Course Schedule - Spring 2006

Electrical and Computer Engineering

101 ***Exploring Digital Info Tech*** Credit: 3 hours.

Principles and processes for the development of information technologies: digital music, digital images, digital logic, data compression, error correction, information security, and communication networks. Laboratory for design of hardware and software, and experiments in audio and image processing. Intended for students outside the College of Engineering. Credit is not given to students enrolled in Electrical or Computer Engineering

This course satisfies the General Education Criteria for a Physical Sciences course.

CRN	Type	Section	Time	Days	Location	Instructor
39895	laboratory	ABB	10:00 AM - 11:50 AM	M	room 251 Everitt Elec and Comp Engr Lab	Jones, D; Narayanan, S
39895: Physical Sciences course.						
39896	laboratory	ABC	01:00 PM - 02:50 PM	M	room 251 Everitt Elec and Comp Engr Lab	Jones, D; Narayanan, S
39896: Physical Sciences course.						
39897	laboratory	ABD	03:00 PM - 04:50 PM	M	room 251 Everitt Elec and Comp Engr Lab	Jones, D; Hesford, A
39897: Physical Sciences course.						
44839	laboratory	ABH	03:00 PM - 04:50 PM	F	room 251 Everitt Elec and Comp Engr Lab	Jones, D
44839: Physical Sciences course.						
39374	lecture	AL	11:00 AM - 11:50 AM	TR	room 260 Everitt Elec and Comp Engr Lab	Jones, D
39374: Physical Sciences course.						

110 ***Intro Elec & Comp Engrg*** Credit: 4 hours.

Integrated introduction to selected fundamental concepts and principles in electrical and computer engineering: circuits, electromagnetics, communications, electronics, controls, and computing. Laboratory experiments and lectures focus on a design and construction project, such as an autonomous moving vehicle. Prerequisite: Credit or registration in MATH 220.

Students must register for one lab and one lecture section.

CRN	Type	Section	Time	Days	Location	Instructor
32456	laboratory	ABA	09:00 AM - 11:50 AM	M	room 146 Everitt Elec and Comp Engr Lab	Franke, P; Ha, T; Cheng, R

32459	laboratory	ABB	08:00 AM - 10:50 AM	T	room 146 Everitt Elec and Comp Engr Lab	Franke, P; Matthews, D; Usmani, S
32460	laboratory	ABC	11:30 AM - 02:20 PM	T	room 146 Everitt Elec and Comp Engr Lab	Franke, P; Matthews, D; Boerman, J
32461	laboratory	ABD	09:00 AM - 11:50 AM	W	room 146 Everitt Elec and Comp Engr Lab	Franke, P; Gupta, S; Chen, Z
32462	laboratory	ABE	11:30 AM - 02:20 PM	R	room 146 Everitt Elec and Comp Engr Lab	Franke, P; Vasireddy, L; Lawson, M
32463	laboratory	ABF	09:00 AM - 11:50 AM	F	room 146 Everitt Elec and Comp Engr Lab	Franke, P; Khanna, A; Ha, T
32464	lecture	AL1	01:00 PM - 01:50 PM	MWF	room 151 Everitt Elec and Comp Engr Lab	Brunet, M
32465	laboratory	BBA	02:00 PM - 04:50 PM	M	room 146 Everitt Elec and Comp Engr Lab	Franke, P; Takos, G; Halley, A
32466	laboratory	BBB	03:00 PM - 05:50 PM	T	room 146 Everitt Elec and Comp Engr Lab	Franke, P; Sun, L; Coombs, J
32467	laboratory	BBC	02:00 PM - 04:50 PM	W	room 146 Everitt Elec and Comp Engr Lab	Franke, P; Coombs, J; Anderson, T
32468	laboratory	BBD	08:00 AM - 10:50 AM	R	room 146 Everitt Elec and Comp Engr Lab	Franke, P; Usmani, S; Farbiz, F
32469	laboratory	BBE	03:00 PM - 05:50 PM	R	room 146 Everitt Elec and Comp Engr Lab	Franke, P; Young, M; Olson, N
32470	laboratory	BBF	02:00 PM - 04:50 PM	F	room 146 Everitt Elec and Comp Engr Lab	Franke, P; Singh, A; Lawson, M
32471	lecture	BL1	12:00 PM - 12:50 PM	MWF	room 151 Everitt Elec and Comp Engr Lab	Haken, L

190 ***Intro to Computing Systems*** Credit: 4 hours.
Bits, binary representations, digital logic structures, the von Neumann computing model, an example instruction set, machine and assembly language programming, machine-level input/output, subroutines, the C programming language, variables and operators, control constructs, functions in C, pointers and arrays, input/output in C, recursion, and simple data. Credit is not given for both ECE 190 and CS 125.

CRN	Type	Section	Time	Days	Location	Instructor

39001	discussion-recitation	AD1	03:00 PM - 03:50 PM	F	room 170 Everitt Elec and Comp Engr Lab	Hutchinson, S; Nichols, M
39002	discussion-recitation	AD2	03:00 PM - 03:50 PM	F	room 163 Everitt Elec and Comp Engr Lab	Hutchinson, S; Becker, A
38999	discussion-recitation	AD3	01:00 PM - 01:50 PM	F	room 169 Everitt Elec and Comp Engr Lab	Hutchinson, S; Becker, A
39000	discussion-recitation	AD4	09:00 AM - 09:50 AM	F	room 169 Everitt Elec and Comp Engr Lab	Hutchinson, S; Kelm, J
39003	discussion-recitation	AD5	12:00 PM - 12:50 PM	F	room 163 Everitt Elec and Comp Engr Lab	Hutchinson, S; Wang, C
43754	lecture-discussion	AE1	11:00 AM - 12:20 PM	TR	room 112 Chemistry Annex	Hutchinson, S

200 ***Seminar*** Credit: 0 hours.
Discussions of educational programs, career opportunities, and other topics in electrical and computer engineering. For ECE students. Approved for S/U grading only.

CRN	Type	Section	Time	Days	Location	Instructor
32482	lecture	SH	05:00 PM - 06:50 PM	W	room 151 Everitt Elec and Comp Engr Lab	Hutchinson, S
32482: This course does not meet the first two weeks of the semester.						

205 ***Intro Elec & Electr Circuits*** Credit: 3 hours.
Basic principles of circuit analysis, transient analysis, AC steady-state analysis, introduction to semiconductor devices and fabrication, digital logic circuits, op-amps, and A/D and D/A conversion. ECE students may not receive credit for this course. Prerequisite: PHYS 212.

CRN	Type	Section	Time	Days	Location	Instructor
32483	lecture	A	08:00 AM - 08:50 AM	MWF	room 151 Everitt Elec and Comp Engr Lab	Zhang, J
32483: 3 hours						
32484	lecture	F	02:00 PM - 02:50 PM	MWF	room 151 Everitt Elec and Comp Engr Lab	Choi, H
32484: 3 hours						

206 ***Intro Elec & Electr Ckts Lab*** Credit: 1 hours.
Laboratory instruments and basic measurement techniques, electric circuits, CMOS logic circuits, DTL and TTL circuits, and op-amps. ECE students may not receive credit for this course. Prerequisite: PHYS 212; concurrent registration in ECE 205.

CRN	Type	Section	Time	Days	Location	Instructor
32485	laboratory	F1	10:00 AM - 11:50 AM	M	room 268 Everitt Elec and Comp Engr Lab	Zhang, J; Bunge, B
32485: 1 hours						
32501	laboratory	F10	06:00 PM - 07:50 PM	R	room 268 Everitt Elec and Comp Engr Lab	Liu, J; Zhang, J
32501: 1 hours						
32486	laboratory	F11	08:00 AM - 09:50 AM	T	room 268 Everitt Elec and Comp Engr Lab	Zhang, J; Lovitt, A
32486: 1 hours						
32487	laboratory	F2	12:00 PM - 01:50 PM	M	room 268 Everitt Elec and Comp Engr Lab	Liu, Y; Zhang, J
32487: 1 hours						
32489	laboratory	F3	08:00 AM - 09:50 AM	M	room 268 Everitt Elec and Comp Engr Lab	Zhang, J; Bunge, B
32489: 1 hours						
32491	laboratory	F4	02:00 PM - 03:50 PM	M	room 268 Everitt Elec and Comp Engr Lab	Zhang, J; Bennett, J
32491: 1 hours						
32493	laboratory	F5	10:00 AM - 11:50 AM	W	room 268 Everitt Elec and Comp Engr Lab	Zhang, J; Zhong, Y
32493: 1 hours						
32495	laboratory	F6	01:00 PM - 02:50 PM	W	room 268 Everitt Elec and Comp Engr Lab	Zhang, J; Zhong, Y
32495: 1 hours						
32497	laboratory	F7	06:00 PM - 07:50 PM	M	room 268 Everitt Elec and Comp Engr Lab	Zhang, J; Lobdell, B

32497: 1 hours						
32499	laboratory	F8	06:00 PM - 07:50 PM	T	room 268 Everitt Elec and Comp Engr Lab	Zhang, J; Chiang, J
32499: 1 hours						
32502	laboratory	F9	06:00 PM - 07:50 PM	W	room 268 Everitt Elec and Comp Engr Lab	Zhang, J; Graunke, C
32502: 1 hours						

210 ***Analog Signal Processing*** Credit: 4 hours.

Introduction to analog signal processing, with an emphasis on underlying concepts from circuit and system analysis: linear systems, review of elementary circuit analysis, differential equation models of linear circuits and systems, Laplace transform, convolution, stability, phasors, frequency response, Fourier series, Fourier transform, active filters, and AM radio. Prerequisite: ECE 110 and PHYS 212; credit or concurrent registration in MATH 385.

Students must register for one lab and one lecture section.

