Department of Industrial and Enterprise Systems Engineering

Elective Course Offerings

Spring 2010

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

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

UNDERGRADUATE ELECTIVES

GE 298, DLT: *Special Topics: Sustainable e-Waste Design*
Ever wonder what happens to your e-Waste, that old computer or cell phone you discarded? Are you concerned that chemicals from land fills are harming the environment? If so, here is your chance to do something about it by creating innovative new uses for e-Waste.

CRN	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
53402	3 hrs	6:30-7:50 pm	R	TBA	Bullock, W.	

GE 361, RLP: *Emotional Intelligence Skills*
Understanding emotions in ourselves and others. Assessment and improvement of interpersonal skills and emotional intelligence competencies including self-regulation, motivation, empathetic listening, communication, influence collaboration and cooperation, conflict management, leadership, teamwork, and managing change. Includes one Saturday laboratory session.

CRN	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
33096	3 hrs	3:30-4:50 pm	TR	TBA	Price, R.	Sophomore standing & above

GE 402, A: *Comp-Aided Product Realization (IE Technical Elect)*
Computer-aided design, analysis, and prototyping tools used in the produce development process. Principles of computer graphics and geometric modeling, including transformations, coordinate systems, parametric solid modeling, spline curves, and surface modeling. Finite element and kinematics analyses. Rapid prototyping, product dissection, CAD-CAM-CAE operability issues, and CAD collaboration tools.

CRN	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
50864	3 hrs	12:30-1:50 pm	TR	101 TB	Leake, J.	GE 101, 331, Jr. standing & above

GE 410, E: *Component Design (GE Design Elect, IE Technical Elect)*
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
33212	3 hrs	3-3:50 pm	MWF	203 TB	TBA	GE 311 & GE 320

UNDERGRADUATE - GRADUATE

GE 412, R: *Nondestructive Evaluation (IE Technical Elect)*
Nondestructive Evaluation (NDE) principles and the role of NDE in design, manufacturing, and maintenance. Primary Nondestructive Testing and Evaluation (NDT&E) techniques, introduced from the fundamental laws of physics, including visual, ultrasonic, acoustic emission, acousto-ultrasonic, radiology, electro-magnetic, eddy-current, penetrant, thermal, and holographic. Industrial applications of probability of flaw detection, material properties characterization, impact and fatigue damage evaluation, adhesion, etc. Current literature.

CRN	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
39435	3 or 4 hrs	1-2:15 pm	TR	203 TB	TBA	CEE 300

GE 423: *Mechatronics (GE Design Elect, IE Manufacturing Elect, IE Technical Elect)*
Mechatronics concepts and practice: computer interfacing of physical devices (sensors, actuators); data acquisition; real time programming and real time control; human-machine interfaces; design principles of mechatronics in manufacturing systems and in consumer systems.

CRN	TYPE	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
33223	Lec AL1	3 hrs	11-11:50 am	MW	203 TB	Block, D	GE 320
33221	Lab AB1		3-5:50 pm	T	302 TB	Block, D	
33222	Lab AB2		3-5:50 pm	R	302 TB	Block, D	

GE 461/TE 461, A: *Technology Entrepreneurship (IE Technical Elect)*
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
48500 GE 48501 TE	3 hrs	6-8:30 pm	R	203 TB	Lilly, B.	MATH 231

GE 462, P: *Leading Sustainable Change (IE Technical Elect)*
Theories and process of change; systems thinking concerning change consequences; building coalitions and communities to support change; implementing and managing projects effectively. Processes to plan, implement, manage, and sustain change with an organization through alignment of change strategies with organizational and individual concerns.

CRN	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
52532	3 hrs	3:30-4:50 pm	MW	TBA	Price, R.	Junior standing and above.

GE 498: *Special Topics: Sustainable e-Waste Design*
Ever wonder what happens to your e-Waste, that old computer or cell phone you discarded? Are you concerned that chemicals from land fills are harming the environment? If so, here is your chance to do something about it by creating innovative new uses for e-Waste.

CRN	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
53404	3 hrs	6:30-7:50 pm 8:00-9:10 pm	R R	TBA	Bullock, W.	Undergraduate juniors and seniors only
53405	4 hrs	6:30-7:50 pm 8:00-9:10 pm	R R	TBA	Bullock, W.	Graduate students only

IE 411, E3/E4: *Optimization of Large Systems (IE M & IE Elect, IE Operations Research Elect, IE Technical Elect)*
Practical methods of optimization of large-scale linear systems including extreme point algorithms, duality theory, parametric linear programming, generalized upper bounding technique, price-directive and resource-directive decomposition techniques, Lagrangian duality, Karmarkar's algorithm, applications in engineering systems and use of state-of-the-art computer codes.

