

Department of Industrial and Enterprise Systems Engineering  
 Elective Course Offerings  
 Fall 2008

For more detail, see posted notices, contact instructor, or consult <http://courses.uiuc.edu/cis/index.html>.

**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	TBA TBA	S. Williams	Sophomore standing & above

**GE 398, RLP: Engaging Leaders**

CRN	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
39684	1 hr	12-12:50 pm	T	101 TB	R. Price	Junior 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	101 TB	TBA	GE 311 & GE 320

**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	101 TB	TBA	GE 320
32180	Lab AB1		3-6 pm	M	302 TB	D. Block	
32182	Lab AB2		3-6 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	11:30-12:50	TR	TBA	S. Hutchinson	MATH 415 or 418 ECE 210 or GE 320
36931	Lab AB1		1-2:50 pm	T	267 Everitt	S. Hutchinson	
36951	Lab AB2		1-2:50 pm	R	267 Everitt	S. Hutchinson	
41575	Lab AB3		3-4:50 pm	T	267 Everitt	S. Hutchinson	

**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	3 hrs	4-4:50 pm	T	203 TB	B. Lilly	MATH 231
50650 TE		4-5:40 pm	R	203 TB		

**GE 498, AA/AEA: Decision Analysis I ^**

Decision Analysis I is the first course in the sequence of decision analysis classes. Throughout the course, we will develop rules of thought that will transform complex decisions into simpler decision situations where the course of action is clear. We will create powerful distinctions that will improve your personal decision making and enable you to help others with their own decisions.

CRN	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
41445 AA	3 hrs	2-3:20 pm	MW	TBA	A. Abbas	Junior standing or above in engineering or applied science.
42751 AEA	4 hrs					

**GE 498, AY: Intro to Syst & Entrepren Engr**

CRN	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
40003	4 hrs	3-4:15 pm	MW	203 TB	A. Yassine	Senior standing or above in engineering

**GE 498, EGE: An Entrepr Appr to Green Engr**

As in the past, the future business opportunities for engineers and scientists will involve solving the world's biggest and most important problems. Technological breakthroughs in pollution control, resource utilization, and protecting human health and the environment will drive new businesses, services, and potentially create a business revolution on the scale of the industrial revolution. This course is designed to introduce engineering students to global environmental issues in the context of applying entrepreneurial principals and market forces towards solutions. Students will actively engage in the examination of a critical environmental issue in their particular engineering discipline and explore solutions that make sense in a free enterprise business framework. It is envisioned that this course and similar courses can change the prevailing notion that entrepreneurship is inherently in conflict with the over consumption of goods and natural resources, and that entrepreneurs themselves are not particularly concerned about the social welfare of the planet.

CRN	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
50172	3 hrs	6-8:20 pm	T	101 TB	B. Lilly	Senior Standing in the College of Engineering

**GE 498, JMF: Sales & Marketing for Engrs**

With today's highly competitive global markets, products cannot be created in a vacuum. Engineers (and inventors), as the product creators, must intimately understand the markets their products are created for. Successful engineers understand the basic principles of marketing and sales and how these principles apply to product innovation. This course will introduce students to relevant marketing and sales topics and provide a foundation for applying these principles through the use of real-world cases. Topics include: engineering perspective on marketing and sales; customer-centric communication; establishing influence; methods of customer interaction; and channels of distribution, as well as the keys to marketing yourself.

CRN	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
50171	2 hrs	4-5:50	MW	TBA	R. Clifton	Senior standing.

**GE 498, JMK: Business Technical Consulting**

In this course, we will not generalize about consulting or recommend a "best way" but will provide a comprehensive and balanced picture of the consulting process. Although we do not recommend a "best way" of consulting, we do recommend a form of consulting in which (i) the consultant shares expertise with the client instead of trying to keep it to him or herself; (ii) the client participates as closely and intensively as possible in the assignment; and (iii) both parties spare no effort to make the assignment a valuable learning experience.

CRN	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
50206	4 hrs	2-3:40 pm	TR	TBA	J. Kurtz	Junior standing or above.

**GE 498, LF: Intro to Financial Engineering**

CRN	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
41276	3 hrs	1-2:15 pm	TR	TBA	L. Feng	GE 331 or IE 300

**GE 598, SC: Venture Funded Startups**

Venture Capital has become an increasingly important source of financing for technology based startups over the past 15 years. However, the process and task of raising venture capital remains largely a black art to students and first time entrepreneurs. Without much prior knowledge they are often forced to negotiate terms of investment with professional investors largely on their own, sometimes making costly mistakes! This course is designed to introduce students to the concepts, tools and language used by Venture Capitalists (VC's). In particular we will look at how VC's evaluate, value, and structure new companies.

CRN	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
50660	1 hr	4-4:50 pm	F	203 TB	S. Chopra	MATH 463, GE 598 FEM, GE 598 IS, GE/TE 461 For seniors and graduate students only.