CRN	Type	Section	Time	Days	Location	Instructor
32534	laboratory	ABA	10:00 AM - 11:50 AM	M	room 234 Everitt Elec and Comp Engr Lab	Chen, J; Jalan, A; Benavi, A
32535	laboratory	ABB	10:00 AM - 11:50 AM	M	room 234 Everitt Elec and Comp Engr Lab	Chen, J; Jalan, A; Benavi, A
32536	laboratory	ABC	12:00 PM - 01:50 PM	M	room 234 Everitt Elec and Comp Engr Lab	Wu, H; Jalan, A
32537	laboratory	ABD	12:00 PM - 01:50 PM	M	room 234 Everitt Elec and Comp Engr Lab	Wu, H
32538	laboratory	ABE	02:00 PM - 03:50 PM	M	room 234 Everitt Elec and Comp Engr Lab	Chen, J; Widikdo, E
32539	laboratory	ABF	02:00 PM - 03:50 PM	M	room 234 Everitt Elec and Comp Engr Lab	Chen, J; Widikdo, E
32541	laboratory	ABG	04:00 PM - 05:50 PM	M	room 234 Everitt Elec and Comp Engr Lab	Chen, J; Widikdo, E
32561	laboratory	ABH	04:00 PM - 05:50 PM	M	room 234 Everitt Elec and Comp Engr Lab	Chen, J; Widikdo, E
32564	laboratory	ABI	06:00 PM - 07:50 PM	T	room 234 Everitt Elec and Comp Engr Lab	Wu, H; Benavi, A

32566	laboratory	ABJ	06:00 PM - 07:50 PM	T	room 234 Everitt Elec and Comp Engr Lab	Wu, H; Benavi, A
32571	laboratory	ABK	06:00 PM - 07:50 PM	W	room 234 Everitt Elec and Comp Engr Lab	Wu, H; Chen, J
32575	laboratory	ABL	06:00 PM - 07:50 PM	W	room 234 Everitt Elec and Comp Engr Lab	Wu, H; Chen, J
32505	lecture	AL1	09:00 AM - 09:50 AM	MTWF	room 269 Everitt Elec and Comp Engr Lab	Sarwate, D
32532	lecture	AL2	01:00 PM - 01:50 PM	MTWF	room 269 Everitt Elec and Comp Engr Lab	Basar, T
32533	lecture	AL3	02:00 PM - 02:50 PM	MTWF	room 269 Everitt Elec and Comp Engr Lab	Meyn, S

211 ***Topics Analog Ckts & Systems*** Credit: 2 hours.
Introduction to concepts from circuit and system analysis: linear systems, review of elementary circuit analysis, op amps, transient analysis, differential equation models of linear circuits and systems, and Laplace transform. Students may not receive credit for both ECE 211 and ECE 210. Prerequisite: ECE 110 and PHYS 212; credit or concurrent registration in MATH 385.

CRN	Type	Section	Time	Days	Location	Instructor
32581	lecture	B	09:00 AM - 09:50 AM	MTWF	room 269 Everitt Elec and Comp Engr Lab	Sarwate, D
32581: 2 hours						
32620	lecture	E	01:00 PM - 01:50 PM	MTWF	room 269 Everitt Elec and Comp Engr Lab	Basar, T
32620: 2 hours						
32660	lecture	F	02:00 PM - 02:50 PM	MTWF	room 269 Everitt Elec and Comp Engr Lab	Meyn, S
32660: 2 hours						

280 ***Biomedical Imaging*** Credit: 3 hours.
Introduction to the physics and engineering principles associated with magnetic resonance, ultrasound, computed tomography, and nuclear imaging. Same as BIOE 280. Prerequisite: MATH 385, PHYS 212; or consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor
39320	lecture	G	08:30 AM - 09:50 AM	TR	room 160 English Bldg	Boppart, S
39320: 3 hours						

290 ***Computer Engineering, I*** Credit: 3 hours.
Introduction to digital logic and computer systems. Representation of information, combinational network analysis and design, sequential network analysis and design, computer organization and control. Laboratory for design and simulation of digital systems. Credit is not given for both ECE 290 and CS 231. Prerequisite: One of CS 101, CS 125, ECE 110, ECE 190.

Students must register for one discussion and one lecture section.

CRN	Type	Section	Time	Days	Location	Instructor
32786	discussion-recitation	ADB	09:00 AM - 09:50 AM	R	room 269 Everitt Elec and Comp Engr Lab	Brown, D; Loui, M
32787	discussion-recitation	ADC	10:00 AM - 10:50 AM	R	room 269 Everitt Elec and Comp Engr Lab	Brown, D; Loui, M; Holm, J
32788	discussion-recitation	ADD	11:00 AM - 11:50 AM	R	room 269 Everitt Elec and Comp Engr Lab	Brown, D; Loui, M; Holm, J
32789	discussion-recitation	ADE	12:00 PM - 12:50 PM	R	room 269 Everitt Elec and Comp Engr Lab	Brown, D; Loui, M; Lundgren, E
32790	discussion-recitation	ADF	01:00 PM - 01:50 PM	R	room 269 Everitt Elec and Comp Engr Lab	Brown, D; Loui, M; Longino, J
32791	discussion-recitation	ADG	02:00 PM - 02:50 PM	R	room 269 Everitt Elec and Comp Engr Lab	Brown, D; Loui, M
32792	discussion-recitation	ADH	03:00 PM - 03:50 PM	R	room 269 Everitt Elec and Comp Engr Lab	Brown, D; Knox, A; Loui, M
32793	lecture	AL1	12:00 PM - 12:50 PM	MW	room 314 Altgeld Hall	Brown, D; Loui, M

307 ***Techniques for Engin Decisions*** Credit: 3 hours.
The course is concerned with the modeling of decisions in engineering work and the analysis of models to develop a systematic approach to making decisions. The course aims to teach students to think structurally about decision-making problems. Fundamental concepts in linear and dynamic programming, probability theory, and statistics serve as the mathematical basis for the development of techniques for solving typical problems faced in making engineering decisions in industry and government. Topics include resource allocation, logistics, scheduling, sequential decision making, siting of facilities, investment decisions, application of financial derivatives, and other problems for decision making under uncertainty. Extensive use of case studies from actual industrial applications gets students involved in real-world decisions. Prerequisite: ECE 210; credit or concurrent registration in ECE 413 or equivalent.

CRN	Type	Section	Time	Days	Location	Instructor
39322	lecture	G	10:00 AM - 11:20 AM	TR	room 245 Everitt Elec and Comp Engr Lab	Gross, G
39322: 3 hours						

316 ***Engineering Ethics*** Credit: 3 hours.
Ethical issues in the practice of engineering: safety and liability, professional responsibility to clients and employers, whistle-blowing, codes of ethics, career choice, and legal obligations; case studies. Same as PHIL 316. Prerequisite: Junior standing; RHET 105.

This course satisfies the General Education Criteria for a Advanced Composition, and Hist&Philosoph Perspect course.

CRN	Type	Section	Time	Days	Location	Instructor
32661	lecture	E3	09:00 AM - 10:20 AM	TR	room 57 Everitt Elec and Comp Engr Lab	Hillmer, P
32661: Advanced Composition, and Hist&Philosoph Perspect course.						
32661: 3 hours						
32662	lecture	E4	02:00 PM - 03:20 PM	TR	room 329 Gregory Hall	Hillmer, P
32662: Advanced Composition, and Hist&Philosoph Perspect course.						
32662: 3 hours						

328 ***Comp Soln EM Probs, I*** Credit: 1 hours.
Solution of selected electromagnetics problems at the ECE 329 level using personal computers. Prerequisite: Credit or concurrent registration in ECE 329.

CRN	Type	Section	Time	Days	Location	Instructor
32669	lecture-discussion	B	09:00 AM - 09:50 AM	F	room 241 Everitt Elec and Comp Engr Lab	Franke, P
32669: 1 hours						

329 ***Intro Electromagnetic Fields*** Credit: 3 hours.
Elementary electromagnetic field theory as summarized in Maxwell's equations for time-varying fields in integral and differential forms; energy storage; static and quasistatic fields; and time-domain analysis of waves. Prerequisite: ECE 205 or ECE 210.

CRN	Type	Section	Time	Days	Location	Instructor

32665	discussion-recitation	B	09:00 AM - 09:50 AM	MWF	room 106B8 Engineering Hall	Frizzell, L
32665: 3 hours						
32666	discussion-recitation	E	01:00 PM - 01:50 PM	MWF	room 106B8 Engineering Hall	Oelze, M
32666: 3 hours						
32667	discussion-recitation	F	02:00 PM - 02:50 PM	MWF	room 245 Everitt Elec and Comp Engr Lab	Mitofsky, A
32667: 3 hours						
32668	discussion-recitation	X	12:00 PM - 12:50 PM	MWF	room 169 Everitt Elec and Comp Engr Lab	Kim, K
32668: 3 hours						

385 ***Digital Systems Laboratory*** Credit: 2 hours.
Introduction to the experimental analysis and synthesis of digital networks, including the use of a microcomputer as a controller. Prerequisite: ECE 110 and ECE 290.

Students must register for one lab and one lecture section.

