Industrial And Manufacturing Systems (IMSE)

IMSE 1000: Introduction to Industrial Engineering
Introduction to industrial engineering profession, the Industrial and Manufacturing Systems Engineering department, and the core topics of industrial engineering. Introduction to problem solving, ethics and industrial engineering design and analysis techniques.

Credit Hour: 1

IMSE 2030: Fundamentals of Systems Design and Analysis
Develop an understanding of a systems approach to the design and operation of modern industrial organizations: systems structure and function, system specification, structured problem solving and system design methodology.

Credit Hours: 3

IMSE 2110: Probability and Statistics for Engineers
Introduction to data analysis, probability concepts, random variables, parameter estimation and hypothesis testing.

Credit Hours: 3
Prerequisites: MATH 1500. Restricted to Engineering Students who are non-IMSE majors

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IMSE 2210: Linear Algebra for Engineers
Study of quantitative methods necessary for analysis, modeling and design of optimal industrial systems.

Credit Hours: 3
Prerequisites: MATH 1700

IMSE 2710: Engineering Economic Decision-Making
Fundamentals of economic decision-making from an engineering perspective. Includes conceptual basis of economic analysis (interest, inflation), principles for decision making (cost/benefits, breakeven analysis, risk and uncertainty, multi-objectives/attributes), generation of engineering economic parameters (life-cycle analysis), and the application of economic decision making in different context (governmental policy, time-phased, and scarce capital).

Credit Hours: 3
Prerequisites: sophomore standing

IMSE 3030: Manufacturing and Supply Systems
Provide a structured approach for the design and optimization of a system throughout its lifecycle: techniques following the logical sequence of strategic analysis, system design, implementation, and monitoring.

Credit Hours: 3
Prerequisites: IMSE 2030

IMSE 3110: Probability Models for Engineers
Introduction to probability concept and theory, random variables, discrete and continuous probability distributions, joint probability distributions. Graded on A-F basis only.

Credit Hours: 3
Prerequisites: Grade of C or better in MATH 1500

IMSE 3110H: Probability Models for Engineers - Honors
Introduction to probability concept and theory, random variables, discrete and continuous probability distributions, joint probability distributions. Honors eligibility required

Credit Hours: 3
Prerequisites: MATH 1500. Restricted to IMSE students only

IMSE 3500: Introduction to Manufacturing Methods
(same as MAE 3500). This course is an introduction to the engineering principles of manufacturing processes, ranging from traditional to state-of-the-art. The course will emphasize material processing, selection, and design considerations for manufacturing. The course introduces critical aspects of manufacturing process engineering through a combination of lectures, videos, class discussions, and case studies to engage students. By the end of the course, students are expected to learn the fundamentals of manufacturing and manufacturing processes. Graded on A-F basis only.

Credit Hours: 2
Prerequisites: MAE 1100, ENGR 2200

IMSE 3505: Computer Aided Design and Manufacturing Processes Laboratory
This course covers the product realization process from design, process planning, to manufacturing, including CE, DFA/DFM, CAD, CAPP, CAM, CNC. The course uses active learning with hands-on laboratory projects, videos, and class discussions. By the end of the course, students will learn the fundamentals of manufacturing and manufacturing processes, and the product realization process from CAD to CAM, primarily through concept learning and hands-on laboratory exercises. Graded on A-F basis only.

Credit Hours: 2
Prerequisites: Junior standing; restricted to IMSE students
Corequisites: IMSE 3500 or MAE 3500

IMSE 3810: Ergonomics and Workstation Design
Ergonomics and human factors theories applied to the design of man-machine systems. Discussion of ergonomic methods for measurement, assessment, and evaluation, with major topics including workstation design, environmental stresses, and workplace safety. Includes lab.

Credit Hours: 3
Prerequisites: Restricted to IMSE students. ENGINR 1200 and IMSE 4110

IMSE 3810W: Ergonomics and Workstation Design - Writing Intensive
Ergonomics and human factors theories applied to the design of man-machine systems. Discussion of ergonomic methods for measurement, assessment, and evaluation, with major topics including workstation

design, environmental stresses, and workplace safety. Includes lab. Prerequisites:

Credit Hours: 3
Prerequisites: Restricted to IMSE students. ENGINR 1200 and IMSE 4110

IMSE 4001: Topics in Industrial and Manufacturing Systems Engineering
Current and new technical developments in industrial engineering.

