

Department of Industrial and Enterprise Systems Engineering
 Elective Course Offerings
 Fall 2009

For more detail, see posted notices, contact instructor, or consult <http://courses.illinois.edu/>.

GE Undergraduate Curriculum

+ Course is a Design Elective

IE Undergraduate Curriculum

* Course is a Human Factors Elective

Course is a Manufacturing Elective

^ Course is an Operations Research Elective

@ Course is an M&IE Elective

& Course is a Technical Elective

Some courses may fit into several categories, but you may not use one course to fulfill more than one requirement.

UNDERGRADUATE ELECTIVES

GE 361, RLP: Emotional Intelligence Skills

Through innovative experiences both in and out of the classroom, *Engineering Emotional Intelligence* will help you determine your own EQ (Emotional Quotient), and show you how to develop the interpersonal, communications and leadership skills crucial for personal and professional success.

CRN	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
30288	3 hrs	4-5:15 pm 9 am-1:20 pm	MW One Saturday	203 TB TBA	R. Price	Sophomore standing & above

GE 410, E: Component Design +&

Design of basic engineering components: structural members, machine parts, and connections. Principles applied include: material failure (yield, fracture, fatigue); buckling and other instabilities; design reliability; analytical simulation.

CRN	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
30294	3 hrs	1-1:50 pm	MWF	TBA	TBA	GE 311 & GE 320

IE 199, REW: Computer Simulation

CRN	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
20426	3 hrs	12:30-1:50 pm	TR	51 DKH	R. Engelbrecht-Wiggans	Chancellor's Scholars only

UNDERGRADUATE - GRADUATE

GE 411, G1 & U: Reliability Engineering &

Design of basic engineering components: structural members, machine parts, and connections. Principles applied include: material failure (yield, fracture, fatigue); buckling and other instabilities; design reliability; analytical simulation.

CRN	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
37670 G1	4 hrs	2-3:20 pm	TR	203 TB	TBA	GE 331 or IE 300 Graduate standing required
37669 U	3 hrs	2-3:20 pm	TR	203 TB	TBA	GE 331 or IE 300 Undergraduates only

GE 420: Digital Control Systems +&

Examines theory and techniques for control of dynamic processes by digital computer; linear discrete systems, digital filters, sampling signal reconstruction, digital design, state space methods, computers, state estimator, laboratory techniques.

CRN	TYPE	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
32187	Lec AE1	4 hrs	10-10:50 am	MWF	203 TB	L. Wozniak	GE 320
32180	Lab AB1		3-5:50 pm	M	302 TB	D. Block	
32182	Lab AB2		3-5:50 PM	W	302 TB	D. Block	

GE 421: Introduction to Robotics &

Fundamentals of robotics, rigid motions, homogeneous transformations, forward and inverse kinematics, velocity kinematics, motion planning, trajectory generation, sensing, vision, and control. *Same as ECE 470.*

CRN	TYPE	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
36965	Lec AL1	4 hrs	11 am-12:20 pm	TR	TBA	T. Bretl	MATH 415 or 418 ECE 210 or GE 320
36931	Lab AB1		1-2:50 pm	T	267 Everitt	TBA	
36951	Lab AB2		1-2:50 pm	R	267 Everitt	TBA	
41575	Lab AB3		3-4:50 pm	T	267 Everitt	TBA	

GE 450, AA/AEA: Decision Analysis I ^

Examines rules of thought that transform complex decision situations into simpler ones where the course of action is clear. Practical application of decision analysis in large organizations; methods to generate insights into real-life decision problems, avoid the common pitfalls in decision processes, and overcome the possible barriers to implementing a high-quality decision-making process for individual and organizational decision making; graphical representations of decision problems such as decision diagrams and utility diagrams.

CRN	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
52698	3-4 hrs	2-3:20 pm	MW	203 TB	A. Abbas	Junior standing or above in engineering or applied science.

GE 461/TE 461, A: Technology Entrepreneurship &

Critical factors affecting technology-based ventures: opportunity assessment; the entrepreneurial process; founders and team building; and preparation of a business plan including market research, marketing and sales, finance, and manufacturing considerations. *Same as TE 461.*

CRN	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
50649 GE 50650 TE	3 hrs	1-2:20	TR	TBA	B. Lilly	MATH 231

IE 400: Design & Anlysis of Experiments @&

Concepts and methods of design of experiments for quality design, improvement and control; simple comparative experiments, including concepts of randomization and blocking, and analysis of variance techniques; factorial and fractional factorial designs; Taguchi's concepts and methods; second-order designs, response surface methodology. All topics are treated through engineering applications and case studies.

CRN	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
30400	3 hrs (ugrad) 3 or 4 hrs (grad)	12-1:20 pm	MW	203 TB	TBA	IE 300

IE 410: Stochastic Processes & Applic ^&@

Modeling and analysis of stochastic processes. Familiarity with discrete-time Markov chains, Poisson processes, and birth-and-death processes is assumed. Topics include the transient and steady-state behavior of continuous-time Markov chains; renewal processes; models of queuing systems (birth-and-death models, embedded-Markov-chain models, queuing networks); reliability models; and inventory models.

