EGE505. Analytical Techniques I . 3 Credits.

EGE506. Analytical Techniques II . 3 Credits.

EGE511. Digital Data and Computer Communication . 3 Credits.

EGE512. Advanced Communications . 3 Credits.

EGE513. Digital Signal Processing . 3 Credits.

EGE521. CMOS Analog Circuit Design . 3 Credits.
Analysis and optimized design of analog integrated circuits and systems in CMOS technology. Specific topics include MOS devices, device physics, basic CMOS analog circuit building blocks, single stage amplifiers, differential amplifiers, operational amplifiers, reference sources, distortions and controls, various circuit design techniques, options and trade-offs. Graduate Standing or Permission of the Instructor.

EGE522. Advanced Analog Circuits . 3 Credits.

EGE523. Wireless Communications . 3 Credits.
Overview of wireless systems, propagation characteristics of wireless channels, modems for wireless communications, cells and cellular traffic, fading and multiple access techniques.

EGE525. Microelectronic Fabrication . 3 Credits.
The physics and technology of various steps required to fabricate complicated integrated circuits are explained. The Si and GaAs materials will be covered. The course will cover microelectromechanical systems (MEMS) fabrication as well.

EGE527. Electronic Properties of Materials . 3 Credits.
Introduction to electronic properties of materials through the concepts of classical mechanics and quantum mechanics principles. Topics include fundamentals of quantum mechanics, Shrödinger wave equations, energy bands, free-electron energy, applications of electronic theory upon electrical, thermal, optical and magnetic properties of materials. Graduate Standing or Permission of the Instructor.

EGE528. Computer Arithmetic . 3 Credits.
Deals with algorithms and architectures used for computer arithmetic. Issues that will be addressed include: number systems and representation, redundant and residue systems. Addition/subtraction circuits. Multiplication, division, square route algorithms, cordic arithmetic system. Floating-point arithmetic systems. Implementation issues – pipelining, low-power, fault-tolerant designs.

EGE533. Introduction to Parallel Computing . 3 Credits.
Paradigms of parallel computer systems, memory system implementation, idealized versus practical parallel computer models, parallel algorithms, algorithmic complexity, survey of commercial parallel machines.

EGE534. Fault-Tolerant Design of Digital Systems . 3 Credits.

EGE535. Low Power VLSI Design . 3 Credits.
Deals with the design of digital systems for low power dissipation. Issues that will be addressed include CMOS power dissipation, analysis and design tools used for low power digital circuits, design methodologies for low power CMOS circuits, low power memory system designs and a discussion on future challenges in low power digital design. Builds on the VLSI design course previously covered by students in Electrical Engineering/Computer Engineering/Computer Science areas. Students are expected to have a background in circuit theory, electronics, digital logic fundamentals, and probability theory fundamentals. These courses are all covered under core courses in the undergraduate program.

EGE536. Computer Architecture . 3 Credits.
Computer architecture and hardware system organization are examined. Topics include performance issues, CPU organization and instruction set implementation, performance enhancement through pipelining, memory organizations, input/output structure, and an introduction to parallel architectures.

EGE537. VLSI Design . 3 Credits.
Introduction to MOS devices and circuits (N-MOS and CMOS), MOS transistor theory, integrated circuit processing technology and design rules (N-MOS and CMOS), circuit characterization and performance estimation, logic design, interfacing, design tools, testability analysis, and discussion of chip design projects.

EGE542. Numerical Methods in Engineering . 3 Credits.
Review of electromagnetic theory and analytical methods. Time domain and frequency domain finite difference methods. Paradigms of parallel computer systems, memory system implementation, idealized versus practical parallel computer models, parallel algorithms, algorithmic complexity, survey of commercial parallel machines.

EGE543. Antennas and Wave Propagation . 3 Credits.
Wire antennas and arrays. Aperature antennas and arrays. Solutions of antennas by the moment method. Antenna synthesis and optimization.

EGE544. Microwave Circuits . 3 Credits.
Review of transmission lines, waveguides, impedance matching and scattering parameters. Microwave resonators, power dividers, directional couplers, and hybrids, microwave litters, microwave defectors, mixers, amplifiers, and oscillators.

EGE545. Satellite Communication . 3 Credits.
EGE551. Electromechanical Energy Conversion. 3 Credits.
Fundamentals of energy conversion including electric circuits and
magnetic circuits. Ideal transformers will be introduced first, and real
transformer construction and equivalent circuit will be presented. The
equivalent circuit will be solved to determine the transformer efficiency
and voltage regulation. Single phase and three phase induction machine
construction, equivalent circuit and its analysis under load will be
performed to determine motor load characteristics and efficiency. Single
phase and three phase synchronous machine construction, excitation,
and load characteristics will be studied in detail, and machine transient
characteristics will be covered briefly.

EGE561. Adaptive Control . 3 Credits.
Basic concept of adaptive control. Real time parameter estimation. Model

EGE562. Optimal Control . 3 Credits.
Review of matrix algebra, gradients and series. Introduction to
Maximum principle - Hamiltonian. Linear regulator and associated topics.
Output feedback problems.

EGE564. Non-Linear Control . 3 Credits.
Phase plane analysis. Lyapunov analysis. Advanced stability theory.
Describing function analysis. Feedback linearization design. Sliding
control design.

EGE570. Fiber Optics. 3 Credits.

EGE572. Engineering Management. 3 Credits.
Prepares engineering students for a career in management. Through
class discussions, group projects, role playing, and guest speakers,
students find out what a management role will entail. Students learn how
to go from being a practicing engineer to being an engineering manager.

EGE575. Heterostructure Devices. 3 Credits.

EGE580. Power Electronics. 3 Credits.

EGE590. Thesis in Electrical Engineering . 3-6 Credits.
Research, writing and defense of a thesis under the guidance of the major
professor. Required form available in the Records and Registration Office.
Required each semester after thesis research project is begun.

EGE593. Engineering Selected Topic. 3-12 Credits.
Selected topics courses are regularly scheduled courses that focus on
a particular topic of interest. Descriptions are printed in the Schedule
of Classes each semester. Selected topics courses may be used as
elective credit and may be repeated for credit, provided that the topic of
the course changes.

EGE594. Fieldwork Engineering. 1-12 Credits.

EGE595. Indep Study Elec Engineering. 1-12 Credits.

EGE599. Comprehensive Exam Workshop. 0 Credits.
Non-credit workshop for students who wish to devote the semester
immediately following the completion of their coursework to prepare for
the comprehensive exam.

EGE790. Thesis Engineering. 1-12 Credits.

EGE795. Indep Study Elec Engineering. 0 Credits.

EGE799. Continued Registration. 1 Credit.