Credit Hours: 3

IMSE 4085: Problems in Industrial Engineering
Supervised investigation in industrial engineering presented in form of an engineering report.

Credit Hour: 1-4

IMSE 4110: Engineering Statistics
(cross-leveled with IMSE 7110). Understanding and application of statistical analysis techniques. Emphasis on hypothesis testing, regression analysis, analysis of variance (ANOVA) and design of experiments (DOE).

Credit Hours: 3
Prerequisites: Restricted to IMSE students or by Departmental consent. Grade of C- or better in IMSE 3110

IMSE 4210: Linear Optimization
(cross-leveled with IMSE 7210). Theory and application of linear optimization.

Credit Hours: 3
Prerequisites: Restricted to IMSE students. Grade of C- or better in IMSE 2210

IMSE 4220: Optimization Modeling and Computational Methods
(cross-leveled with IMSE 7220). Modeling and solution techniques for mathematical optimization, including linear, nonlinear, integer, and stochastic programming. Emphasis on formulation of models for most-efficient use of solution algorithms. Graded on A-F basis only.

Credit Hours: 3
Prerequisites: IMSE 3110, IMSE 4210

IMSE 4230: Operations Research Models
(cross-leveled with IMSE 7230). Formulates probabilistic models and determines optimal control policies for queuing and inventory systems. Introduces Markov chains and dynamic programming.

Credit Hours: 3
Prerequisites: Restricted to IMSE students or by Departmental consent. Grade of C- or better in IMSE 2210 and IMSE 3110

IMSE 4280: Systems Simulation
(cross-leveled with IMSE 7280). Discrete-event stochastic systems modeling and experimentation using simulation software. Statistical design and analysis including distribution fitting and alternative comparison methodologies.

Credit Hours: 3
Prerequisites: Restricted to IMSE students. Grade of C- or better in IMSE 4110

IMSE 4310: Integrated Production Systems Design
(cross-leveled with IMSE 7310). Design and operation of production systems, including lean six sigma concepts, just-in-time/kanban, facility layout and material flow issues.

Credit Hours: 3
Prerequisites: Restricted to IMSE students or by Departmental consent. IMSE 2030, IMSE 2710, IMSE 4210, IMSE 4280

IMSE 4330: Material Flow and Logistics System Design
(cross-leveled with IMSE 7330). Modeling and analysis of structural and operational issues associated with material-flow system design including facility location, warehouse/inventory systems, and distribution/transportation systems.

Credit Hours: 3
Prerequisites: IMSE 4210 and IMSE 4280

IMSE 4350: Production and Operations Analysis
(cross-leveled with IMSE 7350). Quantitative methods for forecasting, scheduling, and production control in manufacturing and service systems. Use of Enterprise Resource Planning (ERP) systems.

Credit Hours: 3
Prerequisites: Restricted to IMSE students or by Departmental consent. IMSE 4210 and IMSE 4230

IMSE 4360: Supply Chain Engineering
(cross-leveled with IMSE 7360). Modeling and analysis of supply chain network design and management issues including integration of production, inventory control, supplier selection, risk management and logistics network design. Graded on A-F basis only.

Credit Hours: 3
Prerequisites: IMSE 4350

IMSE 4370: Service Systems Engineering and Management
(cross-leveled with IMSE 7370). Service systems contribute to more than 75% of US GDP and provide close to 80% employment. This course introduces students to service system engineering and management and will discuss models, concepts and solution methods important in the design, control, and operation of service systems. In addition, this course will provide students the ability to apply industrial engineering and operations research tools for analyzing service enterprises, including supply chain engineering, financial engineering and revenue management. Graded on A-F basis only.

Credit Hours: 3
Prerequisites: IMSE 4210 or instructor's consent

IMSE 4380: Six Sigma Methodology
(cross-leveled with IMSE 7380). An overview of the Six Sigma DMAIC methodology for analyzing and improving processes. Requires completing a Six Sigma Green Belt project. Graded on A-F basis only.

