Industrial & Systems Engineering (ISE)

ISE 502 - INDUSTRIAL & ORGANIZATIONAL PSY
Semester Hours: 3
Application of basic principles of learning, motivation, and perception to typical industrial and organizational problems.

ISE 503 - HUMAN FACTORS PSYCHOLOGY
Semester Hours: 3

ISE 521 - IMPROVING HEALTHCARE SYSTEMS
Semester Hours: 3
Overview of healthcare systems with emphasis on departments, functions, and improving operational performance. Lean concepts and techniques are introduced as they specifically apply in a healthcare environment. Topics include workplace organization, patient and material flow, pull systems, value stream mapping, problem solving, and root cause analysis. Hands on simulations will be utilized.

ISE 522 - HEALTHCARE SYSTEMS ENGINEERING
Semester Hours: 3
This course introduces students to systematic and quantitative analysis of healthcare systems. The purpose of this class is to increase the student's understanding of how to apply proven industrial and systems engineering methods to healthcare related problems. Potential topics include: healthcare financing, health analytics, Six Sigma as they relate to healthcare, reliability and patient safety, capacity management, and healthcare logistics.

ISE 523 - INTR STATISTICAL QUALITY CONTR
Semester Hours: 3
This course introduces statistical theory and techniques to control quality of manufacturing products. This course will provide a solid foundation in Statistical Quality Control (SQC). The Six Sigma methodology is also introduced in this course. Students can take the certification exam to earn a Green Belt in Six Sigma. Prerequisites: ISE 690.

ISE 526 - DESIGN/ANALY OF EXPERIMENT
Semester Hours: 3
Advanced topics in statistical experiments with emphasis on design aspect. Confounding, fractional replication, factorial and nested design.

ISE 530 - MANUF SYS & FACILITIES DESIGN
Semester Hours: 3
Overview of modern manufacturing systems design with emphasis on facility location and plant layout. Includes classical systems, just-in-time systems, basic principles of integrated manufacturing systems design, as well as analysis of process flow, process productivity, and available space to determine plant layout. Includes laboratory exercises.

ISE 533 - PRODUCTION/INVENTORY CONTR SYS
Semester Hours: 3
Inventory models including classical optimal economic order quantity models, manufacturing resource planning (MRP) systems, master production scheduling, material requirements planning, and purchase order control. Emphasis on manufacturing system revision, continuous process improvement, and the implementation of lean principles. Prerequisite: ISE 690.

ISE 537 - ELECTRONICS MANUF PROCESSES
Semester Hours: 3
Current concepts, facilities, and technology utilized in the manufacture of electronic components and products. Includes printed wiring board fabrication and component mounting methods, automation, quality and reliability, product testing, and economic issues.

ISE 539 - SELECTED TOPICS/ISE
Semester Hours: 1-3

ISE 547 - INTRO TO SYSTEMS SIMULATION
Semester Hours: 3
Philosophy and elements of digital discrete-event simulation. Emphasis on modeling and analysis of stochastic systems, including probabilistic models, output analysis, and use of simulation software. Prerequisite: ISE 690.
ISE 580 - SYSTEMS ENGINEERING MODELING  
Semester Hours: 3

The main goal of this course is to teach the student Model Based Systems Engineering (MBSE) fundamentals with application to real-world systems engineering problems. Students will learn (1) core systems engineering concepts and processes; (2) System Modeling Language (SysML) fundamentals and its use to develop and execute system models on a SysML based tool and (3) Architecture and physical model execution, simulation and integration.

ISE 623 - ENGR ECON ANALYSIS  
Semester Hours: 3

This course is designed for graduate students in industrial engineering, systems engineering and engineering management. This course involves mathematical models for expenditure analysis under uncertainty; investment decision criteria; capital planning and budgeting; and decisions involving expansion, acquisitions, replacement, and disinvestment. Prerequisite: ISE 690.

ISE 626 - INTRO OPERATIONS RESEARCH  
Semester Hours: 3

Philosophy and methodology of operations research. Includes linear programming, game theory, sequencing, and networks.

ISE 627 - ENGINEERING SYSTEMS  
Semester Hours: 3

Development of a systems-scientific framework for the integration of systems theory, systems thinking, systems engineering, and systems management. Emphasis is on the conception, design, and management of systems to accommodate complex environments.

