ELECTRICAL AND COMPUTER ENGINEERING

(845) 257-3720

The Division of Engineering Programs offers the following programs (all accredited by the Engineering Accreditation Commission of ABET, http://abet.org):

Bachelor's + Master's Degree Programs in 5 Years

**B.S. in Computer Engineering + M.S. in Electrical Engineering (266)**
This program offers a fast-track Master of Science degree in electrical engineering. The program is open to SUNY New Paltz students who are currently enrolled in their last semester of the junior standing, pursuing a Bachelor of Science in computer engineering.

**B.S. in Electrical Engineering + M.S. in Electrical Engineering (267)**
This program offers a fast-track Master of Science degree in electrical engineering. The program is open to SUNY New Paltz students who are currently enrolled in their last semester of the junior standing, pursuing a Bachelor of Science in electrical engineering.

Master of Science in Electrical Engineering (265)

The Master of Science in Electrical Engineering provides a quality graduate program offered within a small setting, where students get individual attention. The program can be pursued either full or part-time, and is designed to serve recent graduates and practicing engineers who need in-depth knowledge in the rapidly changing and expanding areas of electrical engineering beyond what can be included in the traditional bachelor's program. The program offers the following areas of specialization:

- Microelectronics
- Systems
- Energy
- Computer Engineering

The degree can be completed with two options: thesis and non-thesis. The program with thesis option emphasizes research and requires submission of a thesis. This option requires the completion of 30 credits, 24 course credits and 6 thesis credits. The non-thesis option requires completion of 30 course credits and successful completion and presentation of at least two projects. Students in non-thesis track usually complete the program in 18 months.

Internship and Co-ops are available to students. Some of the companies that our students have recently interned include IBM, General Electrical, Honda Research, and Central Hudson Gas and Electric.

Graduate Programs in Electrical and Computer Engineering

BS/MS in Electrical Engineering (http://catalog.newpaltz.edu/graduate/science-engineering/electrical-computer-engineering/five-year-bs-electrical-engineering-ms-electrical-engineering)

This program offers a fast-track Master of Science degree in electrical engineering. The program is open to SUNY New Paltz students who are currently enrolled in their last semester of the junior standing, pursuing a Bachelor of Science in electrical engineering.

BS in Computer Engineering + MS in Electrical Engineering (http://catalog.newpaltz.edu/graduate/science-engineering/electrical-computer-engineering/five-year-bs-computer-engineering-ms-electrical-engineering)

This program offers a fast-track Master of Science degree in electrical engineering. The program is open to SUNY New Paltz students who are currently enrolled in their last semester of the junior standing, pursuing a Bachelor of Science in computer engineering.

MS in Electrical Engineering (http://catalog.newpaltz.edu/graduate/science-engineering/electrical-computer-engineering/ms-electrical-engineering)

The Master of Science in Electrical Engineering provides a quality graduate program offered within a small setting, where students get individual attention. The program can be completed either full or part-time, and is designed to serve recent graduates and practicing engineers who need in-depth knowledge in the rapidly changing and expanding areas of electrical engineering beyond what can be included in the traditional bachelor's program.

- EGC593. Comp Eng Select Topics. 3-12 Credits.
- EGC595. Indep Study Comptr Engin. 0 Credits.
- EGC795. Indep Study Comptr Engin. 0 Credits.
- 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, Shrodinger 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.

EGE532. 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, cordon 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. Moment methods application to radiation and scattering problems.

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.

EGE562. Optimal Control . 3 Credits.

EGE564. Non-Linear Control . 3 Credits.
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.

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.