

INDUSTRIAL ENGINEERING (IE)

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 (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>).

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 (<http://louisville.edu/bursar/tuitionfee>).

IE 240. Fundamentals of Industrial Engineering 3 Units

Term Typically Offered: Fall Only

Description: An introduction to the analysis and design of industrial systems; emphasis upon appropriate analytical and computer-based techniques and their applications to industrial systems.

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IE 250. Data Management and Spreadsheet Modelings for Industrial Engineering 3 Units

Term Typically Offered: Fall Only

Description: This course will develop analytical and modeling skills using Excel spreadsheets. Students will develop skills needed to analyze data in Excel and to build mathematical models in Excel. The course is divided into two parts. The first part is devoted to data analysis and management. Students will learn a comprehensive set of spreadsheet skills and tools, including how to design, build, test, and use a spreadsheet for data analysis. The second part of the course provides an introduction to the concepts and methods of Decision Science, which involves the application of mathematical modeling and analysis to management problems, with a focus on optimization models. It also provides a foundation in modeling with spreadsheets.

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IE 288. Industrial Engineering Cooperative Education Seminar 0 Units

Grading Basis: Pass/Fail

Term Typically Offered: Fall, Spring, Summer

Prerequisite(s): Eligibility for admission to the IE Department.

Description: Discussion of the policies and procedures for cooperative education and instruction in self-directed job search techniques, including interviewing skills, resume preparation, and guidelines for the co-op report. This is a prerequisite for each cooperative education term. For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

IE 289. Industrial Engineering Cooperative Education I 1 Unit

Grading Basis: Pass/Fail

Term Typically Offered: Fall, Spring, Summer

Prerequisite(s): IE 288, admission to academic department, and good standing within Speed School.

Description: Full-time technical work experience related to the student's academic program.

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>)

IE 320. Manufacturing Processes 4 Units

Term Typically Offered: Spring Only

Prerequisite(s): CHE 253.

Description: Principles of materials processing used in manufacturing; casting, forming, machining, welding, and related techniques such as numerical and computer control. Laboratory includes plant visits.

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

IE 360. Probability and Statistics for Engineers 3 Units

Term Typically Offered: Fall, Spring, Summer

Prerequisite(s): ENGR 102.

Description: Engineering applications using probability, random variables, distribution functions, confidence intervals, estimation and hypothesis testing.

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

IE 370. Engineering Economic Analysis 3 Units

Term Typically Offered: Fall, Spring, Summer

Prerequisite(s): ENGR 101.

Description: Methods for economic evaluation of engineering projects including, time value of money, equivalence, cost estimation, selection of alternatives, effects of depreciation, taxes and inflation, replacement analysis, sensitivity analysis, capital budgeting.

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IE 380. Work Design 3 Units

Term Typically Offered: Fall Only

Description: Work measurement as a basis for the industrial engineering profession. Engineering principles of work measurement, analysis and design. Methods engineering and time study. Predetermined motion time systems. Work sampling and standards. Computerized work measurement systems: ADAM and MOST. Job design and standardization of production.

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IE 389. Industrial Engineering Cooperative Education II **1 Unit**
Grading Basis: Pass/Fail
Term Typically Offered: Fall, Spring, Summer
Prerequisite(s): IE 289.
Description: Full-time work experience related to the student's academic program.
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>)

IE 393. Independent Study in Industrial Engineering **1-6 Units**
Term Typically Offered: Fall, Spring, Summer
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IE 421. Facility Location and Layout **3 Units**
Term Typically Offered: Fall Only
Prerequisite(s): IE 240.
Description: Design and layout of industrial facilities, facility location, space requirements, flow charts, relationship diagrams, material handling, quantitative layout techniques, production line balancing, and computer programs for layout planning.

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IE 425. Production and Inventory Control **3 Units**
Term Typically Offered: Spring Only
Prerequisite(s): IE 360 and IE 240.
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.

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IE 430. Quality Control **3 Units**
Term Typically Offered: Spring Only
Prerequisite(s): IE 360 and IE 240.
Description: 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.