ISE 629 - OPTIMIZ AEROSPACE SYST DSGN  
Semester Hours: 3

in this project course, students will learn to model an aerospace system they are designing and optimize the system using the model. Linear, nonlinear, and discrete optimization are addressed. This course is targeted to students in systems engineering and aerospace systems engineering. Prerequisite with concurrency: ISE 627.

ISE 637 - SYSTEMS MODELING & ANALYSIS  
Semester Hours: 3

System analysis and modeling of large complex systems using systems engineering fundamentals. Life cycle simulations developed as a focus for the multidisciplinary analysis integration using computational systems engineering techniques including probability, statistics, design of experiments, response surfaces, and optimization. State of the art software tools will be used for simulation development.

ISE 638 - ENGINEERING RELIABILITY  
Semester Hours: 3

Methodology of reliability prediction including application of discrete and continuous distribution models. Reliability estimation, reliability logic diagrams, life testing, and reliability demonstrations.

ISE 639 - SELECTED TOPICS/ISE  
Semester Hours: 1-6

ISE 641 - ADVANCED QUALITY CONTROL  
Semester Hours: 3

This capstone course uses advanced statistical quality tools such as autocorrelated data, multi-variate quality controls charts, response surface methodology, ridge analysis, and evolutionary operations (EVOP). Advanced Six Sigma concepts will be taught and students will have the opportunity to earn a Black Belt in Six Sigma upon successful completion of the certification exam and an acceptable project.

ISE 690 - STATISTICAL METHODS FOR ENGR  
Semester Hours: 3

Application of statistics for estimation and inference using parametric and nonparametric methods. Descriptive statistics, sampling distributions, point and interval estimates, tests of hypotheses, ANOVA, and linear regression.

ISE 696 - GRAD INTERN ISE ENGR  
Semester Hours: 1-9

Active involvement in an engineering project in an engineering enterprise, professional organization, or government agency that has particular interest and relevance to the graduate student. Permission of ISE faculty member required.
ISE 697 - INDUS & SYSTEMS ENGR PROJECT I
Semester Hours: 3-9

Application oriented student project designed to show competence in Industrial and Systems Engineering.

ISE 698 - IND & SYSTEMS ENGR PROJECT II
Semester Hours: 3-9

Required each semester student is working and receiving direction on a master's thesis. Minimum of two semesters and 6 hours required for M.S.E. students. A maximum of 9 hours of credit is awarded upon successful completion of master's thesis. Prerequisite: ISE 697.

ISE 699 - MASTER'S THESIS
Semester Hours: 1-9

Required each semester student is working and receiving direction on a master's thesis. Minimum of two semesters and 6 hours required for M.S.E. students. A maximum of 9 hours of credit is awarded upon successful completion of master's thesis. The 1 hour option is only available to students who have successfully defended their thesis and submitted it for approval, but do not meet the deadlines for graduation in the semester submitted. Students may only use the 1 hour option once in their career.

ISE 726 - SYSTEMS MODELING
Semester Hours: 3

The capstone course for the operations research option studies the philosophy and methodology for modeling probabilistic systems. Includes Markov processes, queuing theory, and inventory theory. Team project required. Prerequisite: ISE 690 and (ISE 626 or ISE 627).

ISE 734 - DECISION ANALYSIS
Semester Hours: 3

Decision making for systems engineering and engineering management, with an emphasis on applications to complex systems. Builds a rigorous foundation in decision making under uncertainty using expected utility theory. Topics include decision trees, value models, predictive models, preferences and bias. Prerequisite: ISE 690.

ISE 739 - SELECTED TOPICS/ISE
Semester Hours: 1-6

ISE 761 - EVOL THRY ENG MGMT/IND SYS ENG
Semester Hours: 3

Development of applicable engineering management or industrial and systems engineering theory using classical concepts, contemporary studies and practices at successful technology-based organizations.

ISE 790 - ADV STATISTICAL APPLICATIONS
Semester Hours: 3

Continuation of ISE 690 with extension to regression models and nonparametric methods. Prerequisite: ISE 690.

ISE 799 - DOCTORAL DISSERTATION
Semester Hours: 3-9

Required each semester student is enrolled and receiving direction on doctoral dissertation.