INDUSTRIAL AND SYSTEMS ENGINEERING (ISE)

Subject-area course lists indicate courses currently active for offering at the University of Louisville. Not all courses are scheduled in any given academic term. For class offerings in a specific semester, refer to the Schedule of Classes (https://csprd.louisville.edu/psp/ps_class/EMPLOYEE/PSFT_CS/c/COMMUNITY_ACCESS.CLASS_SEARCH./x/?state=62dab551a0d600a5e8237359c50704e59007&duo_code=sjUx2OSTj21bWvEuQ321YhjHmfxpq6V).

500-level courses generally are included in both the undergraduate- and graduate-level course listings; however, specific course/section offerings may vary between semesters. Students are responsible for ensuring that they enroll in courses that are applicable to their particular academic programs.

Course Fees

Some courses may carry fees beyond the standard tuition costs to cover additional support or materials. Program-, subject- and course-specific fee information can be found on the Office of the Bursar website (https://louisville.edu/bursar/tuitionfee/university-fees/).

ISE 516. Stochastic Operations Research **3 Units**
Term Typically Offered: Spring Only
Prerequisite(s): ISE 360 or equivalent.
Description: A selection of the probabilistic topics of operations research are included: queuing, renewal and Markov processes, simulation, decision analysis.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ISE 525. Project Management **3 Units**
Term Typically Offered: Fall, Spring, Summer
Prerequisite(s): Admission in ISE or EM program or instructor permission.
Description: Use of CPM, PERT, precedence diagramming, resource allocation heuristics, and other techniques for planning, managing, and controlling engineering projects involving research and development, production, maintenance, and construction.Computer procedures and codes for analyzing complex project networks will be covered.
Note: Cross-listed with EM 525.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ISE 540. Robots and Manufacturing Automation **3 Units**
Term Typically Offered: Fall, Spring, Summer
Prerequisite(s): ISE 360.
Description: Computer aided manufacturing; robot programming, implementation, application, and computer control; research trends; social impacts.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ISE 560. Probability and Statistics for Engineers **3 Units**
Term Typically Offered: Fall, Spring, Summer
Prerequisite(s): ENGR 102 OR (Calculus I AND graduate status).
Description: Engineering applications using probability, random variables, distribution functions, confidence intervals, estimation and hypothesis testing.
Note: Students cannot receive credit for both ISE 360 and ISE 560.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ISE 561. Decision Support Systems **3 Units**
Term Typically Offered: Spring Only
Prerequisite(s): Graduate Standing in the JB Speed School of Engineering.
Description: This course introduces students to optimization problems, algorithm design, and problem-solving techniques. The course focuses on developing pseudocode and practical algorithmic solutions for real-world decision problems, such as traveling salesman, bin packing, and knapsack problems. Students will explore how to address optimization challenges by analyzing the search space, identifying feasible solutions, and applying criteria for optimality, with clear, non-mathematical explanations. We will focus on Local Search, Carousel Greedy, Randomized Adaptive Search (GRASP), Genetic Algorithms (GA). The course also covers the fundamentals of coding languages, specifically Python, to support the implementation of algorithms.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ISE 590. Special Topics in Industrial Engineering **1-6 Units**
Term Typically Offered: Fall, Spring, Summer
Description: A theoretical and/or experimental investigation of an industrial engineering design topic.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ISE 600. Additive Manufacturing Processes **3 Units**
Term Typically Offered: Fall Only
Prerequisite(s): Prior knowledge in manufacturing process is required.
Description: Graduate standing in the JB Speed School of Engineering. This course is designed to provide an overview to additive manufacturing processes (a.k.a. 3D printing).An overview of all additive manufacturing processes is provided. Projects are used to develop in-depth knowledge in key applications of additive manufacturing.