CRN	Type	Section	Time	Days	Location	Instructor
32767	laboratory	ABA	08:00 AM - 10:50 AM	T	room 234 Everitt Elec and Comp Engr Lab	
32769	laboratory	ABC	11:30 AM - 02:20 PM	T	room 234 Everitt Elec and Comp Engr Lab	Bray, N
32770	laboratory	ABD	11:30 AM - 02:20 PM	T	room 234 Everitt Elec and Comp Engr Lab	Mehta, V
32771	laboratory	ABE	03:00 PM - 05:50 PM	T	room 234 Everitt Elec and Comp Engr Lab	Bloem, M
32772	laboratory	ABF	03:00 PM - 05:50 PM	T	room 234 Everitt Elec and Comp Engr Lab	Nawaz, N
32773	laboratory	ABG	12:00 PM - 02:50 PM	W	room 234 Everitt Elec and Comp Engr Lab	Lu, Z
32774	laboratory	ABH	12:00 PM - 02:50 PM	W	room 234 Everitt Elec and Comp Engr Lab	Slater, M
32775	laboratory	ABI	03:00 PM - 05:50 PM	W	room 234 Everitt Elec and Comp	Nawaz, N

					Engr Lab	
32776	laboratory	ABJ	03:00 PM - 05:50 PM	W	room 234 Everitt Elec and Comp Engr Lab	Herman, G
32777	laboratory	ABK	08:00 AM - 10:50 AM	R	room 234 Everitt Elec and Comp Engr Lab	Lu, Z
32778	laboratory	ABL	08:00 AM - 10:50 AM	R	room 234 Everitt Elec and Comp Engr Lab	Herman, G
32779	laboratory	ABM	11:30 AM - 02:20 PM	R	room 234 Everitt Elec and Comp Engr Lab	Bray, N
32780	laboratory	ABN	11:30 AM - 02:20 PM	R	room 234 Everitt Elec and Comp Engr Lab	Slater, M
32781	laboratory	ABO	03:00 PM - 05:50 PM	R	room 234 Everitt Elec and Comp Engr Lab	Bloem, M
44775	laboratory	ABP	03:00 PM - 05:50 PM	R	room 234 Everitt Elec and Comp Engr Lab	Fettinger, A
32782	lecture	AL1	03:00 PM - 03:50 PM	M	room 151 Everitt Elec and Comp Engr Lab	Patel, J

390 ***Computer Engineering, II*** Credit: 3 hours.
Design and development of assembly language programs; input-output, interrupts, and multitasking; introduction to data structures and graphics; ethical and social issues in computing; laboratory assignments on real-time data acquisition and device control. Credit is not given for both ECE 390 and CS 232. Prerequisite: ECE 290 or CS 231.

Students must register for one lab and one lecture section.

CRN	Type	Section	Time	Days	Location	Instructor
32794	laboratory	AB1	ARRANGED			Kalbarczyk, Z
32795	lecture	AL1	10:30 AM - 11:50 AM	TR	room 119 Materials Science and Eng Bld	Kalbarczyk, Z

391 ***Computer Systems Engineering*** Credit: 3 hours.
Introduction to the concepts and abstractions central to the development of modern computing systems, with an emphasis on the systems software that controls interaction between devices and other hardware and application programs. Material includes input-output semantics, synchronization, interrupts, multitasking, virtualization of abstractions. Emphasis on learning to operate effectively in teams. Prerequisite: ECE 290 or CS 331. Recommended: ECE 190.

CRN	Type	Section	Time	Days	Location	Instructor
45300	discussion-recitation	AD1	ARRANGED			Lumetta, S
45210	lecture	AL	10:30 AM - 11:45 AM	TR	room 300 Lincoln Hall	Lumetta, S

395 ***Adv Digital Projects Lab*** Credit: 2 or 3 hours.
Planning, designing, executing, and documenting a microcomputer-based project. Hardware is emphasized but the special projects required of student may also require an equal emphasis on software. Prerequisite: ECE 385 or consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor
32766	laboratory	A	ARRANGED			Haken, L
	lecture	A	11:00 AM - 11:50 AM	F	room 261 Everitt Elec and Comp Engr Lab	Haken, L

396 ***Honors Project*** Credit: 1 to 4 hours.
Special project or reading course for James Scholars in engineering. May be repeated. Prerequisite: James Scholar in engineering; consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor
10013	independent study		ARRANGED			
10013: Instructor Approval Required						

397 ***Individual Study in ECE*** Credit: 0 to 4 hours.
Individual Projects. Prerequisite: Approved written application to department as specified by department or instructor.

CRN	Type	Section	Time	Days	Location	Instructor
10010	independent study		ARRANGED			
10010: Instructor Approval Required						

398 ***Special Topics in ECE*** Credit: 0 to 4 hours.
Lectures and discussions relating to new areas of interest. May be repeated if topics vary. Prerequisite: As specified for each topic offering; see Schedule or departmental course information.

CRN	Type	Section	Time	Days	Location	Instructor
44437	discussion-recitation	AD1	10:00 AM - 10:50 AM	W	room 203 Transportation Bldg	Timp, G
44438	discussion-recitation	AD2	02:00 PM - 02:50 PM	F	room 57 Everitt Elec and Comp Engr Lab	Timp, G
44854	discussion-recitation	AD3	09:00 AM - 09:50 AM	M	room 169 Everitt Elec and Comp Engr Lab	Timp, G
44436	lecture	AL1	11:30 AM - 12:20 PM	TR	room 165 Everitt Elec and Comp Engr Lab	Timp, G
44436: 3 hoursTopic: Elements of Solid State Electronics. Prerequisites: ECE 210 and PHYS 214 (co-registration in ECE 329 is suggested). This course will give you credit for ECE 440.						
44435	lecture	RES	11:30 AM - 12:50 PM	TR	room 245 Everitt Elec and Comp Engr Lab	Chapman, P; Gross, G
44435: 3 hoursTopic: Renewable Energy Systems. Prerequisites: ECE 210 or ECE 205.						

403 ***Audio Engineering*** Credit: 3 hours.
Review of resonance and wave phenomena; acoustics of rooms and auditoriums; artificial reverberation and sound localization/spatialization; loudspeakers, enclosures, and microphones; and topics in digital audio. Prerequisite: ECE 290, ECE 410, and ECE 473; or consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor
32796	discussion-recitation	E	01:00 PM - 01:50 PM	MWF	room 245 Everitt Elec and Comp Engr Lab	Allen, J
32796: 3 hours						

410 ***Digital Signal Processing, I*** Credit: 4 hours.
Introduction to discrete-time systems and digital signal processing: discrete-time linear systems, difference equations, z-transform, discrete convolution, stability, discrete-time Fourier transform, analog-to-digital and digital-to-analog conversion, interpolation and decimation, digital filter design, discrete Fourier transform, fast Fourier transform, spectral analysis, and applications of digital signal processing. Prerequisite: ECE 210 or consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor
32797	lecture-discussion	D	02:00 PM - 03:50 PM	TR	room 1310 Digital Computer Laboratory	Singer, A
32797: 4 hours						

32799	lecture-discussion	G	03:00 PM - 03:50 PM	F	room 165 Everitt Elec and Comp Engr Lab	Shanbhag, N
	lecture-discussion	G	03:00 PM - 04:20 PM	MW	room 269 Everitt Elec and Comp Engr Lab	Shanbhag, N
: 4 hours						

411 ***Comp Organization & Design*** Credit: 4 hours.
Basic computer organization and design, computer arithmetic, control design and microprogramming, memory organization, I/D design, and reliability/performance evaluation; laboratory for computer design implementation, simulation, and layout. Credit is not given toward graduate degrees in Electrical Engineering. Prerequisite: ECE 390 or CS 232.

Students must register for one lab and one discussion section.

CRN	Type	Section	Time	Days	Location	Instructor
32816	lecture	AL	03:00 PM - 04:20 PM	MW	room 165 Everitt Elec and Comp Engr Lab	Hwu, W
32815	laboratory-discussion	AY	ARRANGED			Hwu, W

412 ***Microcomputer Laboratory*** Credit: 3 hours.
Design, construction, and use of a small general-purpose computer with a micro-processor CPU; MSI and LSI circuits used extensively; control panel, peripheral controllers, control logic, central processor, and programming experiments; and open lab format. Prerequisite: ECE 385; ECE 390 or CS 232. Recommended: credit or concurrent registration in ECE 411.

CRN	Type	Section	Time	Days	Location	Instructor
32801	laboratory	AB	ARRANGED			Carter, N
32802	lecture	AL	03:00 PM - 03:50 PM	TR	room 260 Everitt Elec and Comp Engr Lab	Carter, N

413 ***Probability with Engrg Applic*** Credit: 3 hours.
Introduction to probability theory with applications to engineering problems such as the reliability of circuits and systems and to statistical methods for hypothesis testing, decision making under uncertainty, and parameter estimation. Credit is not given toward graduate degrees in Electrical Engineering. Prerequisite: ECE 210.

CRN	Type	Section	Time	Days	Location	Instructor
32817	discussion-recitation	C	10:00 AM - 10:50 AM	MWF	room 260 Everitt Elec and Comp Engr Lab	Ahuja, N

32817: 3 hours						
32818	discussion-recitation	D	11:00 AM - 11:50 AM	MWF	room 245 Everitt Elec and Comp Engr Lab	Sanghavi, S
32818: 3 hours						

414 ***Biomedical Instrumentation*** Credit: 3 hours.
Introduction to engineering aspects of the detection, acquisition, processing, and display of signals from living systems; biomedical transducers for measurements of biopotentials, ions and gases in aqueous solution, force, displacement, blood pressure, blood flow, heart sounds, respiration, and temperature; and therapeutic and prosthetic devices. Same as BIOE 414. Prerequisite: ECE 205 or ECE 210 or consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor
33724	discussion-recitation	B	10:00 AM - 10:50 AM	MWF	room 165 Everitt Elec and Comp Engr Lab	Fish, R
33724: 3 hours						

415 ***Biomedical Instrumentation Lab*** Credit: 2 hours.
Laboratory to accompany ECE 414. Studies medical instrumentation and transducers for static and dynamic nonbiological inputs and measures actual biomedical signals; requires some animal experiments. Same as BIOE 415. Prerequisite: Credit or concurrent registration in ECE 414.