**IE 400: Design & Anlys 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	TBA	S. Kapoor	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)	3-4:15 pm	MW	1109 Siebel	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 Bld	W. Fu	PSYC 100 or 103
42726	3 hrs (ugrad & grad)					
44058	4 hrs (grad)	12:30-1:45 pm	TR	31 Psych Bld	D. Morrow	PSYC 100 or 103
44057	3 hrs (ugrad & grad)					

**IE 451: Num Control of Mfg Processes #@&**

Study of numerical control systems, manufacturing processes, principles and practices basic to numerical control, and programming methodology for numerical control.

CRN	TYPE	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
31824	Lec AL3	3 hrs (grad)	2-2:50 pm	MW	203 TB	TBA	CS 101 & ME 350
43295	Lec AL4	4 hrs (grad)					
31827	Lec ALU	3 hrs (ugrad)					
43298	Lab AB1		12-1:50 pm	F	1228 MEL	TBA	
43300	Lab AB2		2-3:50 pm	F	1228 MEL	TBA	

**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.	10-11:20 am	TR	TBA	B. Cunningham	Senior standing in the College of Engineering

**GRADUATE****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 531, S: Genetic Algorithm Methods**

Genetic algorithms search--procedures based on the mechanics of natural genetics and natural selection--are finding increased application to the difficult problems of engineering, science, and commerce. This course surveys what genetic algorithms are, where they come from, how they work, and how and where they have been applied.

CRN	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
30321	4 hrs	3-4:50 3-3:50	T R	101 TB	D. Goldberg	CS 101 & MATH 241

**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	

**GE 598, AN1: *Convex Optimization***

CRN	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
51282	4 hrs.	1-2:40	TR	101 TB	A. Nedich	

**GE 598, AY1: *Product & Market Development for Subsistence Marketplaces***

This exciting new course is a joint initiative between the College of Business and the College of Engineering. This course is targeted at second year MBAs and Masters Students in Engineering. In this course you will build real world skills in product development, marketing, cost accounting, project finance, engineering development, and manufacturing development. You will gain real world experience in developing new products and services, interact extensively with corporations and faculty in engineering and business, learn how to segment, target, and position new products in subsistence marketplaces, and learn how to work effectively on cross-functional teams. The course includes an optional field trip to India to learn about your market first hand, to be scheduled based on mutual convenience over a week during winter break. Subsidized student costs for those opting for the field trip is roughly \$1000, although attempts will be made to subsidize the trip further. Course enrollment is by application only, due March 16<sup>th</sup>. The first course may be taken separately, however room in the second course is not guaranteed. Priority will be given to students planning to register in the two course sequence.

CRN	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
47679	4 hrs.	6-8:50 pm	M	215 TB	A. Yassine M. Viswanathan	Instructor approval required.

**GE 598, FEM: *Financing for Engineering Mgmt***

This class covers the cornerstone concepts of finance for engineers managing new or mature technology companies. A total of 16 segments of 1 hour each will cover topics including: reading and analysis of balance sheets, income statements, day-to-day operations of practical accounting and finance, valuation concepts for new ventures including pre/post funding valuation, term sheet items, etc. The class will also cover the foundational concepts of portfolio analysis. This course applies to the GE/TEC graduate certificate program in Strategic Technology Management.

CRN	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
41135	2 hrs	1-2:50 pm	W	TBA	J. Morris	Probability & statistics, Incl. MATH 463, STAT 400, or equivalent; Graduate standing.

**GE 598, HMK: *Optimal Product Design & Devel***

This course is designed to address the fundamental theories for optimal product realization (planning, design and development): 1) Product planning involves demand modeling, customers' preference analysis, and profit modeling under uncertainty, 2) Product design involves the fundamentals of engineering optimization theory, 3) Product development involves analytical problem formulation to achieve the performance targets assigned at the enterprise level and the engineering design level. Students will learn core components of modeling, solving, and validating optimization models in a mathematically rigorous manner. Individual or group semester project is required.

CRN	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
42849	4 hrs	11am-12:40pm	TR	TBA	H. Kim	MATH 225; recommended: Prior knowledge on algorithm & optimization Engineering graduates only

**GE 598, JP: Optimization in Finance**

Introduces and discusses both continuous (including linear, quadratic, conic, robust, and stochastic programming problems) and discrete optimization problems (including integer programming and dynamic programming problems) encountered in financial models.

CRN	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
51334	3 hrs	3-4:15	MW	TBA	J. Peng	

**GE 598, RLP: Conducting Leadership**

CRN	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
50692	2 hrs	5:30-7:20 pm	M	TBA	R. Price	

**IE 598, NS: Game Theory Models, Appl & Algrthm**

This course provides an introduction to game-theoretic models, with a focus on the theory and algorithms for the solution of equilibrium problems over continuous strategy sets. Specifically, we will develop convergence theory for centralized and distributed approaches for the solution of a variety of game-theoretic problems. Course topics will include fixed-point theorems, Nash equilibrium problems, generalized Nash equilibrium problems and Stackelberg equilibrium problems. We will draw on applications from communication networks, electricity markets, supply-chain networks and traffic equilibrium problems. Students will be expected to implement some of the algorithms on Matlab.

CRN	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
50019	4 hrs	1-2:40 pm	MW	TBA	A. Nedich V. Shanbhag	Basic background in Linear Algebra and Multivariate Calculus