INDUSTRIAL/SYSTEMS ENGINEERING (ISYE)

ISYE 220 | ENGINEERING ECONOMICS
Units: 3  Repeatability: No
Prerequisites: ISYE 330 (Can be taken Concurrently)
Principles of financial analysis appropriate for evaluating the economic impact of engineering projects. Three hours lecture weekly.

ISYE 310 | WORK ANALYSIS AND DESIGN
Units: 4  Repeatability: No
Prerequisites: ISYE 330 (Can be taken Concurrently)
Introduction to the fundamental methods for analyzing and designing procedures to perform operations in the workplace. Includes time and motion study, methods improvement and workplace design. Three hours lecture and one three-hour laboratory weekly. Junior standing in engineering. Fall semester.

ISYE 320 | INTRODUCTION TO SYSTEMS ENGINEERING
Units: 3  Repeatability: No
Prerequisites: ISYE 330 and ISYE 391W
Introduction to the theory and methods used to design and analyze systems. Principles of the system life-cycle including problem identification, description, modeling, solution and implementation. Three hours lecture weekly. Spring semester.

ISYE 330 | ENGINEERING PROBABILITY AND STATISTICS
Units: 3  Repeatability: No
Core Attributes: Quantitative reasoning comp
Prerequisites: MATH 151 (Can be taken Concurrently)
Introduction to probability and applied statistics within an engineering context. Topics include probability, discrete and continuous probability distributions, and statistical tests and confidence intervals for one and two samples. Three hours lecture weekly. Fall and Spring semesters.

ISYE 335 | STATISTICAL PROCESS CONTROL
Units: 4  Repeatability: No
Prerequisites: ISYE 310 and ISYE 330
Application of statistics to improving quality and productivity. Both traditional and modern methods are presented, including state-of-the-art techniques for statistical process monitoring and control. Introduction to Six Sigma quality methodology and the DMAIC (define, measure, analyze, improve, and control) problem-solving strategy for continuous quality improvement. Three hours lecture and one three-hour laboratory weekly. Spring semester.

ISYE 340 | OPERATIONS RESEARCH I
Units: 3  Repeatability: No
Prerequisites: (MATH 310 or MATH 320)
Methods for developing and analyzing deterministic operations research models. Topics include linear programming, networks, and Integer programming. Three hours lecture weekly. Fall semester.

ISYE 350 | MANUFACTURING PROCESSES
Units: 3
Prerequisites: MENG 210 and ENGR 311
Corequisites: ISYE 350L
Description, classification and analysis of manufacturing processes used in the transformation of metal, polymers, and ceramics into consumer or capital goods. Topics include: analysis of variables that affect process operations, performance, quality and cost, and the design of process plans. Three hours lecture weekly. Spring semester.

ISYE 350L | MANUFACTURING PROCESSES LABORATORY
Units: 1
Corequisites: ISYE 350
A laboratory course to complement the lecture material presented in ISYE 350. One three-hour laboratory weekly. Spring Semester.

ISYE 380 | SUSTAINABILITY AND ENGINEERING
Units: 3
The course provides an interdisciplinary overview of the engineering roles and opportunities to improve the sustainability of engineering products, processes and systems. Topics include carbon footprint, life cycle assessment, design for sustainability, wastes and recycling, energy, and water.

ISYE 391W | INDUSTRIAL AND SYSTEMS ENGINEERING PROFESSIONAL PRACTICE
Units: 3  Repeatability: No
Core Attributes: Advanced writing competency, Oral communication competency
Prerequisites: ISYE 310 (Can be taken Concurrently)
Development of skills and knowledge needed to successfully manage projects in ISyE. Topics include project management, teamwork, the role of ISyE in an organization, career planning, formal memo writing, oral and written reports incorporating peer review, iterative drafting techniques, and formal final multimedia presentation incorporating peer review. Three hours lecture weekly.

ISYE 410 | HUMAN FACTORS
Units: 3
Prerequisites: ISYE 330
An introduction to the field of ergonomics/human factors engineering. Principles of workplace and environmental design to conform to the physical and mental abilities and limitations of people are presented. Three hours lecture weekly. Spring semester.