Credit Hours: 3
Prerequisites: Grade of C or better in IMSE 2110 or IMSE 4110 or STAT 4710

IMSE 4385: Lean Six Sigma Green Belt Project
(cross-leveled with IMSE 7385). Application of the Lean Six Sigma methodology in an industry-based project.

Credit Hour: 1
Prerequisites: IMSE 4310

IMSE 4410: Data Engineering and Predictive Modeling
(cross-leveled with IMSE 7410). Introduces the science of processing data using expert systems for faster and smarter decision-making. Topics covered include descriptive analytics, statistical learning algorithms, tree-based algorithms, artificial neural networks, association rule mining, and k-means clustering.

Credit Hours: 3
Prerequisites: INFOTC 4401 or CMP_SC 1050, and IMSE 4110

IMSE 4420: Web-Based Information Systems
(cross-leveled with IMSE 7420). Data models, design of databases using E-R, UML (Access/Oracle), web databases, web servers and interfaces (Visual Basic, JavaScript), E-commerce infrastructure (PDM, STEP, XML), data mining for management information and services.

Credit Hours: 3
Prerequisites: IMSE 4410 and instructor's consent

IMSE 4500: Introduction to Manufacturing Processes
(cross-leveled with IMSE 7500). An introduction to the engineering principles of manufacturing processes, ranging from traditional (casting, forming, cutting, welding) to the state-of-the-art (additive). The course will emphasize material selection, process analysis and selection, and product design considerations for manufacturing. Graded on A-F basis only.

Credit Hours: 3
Prerequisites or Corequisites: ENGINR 2200 or MAE 2200
Prerequisites: MAE 1100

IMSE 4550: Computer Aided Design and Manufacturing
(cross-leveled with IMSE 7550). Product realization process from design, process planning, to manufacturing. Includes CE, DFS/DFM, CAD, CAPP, CNC, and survey of manufacturing methods.

Credit Hours: 4
Prerequisites: Restricted to IMSE students; Junior Standing
Corequisites: ENGINR 2200

IMSE 4560: Introduction to Rapid Prototyping
(cross-leveled with IMSE 7560). Course covers all five MU systems: FDM, SLS, SLA, Polyjet, 3DP. Students will learn fundamental rapid prototyping and related concepts, and design and produce models from each system. Graded on A-F basis only.

Credit Hours: 3
Prerequisites: IMSE 4550

IMSE 4565: Smart Manufacturing Systems
(cross-leveled with IMSE 7565). An introduction to smart manufacturing systems design and operation with respect to Industry 4.0. The course will cover modeling approaches, smart devices and sensors, big data analysis, system security, and advanced manufacturing processes. Graded on A-F basis only.

Credit Hours: 3
Prerequisites: Junior standing

IMSE 4570: Computer Integrated Manufacturing Control
(cross-leveled with IMSE 7570). Implementation of computer integrated manufacturing (CIM) and automation at the shop floor level. Covers essential components of machine sensing and actuation (including programmable robots), information representation and processing, data communication and networking.

Credit Hours: 3
Prerequisites: IMSE 4550

IMSE 4580: Industrial Energy Efficiency and Management
(cross-leveled with IMSE 7580). Introduction to the fundamentals of industrial energy efficiency and management. Covers the essential concepts, best practices, management systems and current standards to achieve and improve energy efficiency in industrial settings, and utilizes hands-on experiences involving real assessment and analysis of industrial site visits and projects.

Credit Hours: 3
Prerequisites: IMSE 2030 or instructor's consent

IMSE 4610: Quality Engineering and Analytics
(cross-leveled with IMSE 7610). Introduces concepts, theory, and analytical methodologies for quality planning, improvement, and control in manufacturing and service systems. Topics covered include process quality modeling, hypothesis testing, control charts, capability analysis, data visualization, text analytics.

Credit Hours: 3
Prerequisites: Restricted to IMSE students or by Departmental consent. IMSE 4110. INFOTC 4401

IMSE 4720: Introduction to Life Cycle Analysis
(cross-leveled with IMSE 7720). Introduction to life cycle thinking, application of ISO standards for conducting an LCA. Students learn process, input-output and hybrid LCA modeling basics, in addition to the application of LCA skills and thinking to improve the performance of systems and processes. Graded on A-F basis only.