Note: Students cannot receive credit for both ISE 600 and ISE 400.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ISE 601. Additive Manufacturing Structure Design **3 Units**
Description: This course focuses on the overview of design issues in additive manufacturing (AM), including the design of structures, materials and processes. The students are expected to gain in-depth understanding of the design issues with current AM technologies. Hands-on projects will be assigned that gives the students the opportunity of understanding the design issues and applying the knowledge to the design of functional parts and assemblies.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ISE 602. Graduate Internship in Industrial Engineering **1 Unit**
Grading Basis: Pass/Fail
Term Typically Offered: Fall, Spring, Summer
Prerequisite(s): Admission to Graduate Study, Permission of Department Chair, and Permission of Director of Career Services.
Description: Supervised professional experience in industry at the graduate level. This course provides the structure and focus for the graduate intern field assignment to ensure that the assignment is appropriate and consistent with the intern's graduate course of study and professional development. May be repeated for credit.
Course Attribute(s): CBL - This course includes Community-Based Learning (CBL). Students will engage in a community experience or project with an external partner in order to enhance understanding and application of academic content.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ISE 610. Foundations of Optimization I **3 Units**
Term Typically Offered: Spring Even Years
Prerequisite(s): ISE 646 and Graduate standing in the JB Speed School of Engineering.
Description: Formulation and solution of applicable optimization models for linear, integer, and network problems. Efficient algorithmic methods and use of computer modeling languages and systems.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ISE 611. Discrete Optimization **3 Units**
Prerequisite(s): ISE 515.
Description: A study of the techniques and applications of discrete optimization, especially as related to integer and dynamic programming.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ISE 614. Foundations of Optimization II **3 Units**
Prerequisite(s): ENGR 330 and ISE 610.
Description: Formulation and solution of applicable optimization models for nonlinear, stochastic programming, robust optimization and convex problems. Efficient algorithmic methods and use of computer modeling languages and systems.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ISE 615. Exact and Heuristic Algorithms for Optimization **3 Units**
Term Typically Offered: Fall Odd Years
Prerequisite(s): CSE 120 (or equivalent previous permission of the instructor) and ISE 515 (or basic knowledge of linear programming, duality theory and integer programming).
Description: This course is a survey of the most common search methods for optimization problems. We will focus on exact methods (including: Exhaustive Search, Branch and Bound, Column Generation, Decomposition methods), and on heuristic methods (including, Random search, Greedy Search, Local Search, Simulated Annealing (SA), Greedy Randomized Adaptive Search (GRASP), Genetic Algorithms (GA)). Both combinatorial and continuous optimization problems will be considered, with emphasis on combinatorics.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ISE 619. Digital and Advanced Manufacturing Systems **3 Units**
Term Typically Offered: Fall Only
Prerequisite(s): Previous course preparation in the areas of manufacturing process principles and industrial digital automation control is required.
Description: This course deals with some of the contemporary aspects of digital manufacturing and industry 4.0 manufacturing systems, which is highly disciplinary and of great interest to today's manufacturing industries. In particular, the course focuses on the fusion between manufacturing technologies and systems, smart manufacturing hardware, and data science. A range of topics including manufacturing sciences/engineering, industrial automation control, product conceptualization and prototyping, smart manufacturing, data analytics and quality modeling. While the discussions into most of these topics will be relatively brief, the emphasis is to establish a perspective of the relationships and interplay of the different areas in digital manufacturing. Throughout the course, 4-5 labs/projects are anticipated. In addition, assignments such as individual homework will be employed as additional learning tools for necessary knowledge for solving manufacturing-related engineering problems.
Note: Students cannot receive credit for both ISE 419 and ISE 619.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ISE 621. Facility Location and Layout **3 Units**
Term Typically Offered: Fall Only
Prerequisite(s): ISE 240.
Description: Design and layout of industrial facilities, facility location, space requirement, flow charts, relationships diagrams, material handling, quantitative layout techniques, production line balancing, and computer programs for layout planning.
Note: Students cannot receive credit for both ISE 621 and ISE 421.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ISE 625. Production and Inventory Systems **3 Units**
Term Typically Offered: Spring Only
Prerequisite(s): ISE 560 (Probability and Statistics) or similar course.