ISYE 410L | HUMAN FACTORS LABORATORY
Units: 1
Corequisites: ISYE 410
Laboratory for ISYE 410. Three hour laboratory weekly. Spring semester.

ISYE 420 | SIMULATION OF PRODUCTION AND SERVICE SYSTEMS
Units: 4  Repeatability: No
Prerequisites: (ENGR 121 or COMP 150) and ISYE 440
Modeling and analysis of systems using computer-based discrete event simulation. Principles of modeling, validation, and output analysis are developed using high-level simulation languages. Three hours lecture and one three-hour laboratory weekly. Fall semester.

ISYE 430 | DESIGN AND ANALYSIS OF ENGINEERING EXPERIMENTS
Units: 3
Prerequisites: ISYE 330 and ISYE 335
Systematic application of statistical techniques to the design and analysis of engineering experiments. Application of experimental design to the improvement of products, processes, and services. Topics will include analysis of variance, single factor experiments, factorial and fractional factorial experimental designs, robust design, and response surface methods. Three hours lecture weekly. Fall semester.

ISYE 440 | OPERATIONS RESEARCH II
Units: 3  Repeatability: No
Prerequisites: ISYE 330 and ISYE 340
Methods for developing and analyzing stochastic operations research models. Topics include Poisson processes, Markov processes, queuing, and decision theory. Three hours lecture weekly. Spring semester.
ISYE 450 | MANUFACTURING SYSTEMS
Units: 3  Repeatability: No
Prerequisites: (ENGR 121 or COMP 150) and ISYE 350
Introduction to principles of manufacturing automation and analysis of automated systems. Topics include process and machine control, control systems, programmable logic controllers, robotics, computer vision and material handling systems. Two hours lecture and one three-hour laboratory weekly. Fall semester.

ISYE 460 | OPERATIONS AND SUPPLY CHAIN MANAGEMENT
Units: 3
Prerequisites: ISYE 220 and ISYE 340
Concepts in planning, controlling, and managing the operations function of manufacturing and service firms. Topics include operations strategy, forecasting, capacity, production planning and control, and trends in operations and supply chain management. Emphasis on the development and use of mathematical models and algorithms used to analyze and improve the use of material, labor and information in various processes. Three hours lecture weekly. Spring semester.

ISYE 470 | FACILITIES PLANNING
Units: 3  Repeatability: No
Prerequisites: ISYE 310 and ISYE 340
Analysis and design of production and service facilities. Analytical and computer-based techniques to assist with strategic planning, process design, material handling and flow, layout and facility location. Three hours lecture weekly. Fall semester.

ISYE 492 | INDUSTRIAL AND SYSTEMS ENGINEERING DESIGN PROJECT
Units: 3  Repeatability: No
Prerequisites: ISYE 310 and ISYE 320 and ISYE 335 and ISYE 350 and ISYE 391W and ISYE 420 and ISYE 470
Capstone Senior design project. Application of principles of Industrial & Systems Engineering from throughout the curriculum to a design project. Written and oral reports, design reviews, final project report and presentation. Six hours of laboratory weekly. Spring semester.

ISYE 494 | SPECIAL TOPICS IN INDUSTRIAL AND SYSTEMS ENGINEERING
Units: 1-4  Repeatability: Yes (Can be repeated for Credit)
Special topics seminar in areas of special interest to current engineering practice in Industrial & Systems Engineering. May be repeated for credit. Upper division standing in the ISYE major.

ISYE 496 | UNDERGRADUATE RESEARCH
Units: 1-3  Repeatability: Yes (Can be repeated for Credit)
Faculty-directed undergraduate research in engineering. Problem proposal must be submitted and approved prior to enrollment. Written report required. Upper division standing in the ISYE major. Prior approval by the department chair is required.

ISYE 498 | INTERNSHIP/CO-OP EXPERIENCE
Units: 1-3
Directed upper division level internship/ co-operative experience in engineering research, design, development, manufacturing, or the engineering activity. Written report required. Credit not applicable to minimum program graduation requirement. Placement contingent upon approval of participating organization. May be repeated for credit.

ISYE 499 | INDEPENDENT STUDY
Units: 1-3
Individual project in creative design and synthesis under the general supervision of a participating professor. Project proposal must be submitted and approved prior to enrollment.