Credit Hours: 3
Prerequisites: Junior standing

IMSE 4750: Entrepreneurial Innovation Management: Enterprise Conception
(same as MANGMT 4750). Develop a new business and technology plan including marketing, finance, engineering, manufacturing, and production concepts in this joint College of Engineering and College of Business course.

Credit Hours: 3
Prerequisites: sophomore standing

IMSE 4755H: Entrepreneurial Innovation Management: Enterprise Conception-Honors
Develop a new business and technology plan including marketing, finance, engineering, manufacturing, and production concepts in this joint College of Engineering and College of Business course.

Credit Hours: 3
Prerequisites: sophomore standing. Honors eligibility required

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IMSE 4810: Cognitive Ergonomics
(cross-leveled with IMSE 7810). This course will cover the study of empirical research in Cognitive ergonomics and Human-Computer Interaction (HCI). Students will learn cognitive information processing, mental workload, human reliability, and empirical methods in HCI research. Graded on A-F basis only.

Credit Hours: 3
Recommended: Junior or senior level undergraduate students

IMSE 4910: Industrial Engineering Internship
An industry-based learning experience that provides opportunities to apply industrial engineering skills, concepts and theories in a practical context. Requires submission of an internship plan for prior approval and a final oral presentation / written report at the completion of the internship. Graded on A-F basis only.

Credit Hours: 3
Prerequisites: instructor and departmental consent
Recommended: junior standing

IMSE 4920: Industrial Engineering COOP
An industry-based learning experience that provides opportunities to apply industrial engineering skills, concepts and theories in a practical context. Requires submission of a COOP plan for prior approval and a final oral presentation / written report at the completion of the COOP. Graded on A-F basis only.

Credit Hours: 3
Prerequisites: instructor and departmental consent
Recommended: junior standing

IMSE 4970: Capstone Design I
Overview of professional engineering issues such as ethics, team dynamics, communication, and project management. Includes team-based industrial assessments to develop skills in problem/opportunity identification. Graded on A-F basis only.

Credit Hour: 1
Prerequisites or Corequisites: IMSE 4310
Prerequisites: Restricted to IMSE students; Senior Standing

IMSE 4970W: Capstone Design I - Writing Intensive
Overview of professional engineering issues such as ethics, team dynamics, communication, and project management. Includes team-based industrial assessments to develop skills in problem/opportunity identification. Graded on A-F basis only.

Credit Hour: 1
Prerequisites or Corequisites: IMSE 4310
Prerequisites: Restricted to IMSE students; Senior Standing

IMSE 4980: Capstone Design II
Industry-based team design experience structured to integrate material presented throughout the Industrial and Manufacturing Systems Engineering curriculum. Must immediately follow IMSE 4970.

Credit Hours: 3
Prerequisites: Restricted to IMSE student; IMSE 3810, IMSE 4310, and IMSE 4970

IMSE 4980W: Capstone Design II - Writing Intensive
Industry-based team design experience structured to integrate material presented throughout the Industrial and Manufacturing Systems Engineering curriculum. Must immediately follow IMSE 4970.

Credit Hours: 3
Prerequisites: Restricted to IMSE student;. IMSE 3810, IMSE 4310, and IMSE 4970

IMSE 4990: Undergraduate Research in Industrial Engineering
Independent investigation or project in industrial engineering. May be repeated to 6 hours.

Credit Hour: 0-6

IMSE 4995: Undergraduate Research Industrial Engineering - Honors
Independent investigation or project in industrial engineering. May be repeated to 6 hours. Enrollment limited to receiving departmental honors

Credit Hour: 0-6
Prerequisites: Restricted to IMSE students only

IMSE 4995H: Undergraduate Research Industrial Engineering - Honors
Independent investigation or project in industrial engineering. May be repeated to 6 hours. Enrollment limited to receiving departmental honors

Credit Hour: 0-6
Prerequisites: Restricted to IMSE students only

IMSE 7001: Topics in Industrial and Manufacturing Systems Engineering
Current and new technical developments in industrial engineering.