CRN	Type	Section	Time	Days	Location	Instructor
33726	laboratory	AB1	01:00 PM - 03:50 PM	T	room ARR Digital Computer Laboratory	Fish, R; Xiong, J
33727	laboratory	AB2	09:00 AM - 11:50 AM	R	room ARR Digital Computer Laboratory	Fish, R; Zhou, C
33728	laboratory	AB3	01:00 PM - 03:50 PM	R	room ARR Digital Computer Laboratory	Fish, R; Qian, Z
33729	laboratory	AB4	01:00 PM - 03:50 PM	W	room ARR Digital Computer Laboratory	Fish, R; Fontes, A
33730	lecture	AL1	10:00 AM - 10:50 AM	T	room 269 Everitt Elec and Comp Engr Lab	Fish, R

418 ***Image & Video Processing*** Credit: 4 hours.
Basic concepts and applications in image and video processing; introduction to multidimensional signal processing: sampling, Fourier transform, filtering, interpolation, and decimation; human visual perception; scanning and display

of images and video; image enhancement, restoration and segmentation; digital image and video compression; and image analysis. Laboratory exercises allow students to gain hands-on experience with these topics and develop C and Matlab programs. Prerequisite: ECE 410; credit or concurrent registration in one of ECE 413, STAT 400, IE 300, MATH 461; MATH 415; and experience with C programming language.

CRN	Type	Section	Time	Days	Location	Instructor
33737	laboratory	NB1	ARRANGED			Moulin, P
33738	lecture	NL1	10:00 AM - 11:20 AM	TR	room 163 Everitt Elec and Comp Engr Lab	Moulin, P

420 ***Digital Signal Processing Lab*** Credit: 2 hours.
Development of real-time digital signal processing (DSP) systems using a DSP microprocessor; several structured laboratory exercises, such as sampling and digital filtering, followed by an extensive DSP project of the student's choice. Prerequisite: ECE 410.

CRN	Type	Section	Time	Days	Location	Instructor
33739	laboratory	ABA	02:00 PM - 03:50 PM	T	room 251 Everitt Elec and Comp Engr Lab	Hasegawa-Johnson, M; Guan, K; Tidemann, J
33740	laboratory	ABB	02:00 PM - 03:50 PM	R	room 251 Everitt Elec and Comp Engr Lab	Yin, Z; Kleffner, M; Hasegawa-Johnson, M
33741	laboratory	ABC	02:00 PM - 03:50 PM	W	room 251 Everitt Elec and Comp Engr Lab	Kleffner, M; Hasegawa-Johnson, M; Tidemann, J
33742	laboratory	ABD	03:00 PM - 04:50 PM	F	room 251 Everitt Elec and Comp Engr Lab	Yin, Z; Hasegawa-Johnson, M; Tidemann, J
33743	laboratory	ABE	03:00 PM - 04:50 PM	M	room 251 Everitt Elec and Comp Engr Lab	Hasegawa-Johnson, M; Guan, K; Tidemann, J
33744	lecture	AL1	02:00 PM - 02:50 PM	M	room 165 Everitt Elec and Comp Engr Lab	Hasegawa-Johnson, M

421 ***Plasma and Fusion Science*** Credit: 3 hours.
Same as NPRE 421 and PHYS 479. See NPRE 421.

CRN	Type	Section	Time	Days	Location	Instructor
34719	lecture-discussion	L	08:30 AM - 09:50 AM	TR	room 203 Nuclear Engineering Lab	Miley, G

425 ***Intro VLSI System Design*** Credit: 3 hours.
Complementary Metal-Oxide Semiconductor (CMOS) technology and theory; CMOS circuit and logic design; layout rules and techniques; circuit characterization and performance estimation; CMOS subsystem design; Very-Large-Scale Integrated (VLSI) systems design methods; VLSI Computer Aided Design (CAD) tools; laboratory experience in custom VLSI chip design on workstations using concepts of cell hierarchy; final project involving specification, design, and evaluation of a VLSI chip or VLSI CAD program; and written report and oral presentation on the final project. Same as CS 435 and CSE 433. Prerequisite: ECE 385 and ECE 411; or CS 232.

CRN	Type	Section	Time	Days	Location	Instructor
33850	laboratory	AB1	ARRANGED			Chen, D
33853	lecture	AL1	11:00 AM - 12:20 PM	MW	room 269 Everitt Elec and Comp Engr Lab	Chen, D

428 ***Distributed Systems*** Credit: 3 hours.
Same as CS 425 and CSE 424. See CS 425.

CRN	Type	Section	Time	Days	Location	Instructor
31388	lecture-discussion	T	03:30 PM - 04:45 PM	TR	room 1304 Siebel Center for Comp Sci	Hu, Y
31388: 3 hours						

430 ***Power Ckts & Electromechanics*** Credit: 3 hours.
Network equivalents, power and energy fundamentals, resonance, mutual inductance, three-phase power concepts, forces and torques of electric origin in electromagnetic and electrostatic systems, energy conversion cycles, principles of electric machines, transducers, relays, and laboratory demonstration. Credit is not given toward graduate degrees in Electrical Engineering. Prerequisite: ECE 210.

CRN	Type	Section	Time	Days	Location	Instructor
33871	discussion-recitation	C	10:00 AM - 10:50 AM	MWF	room 269 Everitt Elec and Comp Engr Lab	Kimball, J
33871: 3 hours						
33873	discussion-recitation	F	12:30 PM - 01:50 PM	TR	room 165 Everitt Elec and Comp Engr Lab	Tate, J
33873: 3 hours						

431 ***Electric Machinery*** Credit: 4 hours.

Theory and laboratory experimentation with three-phase power, power factor correction, single- and three-phase transformers, induction machines, DC machines, and synchronous machines; includes project work on energy control systems; digital simulation of machine dynamics. Prerequisite: ECE 430.

CRN	Type	Section	Time	Days	Location	Instructor
33876	laboratory	ABA	10:00 AM - 12:50 PM	R	room 50 Everitt Elec and Comp Engr Lab	Yeu, R
33878	laboratory	ABB	12:00 PM - 02:50 PM	W	room 50 Everitt Elec and Comp Engr Lab	Amrhein, M
33879	laboratory	ABC	02:00 PM - 04:50 PM	R	room 50 Everitt Elec and Comp Engr Lab	Raczkowski, B
33880	lecture	AL1	11:00 AM - 11:50 AM	MWF	room 260 Everitt Elec and Comp Engr Lab	Sauer, P

435 ***Computer Networking Laboratory*** Credit: 3 or 4 hours.

Design, apply, analyze, and evaluate communication network protocols under both Linux and Window NT operating systems. Emphasis on identifying problems, proposing alternative solutions, implementing prototypes using available network protocols and evaluating results. Students work in pairs on multiple programming projects per term. 3 undergraduate hours; or 3 to 4 graduate hours. Graduate students may receive 4 graduate hours by performing independent design projects. Prerequisite: CS 438.

CRN	Type	Section	Time	Days	Location	Instructor
33882	laboratory	C	ARRANGED			Wah, B
	lecture	C	11:00 AM - 12:20 PM	TR	room 241 Everitt Elec and Comp Engr Lab	Wah, B
: 3 hours						
33881	laboratory	C1	ARRANGED			Wah, B
	lecture	C1	11:00 AM - 12:20 PM	TR	room 241 Everitt Elec and Comp Engr Lab	Wah, B
: 4 hours						

437 ***Sensors and Instrumentation*** Credit: 3 hours.

This course gives senior and graduate students in ECE a hands-on introduction to the fundamental technology and practical application of sensors. Capacitive, inductive, optical, electromagnetic, and other sensing methods are examined. Instrumentation techniques incorporating computer control, sampling, and data collection and analysis are reviewed in the context of real-world scenarios. Prerequisite: ECE 329.

CRN	Type	Section	Time	Days	Location	Instructor
39328	laboratory	AB1	02:00 PM - 04:50 PM	R	room 235 Everitt Elec and Comp Engr Lab	Alvey, G
39329	laboratory	AB2	09:00 AM - 11:50 AM	F	room 235 Everitt Elec and Comp Engr Lab	Alvey, G
39362	laboratory	AB3	02:00 PM - 04:50 PM	F	room 235 Everitt Elec and Comp Engr Lab	Alvey, G
39326	lecture	AL1	03:00 PM - 04:20 PM	T	room 1131 Siebel Center for Comp Sci	Makela, J

438 ***Communication Networks*** Credit: 3 hours.
Same as CS 438 and CSE 425. See CS 438.

CRN	Type	Section	Time	Days	Location	Instructor
31412	lecture-discussion	R	11:00 AM - 12:15 PM	WF	room 1310 Digital Computer Laboratory	Luo, H
31412: 3 hours						

440 ***Solid State Electronic Devices*** Credit: 3 hours.
Semiconductor materials and their electronic properties and applications to electronic devices; p-n junctions; transistors; junction field effect transistors and MOS devices; and introduction to integrated circuits. Credit is not given toward graduate degrees in Electrical Engineering. Prerequisite: PHYS 214; credit or concurrent registration in ECE 329.

CRN	Type	Section	Time	Days	Location	Instructor
33884	discussion-recitation	C	10:00 AM - 10:50 AM	MWF	room 169 Everitt Elec and Comp Engr Lab	Hsieh, K
33884: 3 hours						
33886	discussion-recitation	E	01:00 PM - 01:50 PM	MWF	room 165 Everitt Elec and Comp Engr Lab	Tucker, J
33886: 3 hours						
33887	discussion-recitation	G	03:00 PM - 03:50 PM	MWF	room 260 Everitt Elec and Comp Engr Lab	Bishop, S
33887: 3 hours						

33885	discussion-recitation	X	12:00 PM - 12:50 PM	MWF	room 245 Everitt Elec and Comp Engr Lab	Bishop, S
33885: 3 hours						

441 ***Physcs & Modeling Semicond Dev*** Credit: 3 hours.
Detailed presentation of advanced concepts such as generation-recombination, hot electron effects, and breakdown mechanisms; essential features of small ac characteristics, switching and transient behavior of p-n junctions, bipolar and MOS transistors; addresses fundamental issues for device modeling and discusses the perspective and limitations of Si-devices. Prerequisite: ECE 440.