CRN	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
30396	3 hrs (ugrad) 3 or 4 hrs (grad)	4-4:50	MWF	TBA	TBA	IE 310

IE 412: OR Models for Mfg Systems ^&@

Provides an introduction to the use of operations research techniques to problems in manufacturing and distribution. Topics covered include single and multi-stage lot sizing problems, scheduling and sequencing problems, and performance evaluation of manufacturing systems.

CRN	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
30397	3 hrs (ugrad) 3 or 4 hrs (grad)	10-11:15 am	MW	TBA	TBA	IE 310

IE 445: Hum Perf and Eng Psych *@&

Human capabilities and limitations in processing information; models and theories of signal detection, stimulus analysis, short-term memory, choice reaction time, decision-making, attention, and motor performance are evaluated with respect to experimental data; emphasizes theory, although implications for design of man-machine systems are considered.

CRN	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
37985	4 hrs (grad)	3:30-4:45 pm	TR	32 Psych	W. Fu	PSYC 100 or 103
42726	3 hrs (ugrad & grad)			Bld		
44058	4 hrs (grad)	12:30-1:45 pm	TR	32 Psych	D. Morrow	PSYC 100 or 103
44057	3 hrs (ugrad & grad)			Bld		

IE 485, C: MEMS Devices & Systems @&

Presents an introduction to the principles, fabrication techniques, and applications of microelectromechanical systems (MEMS). Gives an in-depth understanding of sensors and actuator principles and integrated microfabrication techniques for MEMS. It also consists of a comprehensive investigation of the state-of-the-art MEMS devices and systems. *Same as ECE 485.*

CRN	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
36992	3 hrs	9:30-10:50 am	TR	245 Everitt	B. Cunningham	Senior standing in the College of Engineering

GRADUATE**GE 523, A: Discrete Event Dynamic Systems**

Introduction to modeling, analysis, control, and performance evaluation of discrete event dynamic systems (DEDS), characterized by state changes only at discrete points in time in response to the occurrence of particular events and which therefore may have logical or symbolic values rather than numerical ones. Discrete-state/discrete/event models decidability, computational issues, forbidden-state problems, forbidden-string problems, enforcing safety and liveness properties via supervision, generalized semi-Markov processes, sensitivity analysis via likelihood ratio and infinitesimal perturbation methods.

CRN	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
53233	3 or 4 hrs	1-2:15 pm	MW	TBA	R. Sreenivas	CS 173 or MATH 213; CS 225; MATH 215; MATH 461

GE 524, A: Data-Based Systems Modeling

Identification and building of mathematical and computational models directly from data. An overview of systems and model types, such as state-space models and distributed parameter model; parametric estimation methods, such as regression and last-squares methods; recent subspace identification methods; data preprocessing techniques; model validation methods. Applications to a wide range of dynamical systems, including biological systems, electro-mechanical systems, economic systems are reflected in assignments.

CRN	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
53234	4 hrs	10:30-11:50 am	MW	206 TB	C. Beck	GE 331 & GE 424

GE 530, P: Multiattribute Decision Making

Provides the student with background and practice in applying tools for subjective multiple attribute decision making when present or future states of nature are uncertain. Includes exploration of current research in developing computer aids to decision making. Discusses issues in descriptive versus normative approaches in the context of the interface between operations research and artificial intelligence. Covers multiattribute utility analysis from theoretical foundations through assessment procedures, practice, and pitfalls of potential cognitive bases.

CRN	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
37683	4 hrs	9-10:15 am	MW	203 TB	D. Thurston	GE 331 or CEE 202

GE/TE 560, A: *Managing Advanced Technol I*

Focuses on the business side of managing advanced technology in industry: strategic context of advanced technology; analytical financial tools used to estimate the potential value of advanced technology; legal concepts important in managing advanced technology; interpersonal issues related to leading, and advocating on behalf of advanced technology groups.

CRN	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
50538 GE 50539 TE	1 hr	3-5:15 pm	F	101 TB	B. Vojak	Graduate standing required

IE 510: *Applied Nonlinear Programming*

Optimization of nonlinear systems, including: a survey of classical methods and concepts such as the Lagrangian method, the Jacobian method, and Kuhn-Tucker conditions; modern algorithms; numerical methods for digital computers; applications in engineering design; use of state-of-the-art computer codes.

CRN	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
42952	4 hrs	1-4:30 pm	T	TBA	TBA	IE 310

IE 513: *Optimal System Design*

Fundamental theories for optimal product realization: (1) product planning-demand modeling, customers' preference analysis, and profit modeling under uncertainty; (2) product design-fundamental of engineering optimization theory; (3) product development-analytical problem formulation to achieve the performance targets assigned at the enterprise level and the engineering design level. Core components of modeling, solving, and validating optimization models using quantitative mathematical criteria. An individual or group term project is required.

CRN	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
53146	4 hrs	11 am-12:40 pm	TR	TBA	H. Kim	GE 330 or IE 310