CRN	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
34267 34269	3 hrs E3 4 hrs E4	2-2:50 pm	MWF	203 TB	TBA	IE 310 & MATH 415. E4 section-grads only

IE 413, G3/G4: *Simulation*
Introduction to the use of discrete-event simulation in the modeling and analysis of complex systems using a simulation package. Topics covered: components of simulation software, including data structures and event-list processing; verification and validation of simulation models; input modeling, including selection of probability distributions and random variate generation; statistical analysis of output data.

CRN	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
43422 43424	3 hrs. G3 4 hrs. G4	3-3:50 pm	MW	TBA	TBA	CS 101 & IE 310. G4 section-grads only
53236	Lab AB1	4-4:50 pm	M	TBA	TBA	
53237	Lab AB2	4-4:50 pm	W	TBA	TBA	

IE 431: *Quality Engineering (IE M & IE Elect, IE Technical Elect)*
Quality Engineering principles and the Six Sigma Define-Measure-Analyze-Improve-Control (DMAIC) process. Application of concepts and methods of statistical process control, designed experiments, and measurement systems analysis to cases of quality and productivity improvement; application of the fundamentals of quality engineering and the Six Sigma to areas of produce development, service enterprise, and manufacturing processes.

CRN	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
50867	3 hrs	11 am-12:15 pm	MW	410B1 EH	Kim, H.	GE 331 or IE 300

IE 445, BG4/BU3: *Hum Perf and Eng Psych (IE Human Factors Elect, IE M & IE Elect, IE Technical Elect)*
Same as AVI 456 and PSYC 456
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
39905 39906	3 hrs. (undergrads) 4 hrs. (grads)	12:30-1:45 pm	TR	32 Psych. Bldg.	McCarley, J.	PSYC 100 or 103

IE 446, AL1/AB1/AB2: *Hum Comp Interaction Lab (IE Human Factors Elect, IE M & IE Elect, IE Technical Elect)*
Same as AVI 429and Psych 429
Examines basic concepts, methodology, and critical skills needed in conducting research, evaluating and designing human-computer interfaces. Laboratory includes performing experiments in human-computer interaction.

CRN	TYPE	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
46317	Lec AL1	4 hrs.	12-1:50 pm	M	29 Psych. Bldg.	Fu, W.	PSYC 224, 358 or 456; and a course in CS.
46318	Lab AB1		10-11:50 am	W	219A Psych. Bldg.	Fu, W. & Moon, J.	
46319	Lab AB2		2-3:50 pm	W	219A Psych. Bldg.	Fu, W. & Moon, J.	

GRADUATE

GE 520, R: *Analysis of Nonlinear Systems* Same as ECE 528 and ME 546
First-level graduate course on the analysis on nonlinear dynamical systems, covering topics such as nonlinear dynamics, vector fields and flows, Lyapunov stability theory, regular and singular perturbations, averaging, integral manifolds, input-output and input-to-state stability, and various design applications in control systems and robotics.

CRN	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
33987	4 hrs.	9:30-10:50 am	TR	TBA	TBA	ECE 515 & MATH 385

IE 524, P: *Optimization in Finance*
Basic optimization models, theory and methods for financial engineering including linear, quadratic, nonlinear, dynamic integer, and stochastic programming; applications to portfolio selection, index fund tracking, asset management, arbitrage detection, option pricing and risk management; optimization software for classes of optimization problems. Projects requiring building optimization models based on financial market data and solutions using optimization solvers.

CRN	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
53154	4 hrs.	3-4:40 pm	MW	101 TB	Peng, J.	FIN 500 & MATH 415

IE 598, NK: *Special Topics: Information Theory for Operations Research*
This course provides an introduction to information-theoretic approaches to addressing problems in operations research, with a focus on universal schemes for decision (or prediction), gambling, and portfolio selection. Application of such approaches are in aggregation of expert opinions where the expert opinions concern the prediction of the outcome of an uncertain event, universal schemes for sequential investment in stock market, etc. Apart from students in IESE, this course would be of interest to students from math, ECE, computer science, economics, and finance. No prior background in information theory is necessary.

CRN	CREDIT	TIME	DAYS	LOCATION	INSTRUCTOR	PREREQUISITE
53155	4 hrs.	2-3:40 pm	TR	204 TB	Kiyavash, N.	One of MATH 464, MATH 564 or ECE 534

IE 598, NS: *Special Topics: 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
52238	4 hrs.	2-5:20 pm	T	TBA	Shanbhag, V. and Nedich, A.	Basic background in Linear Algebra and Multivariate Calculus