CRN	Type	Section	Time	Days	Location	Instructor
33888	lecture-discussion	D	11:00 AM - 11:50 AM	MWF	room 241 Everitt Elec and Comp Engr Lab	Leburton, J
33888: 3 hours						

442 ***Electronic Circuits*** Credit: 3 hours.
Analysis and design of analog and digital electronic circuits using MOS field effect transistors and bipolar junction transistors, with an emphasis on the study of amplifiers in integrated circuits. Credit is not given toward graduate degrees in Electrical Engineering. Credit is not given for both ECE 442 and PHYS 404. Prerequisite: ECE 210 and ECE 440.

CRN	Type	Section	Time	Days	Location	Instructor
33889	discussion-recitation	B	09:00 AM - 09:50 AM	MWF	room 151 Everitt Elec and Comp Engr Lab	Schutt-Aine, J
33889: 3 hours						

443 ***Electronic Circuits Laboratory*** Credit: 1 hours.
Laboratory to accompany ECE 442. Credit is not given toward graduate degrees in Electrical Engineering. Credit is not given for both ECE 443 and PHYS 404. Prerequisite: Concurrent registration in ECE 442.

CRN	Type	Section	Time	Days	Location	Instructor
33890	laboratory	M	12:00 PM - 02:50 PM	T	room 268 Everitt Elec and Comp Engr Lab	Zhang, J; Byrd, E
33890: 1 hours						
33892	laboratory	N	03:00 PM - 05:50 PM	R	room 268 Everitt Elec and Comp Engr Lab	Zhang, J; Ni, H

33892: 1 hours						
33894	laboratory	O	09:00 AM - 11:50 AM	R	room 268 Everitt Elec and Comp Engr Lab	Zhang, J; Atkins, P
33894: 1 hours						
33896	laboratory	R	03:00 PM - 05:50 PM	T	room 268 Everitt Elec and Comp Engr Lab	Zhang, J; Chelliyil, R
33896: 1 hours						
33898	laboratory	S	12:00 PM - 02:50 PM	R	room 268 Everitt Elec and Comp Engr Lab	Zhang, J; Byrd, E
33898: 1 hours						

444 ***IC Device Theory & Fabrication*** Credit: 4 hours.
Laboratory and lecture course on the physical theory, design, and fabrication of devices suitable for integrated circuitry; includes the electrical properties of semiconductors and techniques (epitaxial growth, oxidation, photolithography diffusion, ion implantation, metallization, and characterization) for fabricating integrated circuit devices such as p-n junction diodes, bipolar transistors, and field effect transistors. Prerequisite: ECE 440.

CRN	Type	Section	Time	Days	Location	Instructor
33902	laboratory	AB1	09:00 AM - 11:50 AM	T	room 50M Everitt Elec and Comp Engr Lab	Kondratko, P; Sievers, D
33903	laboratory	AB2	02:00 PM - 04:50 PM	T	room 50M Everitt Elec and Comp Engr Lab	Sievers, D; Hosmane, S
33904	laboratory	AB3	09:00 AM - 11:50 AM	R	room 50M Everitt Elec and Comp Engr Lab	Kondratko, P; Sievers, D
33905	laboratory	AB4	02:00 PM - 04:50 PM	R	room 50M Everitt Elec and Comp Engr Lab	Sievers, D; Chu, H
33906	laboratory	AB5	02:00 PM - 04:50 PM	M	room 50M Everitt Elec and Comp Engr Lab	Sievers, D; Wayne, M
33907	laboratory	AB6	02:00 PM - 04:50 PM	W	room 50M Everitt Elec and Comp Engr Lab	Sievers, D; Reddy, U
33908	laboratory	AB7	02:00 PM - 04:50 PM	F	room 50M Everitt Elec and Comp Engr Lab	Sievers, D; Hosmane, S
33900	discussion-recitation	AD1	09:00 AM - 09:50 AM	MWF	room 245 Everitt Elec and Comp Engr Lab	Coleman, J

33901	discussion-recitation	AD2	10:00 AM - 10:50 AM	MWF	room 245 Everitt Elec and Comp Engr Lab	Choquette, K

445 ***Senior Design Project Lab*** Credit: 2 hours.
Individual design projects in various areas of electrical and computer engineering; projects are chosen by students with approval of the instructor; a written report, prepared to journal publication standards, and an oral presentation are required. Credit is not given toward graduate degrees in Electrical Engineering. Prerequisite: Senior standing in ECE.

Additional Laboratory time to be arranged in 246 Everitt Laboratory.

CRN	Type	Section	Time	Days	Location	Instructor
33909	laboratory	H	04:00 PM - 04:50 PM	W	room 151 Everitt Elec and Comp Engr Lab	Carney, P; Swenson, G
33909: 2 hours						

447 ***Active Microwave Ckt Design*** Credit: 3 hours.
Laboratory and lecture course on microwave circuit design of amplifiers, oscillators, and mixers. Prerequisite: ECE 450 and ECE 453.

CRN	Type	Section	Time	Days	Location	Instructor
33910	laboratory	ABA	01:00 PM - 03:50 PM	W	room 251 Everitt Elec and Comp Engr Lab	Feng, M; Cimino, K
33911	laboratory	ABB	06:00 PM - 08:50 PM	W	room 251 Everitt Elec and Comp Engr Lab	Stuenkel, M
33912	laboratory	ABC	06:00 PM - 08:50 PM	R	room 251 Everitt Elec and Comp Engr Lab	Cimino, K
33913	lecture	AL1	04:00 PM - 05:15 PM	M	room 245 Everitt Elec and Comp Engr Lab	Feng, M

448 ***Intro Artificial Intelligence*** Credit: 3 or 4 hours.
Same as CS 440. See CS 440.

CRN	Type	Section	Time	Days	Location	Instructor
31425	lecture-discussion	Q3	02:00 PM - 03:15 PM	TR	room 1404 Siebel Center for Comp Sci	Ponce, J

31425: 3 hours						
31426	lecture-discussion	Q4	02:00 PM - 03:15 PM	TR	room 1404 Siebel Center for Comp Sci	Ponce, J
31426: 4 hours						

450 ***Lines, Fields, and Waves*** Credit: 3 hours.
General plane wave solution of Maxwell's equations; reflection and transmission of plane waves; transmission lines; impedance matching; waveguides and cavities; and radiation. Credit is not given toward graduate degrees in Electrical Engineering. Prerequisite: ECE 329.

CRN	Type	Section	Time	Days	Location	Instructor
33914	discussion-recitation	E	01:00 PM - 01:50 PM	MWF	room 260 Everitt Elec and Comp Engr Lab	Cangellaris, A
33914: 3 hours						
33915	discussion-recitation	X	12:00 PM - 12:50 PM	MWF	room 260 Everitt Elec and Comp Engr Lab	Cangellaris, A
33915: 3 hours						

453 ***Radio Communication Circuits*** Credit: 4 hours.
Design of a radio system for transmission of information; types of receivers, matching techniques, receiver and antenna noise, types of modulation, high-frequency circuitry, and point-to-point and satellite communications. Prerequisite: ECE 442; credit or concurrent registration in ECE 450.

CRN	Type	Section	Time	Days	Location	Instructor
33916	laboratory	ABA	09:00 AM - 11:50 AM	T	room 251 Everitt Elec and Comp Engr Lab	Majumdar, S
33917	laboratory	ABB	12:00 PM - 02:50 PM	T	room 251 Everitt Elec and Comp Engr Lab	Minin, S
33919	laboratory	ABC	03:00 PM - 05:50 PM	T	room 251 Everitt Elec and Comp Engr Lab	Kuo, S
33918	discussion-recitation	AD1	11:00 AM - 11:50 AM	MWF	room 163 Everitt Elec and Comp Engr Lab	Franke, S

454 ***Antennas*** Credit: 3 hours.
Antenna parameters; polarization of electromagnetic waves; basic antenna types; antenna arrays; broadband

antenna design; and antenna measurements. Prerequisite: ECE 450 or consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor
33920	discussion-recitation	B	09:00 AM - 09:50 AM	MWF	room 260 Everitt Elec and Comp Engr Lab	Bernhard, J
33920: 3 hours						

457 ***Microwave Devices & Circuits*** Credit: 3 hours.
Electromagnetic wave propagation, microwave transmission systems, passive components, microwave tubes, solid state microwave devices, microwave integrated circuits, S-parameter analysis, and microstrip transmission lines. Prerequisite: ECE 440 or equivalent; ECE 450 or equivalent.

CRN	Type	Section	Time	Days	Location	Instructor
33921	lecture	G	03:00 PM - 03:50 PM	MWF	room 245 Everitt Elec and Comp Engr Lab	Bernhard, J
33921: 3 hours						

458 ***Applic of Rad Wave Propagation*** Credit: 3 hours.
Terrestrial atmosphere, radio wave propagation, and applications to radio sensing and radio communication. Prerequisite: ECE 450 or consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor
33922	discussion-recitation	G	03:00 PM - 03:50 PM	MWF	room 57 Everitt Elec and Comp Engr Lab	Kudeki, E
33922: 3 hours						

459 ***Communications, I*** Credit: 3 hours.
Introduction to analog and digital modulation techniques, random processes, and power spectral density. Effects of noise on, and bandwidth requirements of, different modulation schemes. Prerequisite: ECE 413 or equivalent.

CRN	Type	Section	Time	Days	Location	Instructor
33923	discussion-recitation	R	02:00 PM - 03:20 PM	TR	room 165 Everitt Elec and Comp Engr Lab	Viswanath, P
33923: 3 hours						

461 ***Communications, II*** Credit: 3 hours.
Digital communication systems, modulation, demodulation, channel models, bit error rate, spectral occupancy, synchronization, equalization, and trellis-coded modulation. Prerequisite: ECE 459.

