Industrial Engineering (IE)

Courses

IE 411. Mechatronics I. 0-4 hours.
Elements of mechatronic systems, sensors, actuators, microcontrollers, modeling, hardware in the loop simulations, real time software, Electromechanical systems laboratory experiments. Course Information: Same as ME 411. 3 undergraduate hours. 4 graduate hours. Extensive computer use required. Prerequisite(s): Senior standing or above or approval of the department. Class Schedule Information: To be properly registered, students must enroll in one Laboratory and one Lecture.

IE 412. Dynamic Systems Analysis I. 3 or 4 hours.
Classical control theory, concept of feedback, laplace transform, transfer functions, control system characteristics, root locus, frequency response, compensator design. Course Information: Same as ME 412. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): ME 308.

IE 441. Ergonomics & Human Factors. 3 or 4 hours.
The study of principles and techniques associated with ergonomic problems. Topics include human information input and processing, human output and control, and ergonomic considerations in safety. Course Information: Same as EOHS 441. Previously listed as IE 341. 3 undergraduate hours; 4 graduate hours. Prerequisite(s): Credit or concurrent registration in IE 342 or consent of the instructor.

IE 442. Design &Analysis of Experiment. 0-4 hours.
Covers different methods for statistical design of engineering experiments, executing them and analyzing their results. Course Information: Prerequisite(s): IE 342. Class Schedule Information: To be properly registered, student must enroll in one Lecture-Discussion and one Laboratory-Discussion.

IE 444. IPD Product Development I. 3 or 4 hours.
Cross-functional teams (w/students from AD 420/423 and MKTG 594) research and develop new product concepts. Focus on the identification of technologically appropriate product design problems. Course Information: Same as ME 444. 3 undergraduate hours. 4 graduate hours. Year-long (with IE/ME 445) project course. Prerequisite(s): Senior standing or above; and consent of the instructor.

IE 445. IPD Product Development 2. 4 hours.
Cross-functional teams (w/students from AD 420 and MKTG 594) research and develop new product concepts. Focus on solutions to the opportunities identified in IE/ME 444 to functional prototypes. Serves as a replacement for IE/ME 396. Course Information: Same as ME 445. Year-long (with IE/ME 444) project course. Prerequisite(s): IE 444 or ME 444; and senior standing or above; and consent of the instructor.

IE 446. Quality Control & Reliability. 3 or 4 hours.
Principles of quality control and reliability. Timeseries and regression analysis; quality control charts; hypothesis testing; and estimation of parameters and confidence intervals. Course Information: 3 undergraduate hours. 4 graduate hours. Prerequisite(s): IE 342.

IE 461. Safety Engineering. 3 or 4 hours.
Human protection systems; accident and emergency handling; manufacturing and service hazard systems. Course Information: Same as EOHS 460. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): IE 342 or consent of the instructor.
IE 473. Stochastic Processes & Queuing. 3 or 4 hours.
Stochastic dynamic systems, queuing networks, probabilistic state transition models and nondeterministic decision making models. Course Information: 3 undergraduate hours. 4 graduate hours. Prerequisite(s): IE 342 and Credit or concurrent registration in IE 471 and MATH 210.

IE 494. Special Topics in Indust Engr. 3 or 4 hours.
Particular topics vary from term to term depending on the interests of the students and the specialties of the instructor. Course Information: 3 undergraduate hours. 4 graduate hours. May be repeated. Prerequisite(s): Consent of the instructor.

IE 496. Undergrad Sen Design Thesis I. 0-8 hours.
Introduction to the principles and practice of product design: specifications, evaluation of design alternatives, technical reports, and oral presentations, through independent design projects. Course Information: Same as ME 496. Credit only given to nondegree students. No graduation credit given to students enrolled in Engineering. Extensive computer use required. Field trips required at a nominal fee. Prerequisite(s): Consent of the instructor.

IE 497. Undergrad Sen Design Thesis II. 0-8 hours.
Course Information: Same as ME 497. Credit only given to nondegree students. No graduation credit given to students enrolled in Engineering. Extensive computer use required. Field trips required at a nominal fee. Prerequisite(s): Consent of the instructor.