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IE 489. Industrial Engineering Cooperative Education III **1 Unit**
Grading Basis: Pass/Fail
Term Typically Offered: Fall, Spring, Summer
Prerequisite(s): IE 288 and IE 389.
Description: Full-time technical work experience related to the student's academic program.
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.

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IE 499. IE Capstone Design - CUE **3 Units**
Term Typically Offered: Spring Only
Prerequisite(s): IE 380, IE 421, IE 425, and IE 430.
Description: This course requires the solution of a real-world design problem in industrial engineering. It uses the design and analysis tools learned in previous coursework and emphasizes teamwork, documentation and presentation skills.

Course Attribute(s): CUE - This course fulfills the Culminating Undergraduate Experience (CUE) requirement for certain degree programs. CUE courses are advanced-level courses intended for majors with at least 90 earned credits/senior-level status., 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.

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IE 515. Operations Research Methods **3 Units**
Term Typically Offered: Fall Only
Prerequisite(s): ENGR 330.
Description: 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.

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IE 516. Stochastic Operations Research **3 Units**
Term Typically Offered: Spring Only
Prerequisite(s): IE 360 or equivalent.
Description: A selection of the probabilistic topics of operations research are included: queuing, renewal and Markov processes, simulation, decision analysis.

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<p>IE 525. Project Management 3 Units Term Typically Offered: Fall, Spring, Summer Prerequisite(s): Admission in IE 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.</p> <p>For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)</p>	<p>IE 563. Experimental Design in Engineering 3 Units Term Typically Offered: Spring, Summer Prerequisite(s): IE 360. 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. Note: Cross-listed with CECS 563.</p> <p>For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)</p>
<p>IE 540. Robots and Manufacturing Automation 3 Units Term Typically Offered: Fall, Spring, Summer Prerequisite(s): IE 360. Description: Computer aided manufacturing; robot programming, implementation, application, and computer control; research trends; social impacts.</p> <p>For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)</p>	<p>IE 580. Introduction to Human Factors Engineering and Ergonomics 3 Units Term Typically Offered: Fall Only Description: The main goal of this course is to introduce students to the study of human cognitive and physical abilities and limitations, and application of that knowledge to engineering design. This course will demonstrate how the application of the human factors and ergonomics principles can improve the design of systems involving the interaction of humans with tools, technology, and the work environment.</p> <p>For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)</p>
<p>IE 541. Simulation 3 Units Term Typically Offered: Fall Only Prerequisite(s): IE 240, IE 250, and IE 360. Description: The use of discrete event simulation to analyze systems. Topics include Monte Carlo techniques, sampling from and identifying stochastic distributions, estimating performance measures from simulation outputs, validation methods, and SIMIO simulation language.</p> <p>For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)</p>	<p>IE 581. Advanced Topics in Human Factors Engineering 3 Units Term Typically Offered: Fall, Spring, Summer Prerequisite(s): IE 580. Description: 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.</p> <p>For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)</p>
<p>IE 561. Developing Decision Support Systems with Excel 3 Units Term Typically Offered: Fall, Spring Prerequisite(s): IE 250. Description: This course teaches the fundamentals of computer programming using Excel's macro language, Visual Basic for Applications (VBA), as the language of instruction. The course starts by teaching students to simplify and extend code generated by Excel's macro recorder and then builds on that base toward developing applications that analyze information and enhance decision making. This course also provides an introduction to the concepts and methods of Decision Science, which involves the application of mathematical modeling and analysis to management problems. It also provides a foundation for modeling with VBA in Excel.</p> <p>For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)</p>	<p>IE 585. Usability Engineering 3 Units Term Typically Offered: Spring Only Description: This course exposes students to the constructs of usability, usefulness, user-centered design, and user-experience (UX) and their relation to engineering design. The course covers an interactive evaluation-centered user experience (UX) lifecycle as a template intended to be instantiated in many different ways to match the constraints of a particular development project. The UX lifecycle, sketching, conceptual design, and formative UX evaluation.</p> <p>For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)</p>
	<p>IE 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.</p> <p>For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)</p>