Credit Hours: 3

IMSE 7110: Engineering Statistics
(cross-leveled with IMSE 4110). Understanding and application of statistical analysis of techniques. Emphasis on hypothesis testing, regression analysis, analysis of variance (ANOVA) and design of experiments (DOE).

Credit Hours: 3
Prerequisites: grade of C- or better in IMSE 3110

IMSE 7210: Linear Optimization
(cross-leveled with IMSE 4210). Theory and application of linear optimization.

Credit Hours: 3
Prerequisites: IMSE 2210

IMSE 7220: Optimization Modeling and Computational Methods
(cross-leveled with IMSE 4220). Modeling and solution techniques for mathematical optimization, including linear, nonlinear, integer, and stochastic programming. Emphasis on formulation of models for most-efficient use of solution algorithms. Graded on A-F basis only.

Credit Hours: 3
Prerequisites: IMSE 3110, IMSE 4210

IMSE 7230: Operations Research Models
(cross-leveled with IMSE 4230). Formulates probabilistic models and determines optimal control policies for queuing and inventory systems. Introduces Markov chains and dynamic programming.

Credit Hours: 3
Prerequisites: grade of C- or better in IMSE 2110 and IMSE 3110

IMSE 7280: Systems Simulation
(cross-leveled with IMSE 4280). Discrete-event stochastic systems modeling and experimentation using simulation software. Statistical design and analysis including distribution fitting and alternative comparison methodologies. Graded on A-F basis only.

Credit Hours: 3
Prerequisites: Restricted to IMSE students. Grade of C- or better in IMSE 4110

IMSE 7310: Integrated Production Systems Design
(cross-leveled with IMSE 4310). Design and operation of production systems, including lean production concepts, just-in-time / kanban, facility layout and material flow issues.

Credit Hours: 3
Prerequisites: IMSE 2030, IMSE 2710, IMSE 4210, IMSE 4280

IMSE 7330: Material Flow and Logistics System Design
(cross-leveled with IMSE 4330). Modeling and analysis of structural and operational issues associated with material-flow system design including facility location, warehouse/inventory systems, and distribution/ transportation systems.

Credit Hours: 3
Prerequisites: IMSE 4210, IMSE 4280

IMSE 7350: Production and Operations Analysis
(cross-leveled with IMSE 4350). Quantitative methods for forecasting, scheduling, and production control in manufacturing and service systems. Use of Enterprise Resource Planning (ERP) systems.

Credit Hours: 3
Prerequisites: IMSE 4210 and IMSE 4230

IMSE 7360: Supply Chain Engineering
(cross-leveled with IMSE 4360). Modeling and analysis of supply chain network design and management issues including integration of production, inventory control, supplier selection, risk management and logistics network design. Graded on A-F basis only.

Credit Hours: 3
Prerequisites: IMSE 4350

IMSE 7370: Service Systems Engineering and Management
(cross-leveled with IMSE 4370). Service systems contribute to more than 75% of US GDP and provide close to 80% employment. This course introduces students to service system engineering and management and will discuss models, concepts and solution methods important in the design, control, and operation of service systems. In addition, this course will provide students the ability to apply industrial engineering and operations research tools for analyzing service enterprises, including supply chain engineering, financial engineering and revenue management. Graded on A-F basis only.

Credit Hours: 3
Prerequisites: IMSE 4210 or Instructor's consent

IMSE 7380: Six Sigma Methodology
(cross-leveled with IMSE 4380). An overview of the Six Sigma DMAIC methodology for analyzing and improving processes. Requires completing a Six Sigma Green Belt project. Graded on A-F basis only.

Credit Hours: 3
Prerequisites: Grade of C or better in IMSE 2110 or IMSE 4110 or STAT 4710

IMSE 7385: Lean Six Sigma Green Belt Project
(cross-leveled with IMSE 4385). Application of the Lean Six Sigma methodology in an industry-based project.

Credit Hour: 1
Prerequisites: IMSE 4310

IMSE 7410: Data Engineering and Predictive Modeling
(cross-leveled with IMSE 4410). Introduces the science of processing data using expert systems for faster and smarter decision-making. Topics covered include descriptive analytics, statistical learning algorithms, tree-based algorithms, artificial neural networks, association rule mining, and k-means clustering. Graded on A-F basis only.