Description: Topics include the context of inventory management and production planning decisions, economic order quantities, heuristics and models for probabilistic and time-varying demand patterns, coordinated replenishment systems, and aggregate planning.
Note: Students cannot receive credit for both ISE 425 and ISE 625.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ISE 629. Quality Control **3 Units**
Term Typically Offered: Spring Only
Prerequisite(s): This course is only available for those who have not taken ISE 430.
Description: Previous course preparation in the areas of engineering statistics is required and approved by instructor. Developing an effective total quality control (TQC) system: integrating the quality development, maintenance, and improvement efforts of an organization; control charts, process capability, value engineering, product liability prevention, and computer control.
Note: Students cannot receive credit for both ISE 629 and ISE 430.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ISE 630. Advanced Production Systems Design **3 Units**
Prerequisite(s): ISE 421, ISE 425, ISE 430.
Description: This course is organized around the principles of Lean Manufacturing Engineering. Topics include lean manufacturing, including value, value stream, flow, pull and continuous improvement. Improvement and efficiency are facilitated through a study of factory dynamics, the influence of variability, and "Push and Pull" production systems.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ISE 631. Advanced Quality Control **3 Units**
Description: Advanced techniques for quality improvement and process control are investigated; these include advanced techniques of SPC, trouble shooting and diagnostics and Taguchi methods of experimental design.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ISE 634. Case Studies in Production and Industrial Engineering **3 Units**
Prerequisite(s): ISE 425, ISE 515, ISE 541.
Description: Case studies illustrate the application of industrial engineering techniques to the design of production systems, the control of construction projects, and health care delivery systems.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ISE 640. Applied Systems Analysis **3 Units**
Prerequisite(s): ISE 360, ISE 370, ISE 515.
Description: Problem formulation, data collection, alternative design generation, design evaluation, specification, and implementation for large scale systems.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ISE 642. Statistical Methodology in Simulation **3 Units**
Prerequisite(s): ISE 360 and ISE 541.
Description: Discrete simulation modeling, input probability distributions, random variate generators, output data analysis, validation, variance reduction, experimental design and optimization.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ISE 643. Analysis for Decision Making **3 Units**
Prerequisite(s): ISE 360 and ISE 515.
Description: The role of decision analysis in design; techniques for multicriteria decision analysis; systematic creativity in design.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ISE 645. Systems Simulation **3 Units**
Term Typically Offered: Spring Only
Prerequisite(s): ISE 560 (or equivalent), and Graduate standing in the JB Speed School of Engineering.
Description: The goal of this course is to give the student a basic working knowledge of the concepts of simulation modeling and analysis, especially as applied in the design and operation of both manufacturing-oriented and service-oriented systems. Following this course, students should be able to build and experiment with simulation models of manufacturing/service systems and interpret the output of these models as an aid in the design and operation of these systems.
Note: Students may not receive credit for both ISE 445 and ISE 645.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ISE 646. Operations Research Methods **3 Units**
Term Typically Offered: Fall Only
Prerequisite(s): Prior knowledge in linear algebra is required.
Description: Graduate standing in the JB Speed School of Engineering. Formulation and solution of basic models in operations research. Topics to be covered include applications of linear, integer and nonlinear programming; transportation and assignment problems, and network flows models.
Note: Students may not receive credit for both ISE 446 and ISE 646.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ISE 650. Material Flow Systems Design **3 Units**
Prerequisite(s): ISE 515.
Description: Material handling and equipment concepts; computerized plant layout; problem formulation; requirements definition; queuing; location analysis; conveyor theory; simulation; developing and evaluating alternative systems; systems implementation.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ISE 655. Supply Chain Engineering **3 Units**
Term Typically Offered: Fall Only
Prerequisite(s): Graduate Standing in the JB Speed School of Engineering.