CRN	Type	Section	Time	Days	Location	Instructor
33924	discussion-recitation	L	08:30 AM - 09:50 AM	TR	room 163 Everitt Elec and Comp Engr Lab	Poon, A
33924: 3 hours						

462 ***Logic Design*** Credit: 3 hours.
Design of combinational networks, hazards, finite state testing machines, design of sequential networks in fundamental mode and pulse mode, state reduction, state assignment and races, and fault detection and testing. Same as CS 462 and MATH 491. Prerequisite: ECE 290 or CS 231.

CRN	Type	Section	Time	Days	Location	Instructor
33957	discussion-recitation	C	10:00 AM - 10:50 AM	MWF	room 151 Everitt Elec and Comp Engr Lab	Nicol, D
33957: 3 hours						

463 ***Digital Communications Lab*** Credit: 2 hours.
The focus of this laboratory course is digital communications systems. Students will gain hands-on experience in the configuration and performance evaluation of digital communication systems employing both radio and optical signals. Prerequisite: ECE 459 or equivalent. Credit or concurrent registration in ECE 461 recommended.

CRN	Type	Section	Time	Days	Location	Instructor
44200	laboratory	AB1	09:00 AM - 11:50 AM	W	room 251 Everitt Elec and Comp Engr Lab	Schmitz, C; Chen, G
44222	laboratory	AB2	01:00 PM - 03:50 PM	W	room 251 Everitt Elec and Comp Engr Lab	Schmitz, C; Chen, G
43642	lecture	AL	09:00 AM - 09:50 AM	M	room 251 Everitt Elec and Comp Engr Lab	Schmitz, C; Franke, S

468 ***Optical Remote Sensing*** Credit: 3 hours.
Introduction to Optical Remote Sensing. Optical sensors including single element and area arrays (CCDs). Systems including imager, spectrometer, interferometer, and lidar optical principles and light gathering power. Electromagnetics of atomic and molecular emission and scattering with applications to the atmosphere as an

example. Applications include ground and spacecraft platforms. Four laboratory sessions (4.5 hours each) will be arranged during the semester in lieu of four lectures. Same as AE 468 and ATMS 468. Prerequisite: PHYS 214, ECE 210, ECE 329, and a course in probability or statistics; or consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor
40643	lecture	A	11:30 AM - 12:50 PM	TR	room 169 Everitt Elec and Comp Engr Lab	Swenson, G
40643: 3 hoursThis course has 4 lab times that will be arranged.						

473 ***Fund of Engrg Acoustics*** Credit: 3 or 4 hours.
Development of the basic theoretical concepts of acoustical systems; mechanical vibration, plane and spherical wave phenomena in fluid media, lumped and distributed resonant systems, and absorption phenomena and hearing. Same as TAM 413. 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: MATH 385 or equivalent.

CRN	Type	Section	Time	Days	Location	Instructor
33967	discussion-recitation	F3	02:00 PM - 02:50 PM	MWF	room 163 Everitt Elec and Comp Engr Lab	O'Brien, W
33967: 3 hours						
33968	discussion-recitation	F4	02:00 PM - 02:50 PM	MWF	room 163 Everitt Elec and Comp Engr Lab	O'Brien, W

475 ***Modeling of Bio-Systems*** Credit: 3 or 4 hours.
Application of linear systems theory and feedback control systems analysis to biological systems; sensory receptors, neuro-muscular system models, control of eye movement, the pupil control system, man-machine interactions, parameter identification in biological systems; and optional project laboratory. Same as BIOE 475. Prerequisite: GE 320 or ECE 210 or consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor
39331	lecture	G	09:30 AM - 10:50 AM	TR	room ARR Digital Computer Laboratory	Wheeler, B
39331: 3 hoursThis class will meet in 3211 DCL.						

478 ***Formal Software Dev Methods*** Credit: 3 or 4 hours.
Same as CS 477. See CS 477.

CRN	Type	Section	Time	Days	Location	Instructor

39766	lecture-discussion	B3	09:30 AM - 10:45 AM	TR	room 1103 Siebel Center for Comp Sci	Meseguer, J
39766: 3 hours						
39767	lecture-discussion	B4	09:30 AM - 10:45 AM	TR	room 1103 Siebel Center for Comp Sci	Meseguer, J
39767: 4 hours						

483 ***Analog IC Design*** Credit: 3 hours.
Basic linear integrated circuit design techniques using bi-polar, JFET, and MOS technologies; operational amplifiers; wide-band feedback amplifiers; sinusoidal and relaxation oscillators; electric circuit noise; application of linear integrated circuits. Prerequisite: ECE 442.

CRN	Type	Section	Time	Days	Location	Instructor
33973	discussion-recitation	L	02:00 PM - 03:20 PM	TR	room 156 Henry Administration Bldg	Chiu, Y
33973: 3 hours						

484 ***Prin Adv Microelec Processing*** Credit: 3 hours.
Teaches seniors and first year graduate students in Electrical Engineering advanced topics in semiconductor device processing. Covers the principles of advanced methods of pattern delineation, pattern transfer, and modern material growth and how these are applied to produce novel and high performance devices and circuits in various semiconductor materials with special emphasis on compound semiconductors. Issues in computer simulation of processes and the manufacturing of devices and circuits are also covered. Prerequisite: ECE 444.

CRN	Type	Section	Time	Days	Location	Instructor
33974	lecture-discussion	N	10:00 AM - 11:20 AM	TR	room 252 Mechanical Engineering Bldg	Jain, K
33974: 3 hours						

486 ***Control Systems*** Credit: 4 hours.
Analysis and design of control systems with emphasis on modeling, state variable representation, computer solutions, modern design principles, and laboratory techniques. Prerequisite: ECE 210 or consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor
33976	laboratory	ABA	03:00 PM - 05:50 PM	T	room 235 Everitt Elec and Comp Engr Lab	Tang, X

33977	laboratory	ABB	11:00 AM - 01:50 PM	T	room 235 Everitt Elec and Comp Engr Lab	Tang, X
33978	laboratory	ABC	02:00 PM - 04:50 PM	W	room 235 Everitt Elec and Comp Engr Lab	Maggio, D
33975	discussion-recitation	ADC	10:00 AM - 10:50 AM	MWF	room 163 Everitt Elec and Comp Engr Lab	Liberzon, D

488 ***Compound Semicond & Devices*** Credit: 3 hours.
Advanced semiconductor materials and devices course covering elementary band theory, heterostructures, transport issues, three-terminal devices, two-terminal devices, including lasers and light modulators. Prerequisite: ECE 440; ECE 450 or consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor
39332	lecture	C	10:00 AM - 10:50 AM	MWF	room 305 Materials Science and Eng Bld	Cheng, K
39332: 3 hours						

490 ***Introduction to Optimization*** Credit: 3 or 4 hours.
Basic theory and methods for the solution of optimization problems; iterative techniques for unconstrained minimization; and introductory presentation of linear and nonlinear programming with engineering applications. Same as CSE 441. 3 undergraduate hours. 4 graduate hours. Prerequisite: CS 101 or CS 125; MATH 380; or consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor
33979	discussion-recitation	P	11:30 AM - 12:50 PM	TR	room 112 Transportation Bldg	Kumar, P

491 ***Intro to Numerical Analysis*** Credit: 3 or 4 hours.
Same as CS 450, CSE 401, and MATH 450. See CS 450.

CRN	Type	Section	Time	Days	Location	Instructor
31436	lecture-discussion	B3	09:00 AM - 09:50 AM	MWF	room 1302 Siebel Center for Comp Sci	Hewett, R; Hirani, A
31436: 3 hours						
31438	lecture-	B4	09:00 AM - 09:50	MWF	room 1302 Siebel	Hewett, R; Hirani, A

	discussion		AM		Center for Comp Sci	
31438: 4 hours						

492 ***Intro to Parallel Programming*** Credit: 3 or 4 hours.
Same as CS 420 and CSE 402. See CS 420.

CRN	Type	Section	Time	Days	Location	Instructor
31374	lecture-discussion	D3	11:00 AM - 11:50 AM	MWF	room 1302 Siebel Center for Comp Sci	Padua, D
31374: 3 hours						
39739	lecture-discussion	D4	11:00 AM - 11:50 AM	MWF	room 1302 Siebel Center for Comp Sci	Padua, D
39739: 4 hours						

497 ***Senior Research Project*** Credit: 2 hours.
Individual research project under the guidance of a faculty member: for example, mathematical analysis, laboratory experiments, computer simulations, software development, circuit design, or device fabrication. Preparation of a written research proposal, which includes preliminary results. 2 undergraduate hours. No graduate credit. Prerequisite: Senior standing; RHET 105; consent of instructor.

This course satisfies the General Education Criteria for a Advanced Composition course.

This course is intended for Honors students and Chancellor Scholars. ECE 497 and ECE 499 are approved for General Education credit only as a sequence. Both courses must be completed to receive Advanced Composition credit.

CRN	Type	Section	Time	Days	Location	Instructor
10016	independent study		ARRANGED			
10016: Advanced Composition course.Instructor Approval Required						

498 ***Special Topics in ECE*** Credit: 0 to 4 hours.
Lectures and discussions relating to new areas of interest. May be repeated if topics vary. Prerequisite: As specified for each topic offering; see Schedule or departmental course information.

CRN	Type	Section	Time	Days	Location	Instructor
44043	lecture	BC	09:00 AM - 09:50 AM	MWF	room 106B6 Engineering Hall	Cunningham, B
44043: 3 hoursTopic: Biosensors. Prerequisites: Senior or graduate standing in the department.						

44431	lecture	JL	10:00 AM - 11:20 AM	TR	room 260 Mechanical Engineering Bldg	Lyding, J
44431: 3 hoursTopic: Introduction to Nanotechnology. Prerequisite: Senior or Graduate standing.						
43739	lecture	NHV	02:00 PM - 03:20 PM	TR	room 106B3 Engineering Hall	Vaidya, N
43739: 3 hoursTopic: Wireless Networks. Prerequisites: ECE/CS 438 or equivalent or instructor's approval.						
45293	lecture	NV4	02:00 PM - 03:20 PM	TR	room 106B3 Engineering Hall	Vaidya, N
45293: 4 hoursTopic: Wireless Networks. Prerequisites: ECE/CS 438 or equivalent or instructor's approval.						

