze and quantify the impact of changes.

I E 248. Engineering System Design, Manufacturing Processes and Specifications

Introduction to metrology, engineering drawings and specifications. Engineering methods for designing and improving systems. Theory, applications, and quality issues related to machining processes.

I E 271. Applied Ergonomics and Work Design

Basic concepts of ergonomics and work design. Their impact on worker and work place productivity, and cost. Investigations of work physiology, biomechanics, anthropometry, work methods, and their measurement as they relate to the design of human-machine systems.

I E 305. Engineering Economic Analysis

Economic analysis of engineering decisions under uncertainty. Financial engineering basics including time value of money, cash flow estimation, and asset evaluation. Make versus buy decisions. Comparison of project alternatives accounting for taxation, depreciation, inflation, and risk.

I E 312. Optimization

Concepts, optimization and analysis techniques, and applications of operations research. Formulation of mathematical models for systems, concepts, and methods of improving search, linear programming and sensitivity analysis, network models, and integer programming.

I E 341. Production Systems

Introduction of key concepts in the design and analysis of production systems. Topics include inventory control, forecasting, material requirement planning, project planning and scheduling, operations scheduling, and other production systems such as Just-In-Time (JIT), warehousing, and global supply chains.

I E 348. Solidification Processes

Theory and applications related to metal casting, welding, polymer processing, powder metallurgy, composites manufacturing, and related rapid manufacturing processes.

I E 361. Statistical Quality Assurance

Statistical methods for process improvement. Simple quality assurance principles and tools. Measurement system precision and accuracy assessment. Control charts. Process capability assessment. Experimental design and analysis for process improvement. Significant external project in process improvement.

I E 413. Stochastic Modeling, Analysis and Simulation

Development and analysis of simulation models using a simulation language. Application to various areas of manufacturing and service systems such as assembly, material handling, and customer queues. Utilizing model output to make important business decisions. Fitting of data to statistical distributions. Introduction to Markov processes and other queuing models.

I E 441. Industrial Engineering Design

A large, open-ended design project related to an enterprise. Application of engineering design principles including problem definition, analysis, synthesis, and evaluation.

I E 448. Manufacturing Systems Engineering

Fixturing and tooling requirements for manufacturing process planning, geometric dimensioning and tolerancing, computer aided inspection, cellular and flexible manufacturing, and facility layout. Lean manufacturing principles and controlled flow production.