Description: This course is designed to offer a balanced coverage on concept survey, analytics and modeling for operations and engineering in supply chain and logistics systems. Emphasis will be on analysis of strategic, tactical and operational supply chain problems including inventory decisions, revenue operations & modeling, distribution & network design, supply contracts and coordination among supply chain partners. Other related topics to be covered include various critical concepts and strategies such as risk pooling, information sharing, and the role of information systems in supply chain engineering.
Note: Students cannot receive credit for both ISE 655 and ISE 455.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ISE 657. Models for Design and Analysis of Logistical Systems **3 Units**
Term Typically Offered: Spring Only
Prerequisite(s): ISE 646, and Graduate standing in the JB Speed School of Engineering.
Description: This modeling oriented course for the design, analysis and operation of logistical systems includes topics such as inventory control, transportation, distribution network design, and supply chain management. Both deterministic as well as stochastic models are studied.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ISE 660. Reliability and Maintainability **3 Units**
Prerequisite(s): ISE 360.
Description: Design, development, and test techniques required to assure the reliability and maintainability of new systems. Design of maintenance programs for new and existing systems.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ISE 662. Predictive Analytics for Decision Making I **3 Units**
Term Typically Offered: Fall Only
Prerequisite(s): Prior knowledge on basic probability and statistics.
Description: Graduate standing in the JB Speed School of Engineering. This course will prepare students with various predictive analytics methods for manufacturing, healthcare, etc., which will be illustrated in examples. Different data types from real-world examples will be shown. Subsequently, it will be demonstrated how the predictive analytics methods can be used for better decision making. The methods will be implemented in non-programming based standard software such as Matlab, Excel, and Minitab.
Note: Students cannot receive credit for both ISE 662 and ISE 462.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ISE 663. Predictive Analytics for Decision Making II **3 Units**
Term Typically Offered: Spring Only
Prerequisite(s): ISE 462 or ISE 662 or similar; Experience with Python; ISE 560 (Prob&Stats) or similar course.
Description: This course provides an introduction to several classical and state-of-the-art machine learning methods and their applications for engineers. Fundamentals of linear model and shallow neural networks, multilayer perceptrons, and deep neural networks will be covered. Modern convolutional neural networks (CNN, including AlexNet, NiN, GoogleNet, ResNet, DenseNet), recurrent neural networks (RNN, including GRU, LSTM, Bi-LSTM, Transformer), and optimization techniques will be discussed with engineering examples implemented in Python.
Note: Students cannot receive credit for both ISE 663 and ISE 463.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ISE 664. Experimental Design in Engineering **3 Units**
Term Typically Offered: Spring, Summer
Prerequisite(s): ISE 560 (or equivalent) and Graduate standing in the JB Speed School of Engineering.
Description: Design of engineering experiments and projects using theory of least squares, analysis of variance, randomized blocks, factorial experiments, nested designs, split plot designs and logistic regression techniques. Covers a combination of analysis by hand and using Minitab statistical software.Students may only receive credit for one of the following: ISE 464, ISE 664, ME 611, and EM 661.
Note: Cross-listed with CSE 563.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ISE 669. Introduction to Human Factors Engineering and Ergonomics **3 Units**
Term Typically Offered: Fall Only
Prerequisite(s): Graduate Standing in the JB Speed School of Engineering.
Description: Human factors engineering is the study of human cognitive and physical abilities and limitations, and applying that knowledge to engineering design. "Ergonomics" typically relates to physical abilities and limitations. This course will provide a broad coverage of human factors and ergonomics and show how the application of human factors and ergonomics principles can improve the design of systems involving the interaction of humans with technology.
Note: Students may not receive credit for both ISE 469 and ISE 669.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ISE 670. Advanced Engineering Economy **3 Units**
Prerequisite(s): ISE 370.
Description: Inflation; cost of capital; revenue requirements; uncertainty and risk; propagation of errors; Hillier's results; simulation; capital budgeting.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ISE 671. Advanced Topics in Human Factors Engineering **3 Units**
Term Typically Offered: Spring Only
Prerequisite(s): ISE 669 (or equivalent); graduate Standing in the JB Speed School of Engineering.