499 ***Senior Thesis*** Credit: 2 hours.
Completion of the research project begun under ECE 497. Preparation and oral presentation of a written thesis that reports the results of the project. 2 undergraduate hours. Approved for both letter and S/U grading. No graduate credit. Prerequisite: ECE 497 and consent of instructor.

This course satisfies the General Education Criteria for a Advanced Composition course.

ECE 497 and ECE 499 are approved for General Education credit only as a sequence. Both courses must be completed to receive Advanced Composition credit.

CRN	Type	Section	Time	Days	Location	Instructor
10018	independent study		ARRANGED			
10018: Advanced Composition course.Instructor Approval Required						

500 ***Graduate Seminar*** Credit: 0 hours.
Required of all graduate students. Approved for S/U grading only.

CRN	Type	Section	Time	Days	Location	Instructor
33981	lecture	U	04:00 PM - 04:50 PM	R	room 151 Everitt Elec and Comp Engr Lab	Fisher, L
40290	lecture	U1	04:00 PM - 04:50 PM	R	room 151 Everitt Elec and Comp Engr Lab	Fisher, L
33982	lecture	U2	04:00 PM - 04:50 PM	R	room 151 Everitt Elec and Comp Engr Lab	Fisher, L

512 ***Computer Microarchitecture*** Credit: 4 hours.
Design of high performance computer systems; instruction level concurrency; memory system implementation; pipelining, superscalar, and vector processing; compiler back-end code optimization; profile assisted code transformations; code generation and machine dependent code optimization; cache memory design for

multiprocessors; synchronization implementation in multiprocessors; compatibility issues; technology factors; state-of-the-art commercial systems. Same as CSE 528. Prerequisite: ECE 511; CS 426 or equivalent.

CRN	Type	Section	Time	Days	Location	Instructor
39333	lecture-discussion	G	03:00 PM - 04:20 PM	MW	room 252 Mechanical Engineering Bldg	Frank, M
39333: 4 hours						

513 ***Signal & Spectral Analysis*** Credit: 4 hours.
Fundamentals of linear least squares estimation of discrete-time signals and their spectra; minimum-norm least squares and total least squares solutions; singular value decomposition; Wiener and Kalman filtering; autoregressive spectral analysis; and the maximum entropy method. Prerequisite: ECE 410, ECE 413, MATH 418 or equivalent; or consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor
44849	lecture	D	03:00 PM - 04:20 PM	MW	room 170 Everitt Elec and Comp Engr Lab	Bresler, Y
44849: 4 hours						

515 ***Control Syst Theory & Design*** Credit: 4 hours.
Synthesis of feedback control systems to meet design specifications, including sensitivity; multivariable systems; introduction to systems with random inputs; state variable techniques; and nonlinear systems. Prerequisite: ECE 486 or equivalent; or consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor
33983	discussion-recitation	N	10:00 AM - 11:20 AM	TR	room 165 Everitt Elec and Comp Engr Lab	Basar, M
33983: 4 hours						

520 ***EM Waves & Radiating Systems*** Credit: 4 hours.
Fundamental electromagnetic theory with applications to transmission lines, waveguides, and antennas; introduction to the solution of advanced problems in static electric and magnetic fields. Prerequisite: ECE 452.

CRN	Type	Section	Time	Days	Location	Instructor
33984	discussion-recitation	E	01:00 PM - 01:50 PM	MWF	room 335 Mechanical Engineering Bldg	Chew, W

33984: 4 hours

523 ***Gaseous Electronics & Plasmas*** Credit: 4 hours.
Basic concepts and techniques, both theoretical and experimental, which are used in the areas of gaseous electronics, gas and solid plasmas, controlled fusion, aeronomy, gas lasers, and magnetohydrodynamics. Prerequisite: PHYS 485 or ECE 452 or equivalent; or consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor
33985	lecture	E	01:00 PM - 02:20 PM	MW	room 170 Everitt Elec and Comp Engr Lab	Eden, J

528 ***Analysis of Nonlinear Systems*** Credit: 4 hours.
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. Same as GE 520, and ME 546. Prerequisite: ECE 515 or equivalent; MATH 385; or consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor
33986	discussion-recitation	R	01:30 PM - 02:50 PM	TR	room 169 Everitt Elec and Comp Engr Lab	Spong, M
33986: 4 hours						

533 ***Parallel Computer Architecture*** Credit: 4 hours.
Same as CS 533 and CSE 522. See CS 533.

CRN	Type	Section	Time	Days	Location	Instructor
31613	lecture-discussion	S	09:30 AM - 10:45 AM	TR	room 1109 Siebel Center for Comp Sci	Torrellas, J
31613: 4 hours						

534 ***Random Processes*** Credit: 4 hours.
Basic concepts of random processes; linear systems with random inputs; Markov processes; spectral analysis; Wiener and Kalman filtering; applications to systems engineering. Prerequisite: One of ECE 413, MATH 461, STAT 400; or consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor
33989	discussion-	F	02:30 PM - 03:50	MW	room 305	Srikant, R

	recitation		PM		Materials Science and Eng Bld	
33989: 4 hours						

536 ***Integ Optics & Optoelectronics*** Credit: 4 hours.
Integrated optical and optoelectronic devices; theory of optical devices including laser sources, waveguides, photodetectors, and modulations of these devices. Prerequisite: One of ECE 455, ECE 487, PHYS 486; ECE 488 recommended.

CRN	Type	Section	Time	Days	Location	Instructor
33990	discussion-recitation	N	10:30 AM - 11:50 AM	TR	room 170 Everitt Elec and Comp Engr Lab	Chuang, S
33990: 4 hours						

540 ***Computational Electromagnetics*** Credit: 4 hours.
Course will cover basic computational techniques for numerical analysis of electromagnetics problems, including the finite difference, finite element, and moment methods. Emphasis will be placed on the formulation of physical problems into mathematical boundary-value problems, numerical discretization of continuous problems into discrete problems, and development of rudimentary computer codes for simulation of electromagnetic fields in engineering problems using each of these techniques. Same as CSE 530. Prerequisite: ECE 520 or concurrent registration in ECE 520; CS 257 or equivalent; or consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor
43647	lecture	R	01:30 PM - 02:50 PM	R	room 450D Everitt Elec and Comp Engr Lab	Jin, J
43647: 4 hours						

542 ***Design Fault-Tolerant Dig Syst*** Credit: 4 hours.
Advanced concepts in hardware and software fault tolerance; topics addressed include fault models, coding in computer systems, module and system level fault detection mechanism, reconfiguration techniques in multiprocessor systems and VLSI processor arrays, and software fault tolerance techniques such as recovery blocks, N-version programming, checkpointing, and recovery; survey of practical fault-tolerant systems. Same as CS 536. Prerequisite: ECE 411 or equivalent.

CRN	Type	Section	Time	Days	Location	Instructor
33991	lecture-discussion	C	10:30 AM - 11:50 AM	MW	room 260 Mechanical Engineering Bldg	Iyer, R
33991: 4 hours						

543 ***Dig Testing & Design for Test*** Credit: 4 hours.
Fundamental techniques of detecting failures in complex digital systems, algorithms for automatic test generation, and schemes for designing systems to be easily testable and with self test capability; hands-on experience with state-of-the-art computer-aided test tools in the laboratory. Prerequisite: ECE 411; ECE 462 or equivalent.

CRN	Type	Section	Time	Days	Location	Instructor
33993	discussion-recitation	C	10:00 AM - 11:20 AM	MW	room 57 Everitt Elec and Comp Engr Lab	Patel, J
33993: 4 hours						

548 ***Comp Models of Cognitive Proc*** Credit: 4 hours.
Same as CS 548. See CS 548.

CRN	Type	Section	Time	Days	Location	Instructor
31617	lecture-discussion	R	12:30 PM - 01:45 PM	TR	room 1131 Siebel Center for Comp Sci	Dejong, G
31617: 4 hours						

551 ***Digital Signal Processing II*** Credit: 4 hours.
Reviews basic concepts of digital signals and systems; examines computer-aided digital filter design, quantization effects, decimation and interpolation, and fast algorithms for convolution and the DFT; and introduces adaptive signal processing. Same as CSE 542. Prerequisite: ECE 410 and ECE 413; or equivalent.

CRN	Type	Section	Time	Days	Location	Instructor
33996	discussion-recitation	R	01:30 PM - 02:50 PM	TR	room 260 Everitt Elec and Comp Engr Lab	Liang, Z
33996: 4 hours						

553 ***Optimum Control Systems*** Credit: 4 hours.
Formulation of the optimization problem; controlability; observability; stability; Lyapunov's second method; application of variational calculus, maximum principle, and principle of optimality to control problems; stochastic control; and adaptive control. Prerequisite: ECE 515.

CRN	Type	Section	Time	Days	Location	Instructor
33998	discussion-recitation	N	12:30 PM - 01:50 PM	MW	room 106B3 Engineering Hall	Basar, M

33998: 4 hours

558 ***Digital Imaging*** Credit: 4 hours.
Multidimensional signals, convolution, transforms, sampling, and interpolation; design of two-dimensional digital filters; sensor array processing and range-doppler imaging; applications to synthetic aperture radar, optics, tomography, radio astronomy, and beam-forming sonar; image estimation from partial data. Prerequisite: ECE 410 and ECE 413; or equivalent.