Credit Hours: 3
Prerequisites: INFOTC 4401, CMP_SC 1050 and IMSE 4110

IMSE 7420: Web-Based Information Systems
(cross-leveled with IMSE 4420). Data models, design of databases using E-R, UML (Access/Oracle), web databases, web servers and interfaces (Visual Basic, JavaScript), E-commerce infrastructure (PDM, STEP, XML), data mining for management information and services.

Credit Hours: 3
Prerequisites: IMSE 4410 and instructor's consent

IMSE 7500: Introduction to Manufacturing Processes
(cross-leveled with IMSE 4500). An introduction to the engineering principles of manufacturing processes, ranging from traditional (casting, forming, cutting, welding) to the state-of-the-art (additive). The course will emphasize material selection, process analysis and selection, and product design considerations for manufacturing. Graded on A-F basis only.

Credit Hours: 3
Prerequisites: MAE 1100, and ENGINR 2200 or MAE 2200

IMSE 7510: CAD/CAM Laboratory
A laboratory that includes the product realization process from design, process planning, to manufacturing. Includes CE, DFS/DFM, CAD, CAPP, CNC, and the application of applicable manufacturing methods. Graded on A-F basis only.

Credit Hour: 1
Corequisites: IMSE 7500

IMSE 7550: Computer Aided Design and Manufacturing
(cross-leveled with IMSE 4550). Product realization process from design, process planning, to manufacturing. Includes CE, DFS/DFM, CAD, CAPP, CNC, and survey of manufacturing methods.

Credit Hours: 4

IMSE 7560: Introduction to Rapid Prototyping
(cross-leveled with IMSE 4560). Course covers all five MU systems: FDM, SLS, SLA, Polyjet, 3DP. Students will learn fundamental rapid prototyping and related concepts, and design and produce models from each system. Graded on A-F basis only.

Credit Hours: 3

IMSE 7565: Smart Manufacturing Systems
(cross-leveled with IMSE 4565). An introduction to smart manufacturing systems design and operation with respect to Industry 4.0. The course will cover modeling approaches, smart devices and sensors, big data analysis, system security, and advanced manufacturing processes. Graded on A-F basis only.

Credit Hours: 3

IMSE 7570: Computer Integrated Manufacturing Control
(cross-leveled with IMSE 4570). Implementation of computer integrated manufacturing (CIM) and automation at the shop floor level. Covers essential components of machine sensing and actuation (including programmable robots), information representation and processing, data communication and networking.

Credit Hours: 3
Prerequisites: IMSE 4550

IMSE 7580: Industrial Energy Efficiency and Management
(cross-leveled with IMSE 4580). Introduction to the fundamentals of industrial energy efficiency and management. Covers the essential concepts, best practices, management systems and current standards to achieve and improve energy efficiency in industrial settings, and utilizes hands-on experiences involving real assessment and analysis of industrial site visits and projects.

Credit Hours: 3
Prerequisites: IMSE 2030 or instructor's consent

IMSE 7610: Quality Engineering and Analytics
(cross-leveled with IMSE 4610). Introduces concepts, theory, and analytical methodologies for quality planning, improvement, and control in manufacturing and service systems. Topics covered include process quality modeling, hypothesis testing, control charts, capability analysis, data visualization, text analytics. Graded on A-F basis only.

Credit Hours: 3
Prerequisites: IMSE 4110 or IMSE 7110. INFOTC 4401 or other Python programming course

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IMSE 7720: Introduction to Life Cycle Analysis
(cross-leveled with IMSE 4720). Introduction to life cycle thinking, application of ISO standards for conducting an LCA. Students learn process, input-output and hybrid LCA modeling basics, in addition to the application of LCA skills and thinking to improve the performance of systems and processes. Graded on A-F basis only.

Credit Hours: 3

IMSE 7750: Entrepreneurial Innovation Management: Advanced Enterprise Conception
Develop a new business and technology plan (including marketing, finance, engineering, manufacturing, and production concepts) in this joint College of Engineering/College of Business course.

Credit Hours: 3

IMSE 7810: Cognitive Ergonomics and Decision Making
(cross-leveled with IMSE 4810). This course will cover the study of empirical research in cognitive ergonomics and Human-Computer Interaction (HCI). Students will learn cognitive information processing, mental workload, human reliability, decision-making, and empirical methods in HCI research. Graded on A-F basis only.