Description: Human factors engineering is the study of human cognitive and physical abilities and limitations, and applying that knowledge to engineering design. The main goal of this course is to learn and apply advanced methods in human factors engineering, as well as newer models, theories, and frameworks related to the field.
Note: Students may not receive credit for both ISE 471 and ISE 671.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ISE 675. Usability Engineering **3 Units**
Term Typically Offered: Spring Only
Prerequisite(s): Graduate Standing in the JB Speed School of Engineering.
Description: Although the title of this course is 'Usability Engineering', the traditional concept of usability is expanded to a broader notion of user experience, including usability, usefulness, and emotional impact. The course will present an iterative evaluation-centered user experience (UX) lifecycle as a lifecycle template intended to be instantiated in many different ways to match the constraints of a particular development project. The UX lifecycle activities we will cover include contextual inquiry and analysis, requirements extraction, design-informing models, design thinking, ideation, sketching, conceptual design, and formative UX evaluation. It is a goal of this course to help students realize that UX engineering is an ongoing process throughout the full product lifecycle, and developing the human-computer interface is not something to be done at the last minute, when the "rest of the system" is finished.
Note: Students may not receive credit for both ISE 475 and ISE 675.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ISE 682. Quality of Care and Patient Safety **3 Units**
Term Typically Offered: Fall Only
Description: This course provides students an overview of the healthcare system and the different types of healthcare delivery, as well as factors that determine quality of care. This course also exposes students to tenets of patient safety from a human factors engineering perspective. Students will learn models of patient safety and incident analysis tools, including Root Cause Analysis (RCA) and Healthcare Failure Mode and Effects Analysis (HFMEA).
Note: Students cannot receive credit for both ISE 682 and ISE 482.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ISE 684. Health IT and Clinician Support **3 Units**
Term Typically Offered: Spring Only
Description: This course provides students an overview of various types of health information technology (IT) systems, as well as strategies, methods, and tools used to support the work and health of clinicians. This course also exposes students to applied tools and guidelines of the design and evaluation of health IT systems. Students will learn to use software to prototype high-fidelity, interactive user interfaces, and to conduct human factors evaluation on health IT systems based on the FDA guidelines. Documentation of such design and evaluation process will also be practiced with the semester project.
Note: Students cannot receive credit for both ISE 684 and ISE 484.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ISE 690. Master of Science Thesis in Industrial Engineering **1-6 Units**
Grading Basis: Pass/Fail
Prerequisite(s): Department Chair permission required.
Description: Research on MS thesis project. Grade shall be deferred by the major professor until evaluation of the thesis by the student's committee. Grade on pass-fail basis by the examining committee.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ISE 693. Independent Study in Industrial Engineering **1-12 Units**
Description: Opportunity for the student, under the supervision of a sponsoring faculty member, to pursue individualized study related to research or practice that is not included in regular courses in the curriculum.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ISE 694. Advanced Topics in IE **1-6 Units**
Prerequisite(s): Consent of instructor.
Description: An advanced course in Industrial Engineering topics not covered by regularly scheduled courses.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ISE 695. PhD Seminar **1 Unit**
Grading Basis: Pass/Fail
Term Typically Offered: Fall, Spring
Prerequisite(s): Consent of advisor.
Description: This course is a series of seminars covering topics related to Industrial Engineering (IE).
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ISE 699. Industrial Engineering Master's Degree Project **3 Units**
Prerequisite(s): Instructor permission required.
Description: The Industrial Engineering MS student carries out an engineering project under the supervision of a faculty mentor, prepares an acceptable written report, and presents a seminar on the project.
Note: Cross-listed with EM 699.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ISE 700. Dissertation Research in Industrial Engineering 1-18 Units
Grading Basis: Pass/Fail
Prerequisite(s): Department Chair permission required.
Description: Research on dissertation project. Grade will be deferred by the major professor until evaluation of the dissertation by the student's committee. Graded on a Pass/Fail basis by the examining committee. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)