CRN	Type	Section	Time	Days	Location	Instructor
34000	discussion-recitation	D	11:00 AM - 11:50 AM	MWF	room 169 Everitt Elec and Comp Engr Lab	Kamalabadi, F
34000: 4 hours						

559 ***Topics in Communications*** Credit: 4 hours.
Lectures and discussion related to advanced topics and new areas of interest in the theory of communication systems, including information theory, coding theory, and communication network theory. May be repeated in the same term as topics vary, to a maximum of 12 graduate hours; may be repeated in separate terms as topics vary, to a maximum of 16 graduate hours. Two or more sections of this course may be offered in a term with different outlines. Students registering in more than one section should receive credit separately for each section. Students will not receive additional credit toward a degree from multiple offerings of this course if those offerings have significant overlap, as determined by the Electrical and Computer Engineering department. Prerequisite: Specified each semester or consent of instructor. (It is expected that each offering will have a 500-level course as a prerequisite or co-requisite.)

CRN	Type	Section	Time	Days	Location	Instructor
44108	lecture	BH	01:00 PM - 02:20 PM	TR	room 336 Mechanical Engineering Bldg	Hajek, B
44108: 4 hoursTopic: Distributed Network Algorithms. Prerequisites: CS 473, and ECE 534 or Math 466, or consent of instructor.						
34002	lecture	RK	02:30 PM - 03:50 PM	TR	room 170 Everitt Elec and Comp Engr Lab	Koetter, R
34002: 4 hoursTopic: Advanced Coding Theory. Prerequisities: ECE 556 or consent of instructor.						

561 ***Detection & Estimation Theory*** Credit: 4 hours.
Introduction to detection and estimation theory, with applications to communication, control, and radar systems; decision-theory concepts and optimum-receiver principles; detection of random signals in noise, coherent and noncoherent detection; and parameter estimation, linear and nonlinear estimation, and filtering. Prerequisite: ECE 534 or equivalent or consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor

34003	discussion-recitation	E	01:00 PM - 02:20 PM	MW	room 106B6 Engineering Hall	Veeravalli, V
34003: 4 hours						

568 ***Model & Ctrl Electromech Syst*** Credit: 4 hours.
Examines fundamental electrical and mechanical laws for derivation of machine models; simplifying transformations of variables in electrical machines; power electronics for motor control; time-scale separation; feedback linearization and nonlinear control as applied to electrical machines. Typical electromechanical applications in actuators, robotics, and variable speed drives. Same as ME 565. Prerequisite: ECE 431 and ECE 515; or consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor
34004	lecture	R	01:00 PM - 02:20 PM	TR	room 245 Everitt Elec and Comp Engr Lab	Chapman, P
34004: 4 hours						

582 ***Physical VLSI Design*** Credit: 4 hours.
Basic physical design requirements for VLSI; performance-oriented formulation and optimization of chip partitioning, module placement and interconnection; optimized design and layout of on-chip modules; circuit extraction; high-speed VLSI circuits; yield and reliability analysis; advanced VLSI packaging and parametric testing. Prerequisite: ECE 425 or ECE 482.

CRN	Type	Section	Time	Days	Location	Instructor
34008	lecture-discussion	N	10:00 AM - 11:20 AM	TR	room 169 Everitt Elec and Comp Engr Lab	Wong, M
34008: 4 hours						

585 ***MOS Device Modeling & Design*** Credit: 4 hours.
Techniques for characterizing gate oxide and interface properties and reliability, I-V models for circuit simulation, design for control of short channel effects, silicon-on-insulator, and new device structures. Prerequisite: ECE 441 or equivalent.

CRN	Type	Section	Time	Days	Location	Instructor
34009	lecture	D	11:30 AM - 12:50 PM	MW	room 170 Everitt Elec and Comp Engr Lab	Rosenbaum, E
34009: 4 hours						

586 ***Topics in Decision and Control*** Credit: 4 hours.

Lectures and discussions related to advanced topics and new areas of interest in decision and control theory, including hybrid, sampled-data, and fault tolerant systems, control over networks, vision-based control, system estimation and identification, and dynamic games. May be repeated up to 12 hours within a semester, and up to 20 hours total for the course. Students may not receive additional credit towards a degree from multiple offerings of this course if those offerings have significant overlap, as determined by the ECE department. Prerequisite: As specified each semester of consent of instructor. It is expected that each offering will have a 500-level course as prerequisite or co-requisite.

CRN	Type	Section	Time	Days	Location	Instructor
45232	lecture	CH	02:30 PM - 03:50 PM	TR	room 143 Everitt Elec and Comp Engr Lab	Hadjicostis, C
45232: 4 hoursTopic: Coding Approaches to Reliable System Design. Prerequisites: ECE413 or ECE462 (or permission of instructor). Familiarity with elementary algebra at the level of Math 417 and linear system theory at the level of ECE515 would be helpful, but not required; a self-contained introduction to these topics will be provided.						
43650	lecture	YM	01:30 PM - 02:50 PM	TR	room 106B6 Engineering Hall	Ma, Y
43650: 4 hoursTopic: Estimation and Segmentation of Hybrid Models. Prerequisites: Linear algebra (Math415/426) and statistics (ECE413). This course can be viewed as a follow-up course to either one of the following: ECE549, ECE547, ECE515, ECE534, ECE561.						

590 ***Grad Sem in Special Topics*** Credit: 0 to 2 hours.
Lectures and discussions on current research and literature on advanced topics in electrical engineering. May be repeated. Approved for S/U grading only. Prerequisite: Advanced standing; consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor
34012	lecture	B	04:00 PM - 04:50 PM	T	room 269 Everitt Elec and Comp Engr Lab	Chew, W
34010	lecture	D	04:00 PM - 04:50 PM	T	room 3269 Beckman Institute	O'Brien, W
34013	lecture	G	04:00 PM - 04:50 PM	W	room B2 Coordinated Science Lab	Liu, C
45608	lecture	H	ARRANGED			Eden, J
34014	lecture	I	04:00 PM - 04:50 PM	M	room 50 Everitt Elec and Comp Engr Lab	Gross, G
34011	lecture	P	04:00 PM - 04:50 PM	W	room 2269 Beckman Institute	Do, M
34015	lecture	X	04:00 PM - 04:50 PM	T	room B2 Coordinated	Nicol, D

					Science Lab	
34015: 1 hours						

594 ***Math Models of Language*** Credit: 3 or 4 hours.
Mathematical models of linguistic structure and their implementation in computational algorithms used in automatic speech understanding and speech synthesis. Statistical and automata theoretic techniques are studied allowing a quantitative description of acoustic-phonetics, phonology, phonotactics, lexicons, syntax, and semantics. Students will use the methods to build components of a speech understanding system. Same as LING 594. For 4 hours credit, an extended project is required. Prerequisite: ECE 537 or consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor
34016	lecture	B	09:00 AM - 09:50 AM	MWF	room 170 Everitt Elec and Comp Engr Lab	Levinson, S

596 ***Master's Project*** Credit: 1 to 8 hours.
Graduate-level individual or team projects in electrical and computer engineering emphasizing advanced engineering analysis and design. May be repeated to a maximum of 16 hours. Only 4 hours of ECE 496 can be included in the 32 hours required for the M. S. degree in Electrical Engineering. Credit in ECE 496 cannot be included in the 64 post-M. S. hours required for the Ph.D. degree in Electrical Engineering. Prerequisite: Graduate standing in ECE. Students with deferred credit for ECE 599 may not register in ECE 596 without consent of the ECE department.

CRN	Type	Section	Time	Days	Location	Instructor
10020	independent study		ARRANGED			
10020: Instructor Approval Required						

597 ***Individual Study in ECE*** Credit: 1 to 8 hours.
Individual projects. Prerequisite: Consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor
10023	independent study		ARRANGED			
10023: Instructor Approval Required						

598 ***Special Topics in ECE*** Credit: 0 to 4 hours.
Lectures and discussions relating to new areas of interest. May be repeated if topics vary. Prerequisite: As specified for each topic offering; see Schedule or departmental course information.

CRN	Type	Section	Time	Days	Location	Instructor
44432	lecture	CDP	03:00 PM - 04:20 PM	MW	room 1111 Siebel Center for Comp Sci	Polychronopoulos, C
44432: 4 hoursTopic: Next Generation Smart Routers. Prerequisites: ECE 411 or CS 433, and CS/ECE 438 or equivalent.						
45422	lecture	FK	12:00 PM - 01:20 PM	TR	room 260 Everitt Elec and Comp Engr Lab	Koushanfar, F
45422: 4 hoursTopic: Practical Statistical Modeling for Emerging Technologies. Prerequisites: ECE 413 or equivalent.						
34024	lecture	KH	02:00 PM - 02:50 PM	MWF	room 169 Everitt Elec and Comp Engr Lab	Hess, K
34024: 4 hoursTopic: Quantum Mechanics for Nano-technology. Prerequisites: ECE 535.						
34019	lecture	MD	09:30 AM - 10:50 AM	MW	room 252 Mechanical Engineering Bldg	Do, M
34019: 4 hoursTopic: Wavelets in Signal Processing. Prerequisites: ECE 551 or consent of instructor.						
44223	lecture	NB	11:00 AM - 12:15 PM	TR	room 344 Mechanical Engineering Bldg	Borisov, N
44223: Topic: Pirvacy Enhancing Technologies. Prerequisites: ECE 428/CS425 or equivalent or consent of instructor. This course can be taken for 2 hours (if not doing a research project) or 4 hours (will do a reserach project).						
40110	lecture	YS	01:00 PM - 02:20 PM	TR	room 214 Ceramics Bldg	Shinagawa, Y
40110: 4 hoursTopic: Object-Based Image and Video Processing. Prerequisites: ECE 418 or ECE 547 or ECE 549 or consent by the instructor.						

599 ***Thesis Research*** Credit: 0 to 16 hours.
May be repeated. Approved for S/U grading only.

CRN	Type	Section	Time	Days	Location	Instructor
10025	independent study		ARRANGED			
10025: Instructor Approval Required						