Credit Hours: 3

IMSE 8001: Advanced Topics in Industrial & Manufacturing Systems Engineering
Current and new technical developments in industrial engineering.

Credit Hours: 3

IMSE 8030: Advanced Manufacturing and Supply Systems
The design, regulation, and optimization of manufacturing and supply systems through systems analysis.

Credit Hours: 3

IMSE 8085: Problems in Industrial and Manufacturing Systems Engineering
Supervised investigation in industrial engineering to be presented in the form of an engineering report.

Credit Hour: 1-99

IMSE 8087: Industrial Engineering Graduate Seminar
Selected topics in industrial engineering; oral presentations and engineering reports. Graded on S/U basis only.

Credit Hours: 0

IMSE 8110: Design and Analysis of Engineering Experiments
Application of advanced statistical methods for the design and analysis of experiments, including two-level factorial designs and fractional factorial designs, response surface methods, and random effects models. Graded on A-F basis only.

Credit Hours: 3
Prerequisites: IMSE 4110 or IMSE 7110 or equivalent

IMSE 8210: Linear and Network Optimization
Applications of discrete operations research methods, including linear programming, network models, fuzzy sets, integer programming, and meta-heuristics. Graded on A-F basis only.

Credit Hours: 3

IMSE 8220: Nonlinear Optimization
Introduces computational non-linear mathematical programming procedures their use in solving complex industrial systems design problems. Graded on A-F basis only.

Credit Hours: 3

IMSE 8230: Stochastic Processes and Models
Theory and applications of stochastic processes; includes continuous time Markov chain, Markov decision process, queueing theory, and stochastic manufacturing systems. Graded on A-F basis only.

Credit Hours: 3

IMSE 8310: Advanced Integrated Production Systems
Advanced study of the design and operation of flow shop, job shop, and cell-based production systems, including scheduling, layout and material flow issues. Graded on A-F basis only.

Credit Hours: 3

IMSE 8370: Supply Chain Modeling and Analysis
Theory and application of supply chain networks, integration of production and inventory control methods. Graded on A-F basis only.

Credit Hours: 3

IMSE 8410: Advanced Analytics with Engineering Applications
Introduces the core principles, methods, and tools associated with data analytics and provides hands-on training using Python and R. The course covers advanced tools/techniques for data summarization, visualization, predictive modeling, association mining, clustering, and natural language processing. Graded on A-F basis only.

Credit Hours: 3

IMSE 8550: Advanced CAD/CAM
Covers the state-of-the-art in CAD/CAM and explores the latest developments, residual problems, and new direction in CAD/CAM. Includes sculptured surface modeling, rapid prototyping and manufacturing, integrated process planning, shape analysis, machine intelligence. Graded on A-F basis only.

Credit Hours: 3

IMSE 8560: Advanced Manufacturing Technologies
The fundamental theory, design, fabrication, and analysis of state-of-the-art manufacturing technologies will be covered in this course. The course will emphasize production design, CAD/CAM, material selection, and material processing technologies, including traditional machining methods, rapid prototyping and manufacturing, integrated process planning, shape analysis, and cutting-edge Micro/Nanofabrication techniques. The course uses active learning with hands-on projects, videos, and class discussions to help students understand manufacturing principles and product realization methods. Graded on A-F basis only.

Credit Hours: 3

IMSE 8730: Strategic Enterprise Management
Topics including enterprise strategies, process and content models, strategy implementation, value chain analysis, business processes, systems engineering approaches, business process reengineering, and dynamic systems modeling.

Credit Hours: 3

IMSE 8810: Human Factors
Human factors inputs, outputs and environment and their influence on design and evaluation of man and machine systems.

Credit Hours: 3

IMSE 8990: Research-Masters Thesis in Industrial Engineering
Independent investigation in field of industrial engineering to be presented as a thesis. Graded on S/U basis only.

Credit Hour: 1-99

IMSE 9990: Research-Doctoral Dissertation in Industrial Engineering
Independent investigation in field of industrial engineering to be presented as a dissertation. Graded on S/U basis only.

Credit Hour: 1-99