IE 499. Prof Development Seminar. 0 hours.
Students are provided general information about their role as UIC alumni in society and the role of the University in their future careers. Students provide evaluations of their educational experience in the MIE department. Course Information: Satisfactory/Unsatisfactory grading only. Prerequisite(s): Open only to seniors; and approval of the department. Must be taken in the student's last semester of study.

IE 511. Mechatronics II. 4 hours.
Microcontrollers used in electro-mechanical systems for measurement and control purposes, interface hardware, real time software and development tools, applications in robotic motion control and factory automation. Course Information: Same as ME 511. Prerequisite(s): ME 411 and consent of the instructor. Class Schedule Information: To be properly registered, students must enroll in one Laboratory and one Lecture.

IE 525. Exercise Tech & Disability. 3 hours.
Applications of new and emerging technologies to promote participation in and adherence to healthful physical activity by people with disabilities. Considers ways of redesigning physical, social and attitudinal environments to achieve these outcomes. Course Information: Same as DHD 525. Recommended background: DHD 515 or an equivalent course on interpreting research findings.

IE 542. Adv Comp Mthds-P&P Design. 4 hours.
Deterministic and statistical models for modeling and optimizing engineering systems, in the broad context of product design, manufacturing process development, and designing for life cycle issues. Course Information: Same as ME 542. Prerequisite(s): Programming language experience.

IE 552. Applied Stochastic Processes. 4 hours.
Stationary point processes; Markov renewal theory; semi-Markov processes; regenerative processes; computational methods and applications to queues, inventories, dams, and reliability. Course Information: Prerequisite(s): IE 342.

IE 562. Supervisory Control of DES. 4 hours.
Discrete event systems; languages and automata, supervisory control, timed models, supervisory control applications. Course Information: Extensive computer use required.

IE 565. Expert Syst in Manufacturing. 4 hours.
Industrial uses of expert systems; applicability to industrial processes; availability of commercial expert systems; design and implementation of expert systems; knowledge engineering, research uses of expert systems. Course Information: Prerequisite(s): CS 102 or CS 107 or the equivalent.

IE 567. Data Mining & Machine Health. 4 hours.
Theories and techniques of data mining to machinery health diagnosis and prognosis, case studies on rotor shafts, bearing, gearboxes fault diagnosis and remaining useful life prognosis.

IE 569. Adv Virtual Manufacturing. 4 hours.
Manufacturing systems design optimization using virtual environments, optimization of manufacturing decision support using virtual reality interfaces, analysis and evaluation of virtual environments. Course Information: Same as ME 569. Prerequisite(s): Consent of the instructor.

IE 571. Stat Qual Control & Assurance. 4 hours.
The importance of quality in products and services, quality surveillance, Deming's management method, Ishikawa's seven tools, control charts, acceptance sampling, quality improvement using directed experiments. Course Information: Same as IDS 571. Prerequisite(s): At least one term of statistics.

IE 575. Integer & Comb Optimization. 4 hours.
Modeling, computational complexity, polyhedral theory, valid inequalities, duality and relaxation, branch-and-bound algorithms, cutting plane algorithms, heuristic algorithms, and real-world application. Course Information: Prerequisite(s): IE 471.

IE 576. Nonlinear Optimization. 4 hours.
Convex analysis, line search techniques, unconstrained and constrained optimization, optimality conditions, duality, convex and nonconvex optimization, large-scale optimization, and real-world applications. Course Information: Prerequisite(s): IE 471 or the equivalent.

IE 594. Current Topic in Indust Engr. 4 hours.
Particular topics vary from term to term depending on the interests of the students and the specialties of the instructor. Course Information: May be repeated. Prerequisite(s): Consent of the instructor.

IE 595. Industrial Engineering Seminar. 0-1 hours.
Advances in Industrial Engineering research will be discussed in a seminar setting. Course Information: Satisfactory/Unsatisfactory grading only. Must be taken every semester by all registered MS and PhD students in Industrial Engineering. Students taking the course for one credit hour submit reflective summaries of the presentations. Prerequisite(s): Graduate standing in industrial engineering.

IE 596. Indep Study in Indust Engr. 1-4 hours.
Individual study under close supervision of a faculty member. Course Information: May be repeated to a maximum of 4 hours. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.
IE 598. MS Thesis Research. 0-16 hours.
Individual research in specialized problems under close faculty supervision. Course Information: Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Consent of the instructor.

Individual research on specialized problems under close faculty supervision. Course Information: Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Consent of the instructor.