ENGINEERING PROGRAMS

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The Division of Engineering Programs offers high-quality Bachelor of Science degree programs in Computer Engineering, Electrical Engineering, and Mechanical Engineering, all of which are accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org. We also offer a minor in Engineering and an accelerated program through which students may earn a bachelor's degree in Computer Engineering or Electrical Engineering and a master's degree in Electrical Engineering in five years. For more information about the accelerated BS/MS programs, please refer to the Graduate Catalog.

Computer, electrical and mechanical engineering continue to be growth areas due to rapidly changing technologies and expanding industrial needs. New Paltz's programs are designed to meet these needs, both generally and within the Mid-Hudson Valley, specifically. Each program includes a General Education experience, foundation coursework in math, science and engineering concepts, required core courses, and technical electives. Design is emphasized throughout the curriculum. These components ensure that students develop and refine discipline-specific knowledge and skills and engage in opportunities to apply their knowledge to engineering problems using the tools and techniques of modern engineering practice. The General Education component complements students' engineering education and encourages them to understand engineering roles in a broader context.

The flexibility of the engineering curricula serves full- and part-time students, traditional and non-traditional students, and students new to engineering as well as those who have some experience in technical areas. Our students benefit from quality facilities, small classes and labs, close interaction with faculty with real-world experience, and opportunities for research and internships with industry partners. Students acquire the cultural, social, and communication skills that only a liberal arts education can provide and graduate fully prepared for the engineering profession of today and tomorrow.

Departmental Academic Policies

- Students may not enroll in any engineering course unless all prerequisites have been met with a grade of C- or better.
- Students must earn a grade of C- or better in any course that is used to satisfy engineering major requirements.(See Major in Mechanical Engineering for limited exceptions to this minimum grade requirement.)
- Except for Fieldwork (EGC494 Fieldwork Computer Engin or EGE494 Fieldwork Engineering or EGM494 Fieldwork Mechanical Engineering), courses taken on a Satisfactory/Unsatisfactory basis cannot be applied toward engineering major requirements.
- Non-engineering students may not enroll in engineering or engineering-related courses other than EGG101 Introduction to Engineering Science and EGG321 Technical Communication. Exceptions are frequently granted for EGE200 Circuit Analysis, EGE201 Circuits Laboratory, EGC220 Digital Logic Fundamentals, and EGC221 Digital Logic Lab. Permission to register in any of these courses[1] must be obtained from the Division of Engineering Programs prior to registration.
- Admission of transfer students is based on transcript review, detailed comparison with SUNY New Paltz foundation requirements, and consultation with an advisor from the Division of Engineering Programs. SUNY publishes additional information for transfer students, along with designated "transfer paths" for engineering and other academic programs.

Please note: Our program is designed to be completed in four (4) years if students begin the math sequence with Calculus I.

[1] Permission is not required for Computer Science students to register for EGC220 Digital Logic Fundamentals and EGC221 Digital Logic Lab.

Computer Engineering (BS), Electrical Engineering (BS), and Mechanical Engineering (BS): Program Learning Outcomes

All undergraduate (BS) engineering programs have adopted ABET Criterion 3 (a)-(k) as their guiding outcomes. Students who successfully complete the Computer Engineering, Electrical Engineering, or Mechanical Engineering major will be able to:

- Apply knowledge of mathematics, science and engineering.
- Design and conduct experiments, as well as analyze and interpret data.
- Design a system, component, or process to meet desired needs within realistic constraints, such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
- Function on multi-disciplinary teams.
- Identify, formulate, and solve engineering problems.
- Understand professional and ethical responsibility.
- Communicate effectively.
- Demonstrate the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
- Recognize the need for, and be able to engage in, life-long learning.
- Demonstrate knowledge of contemporary issues.
- Use the techniques, skills, and modern engineering tools necessary for engineering practice.

- Major in Computer Engineering
- Major in Electrical Engineering
- Major in Mechanical Engineering
- Minor in Engineering

General Engineering

EGG101. Introduction to Engineering Science. 3 Credits.

This entry-level course provides students with an overview of the engineering sciences. Equal emphasis is placed on the three fields of engineering in which SUNY New Paltz offers degree programs; Electrical Engineering, Computer Engineering, and Mechanical Engineering. Each module offers hands-on learning experiences through projects.

Attributes:

- Liberal Arts

Restrictions:

- Must have the following level: Undergraduate

Prerequisites:

- Math Placement Level Minimum Score of 5 or MAT181 Minimum Grade of C-

May not be repeated for credit

EGG193. Engineering Selected Topic. 1-12 Credits.

Restrictions:

- Must have the following level: Undergraduate

Prerequisites:

- EGG101 Minimum Grade of C-

May be repeated for credit

EGG199. Modular Course. 1-12 Credits.

May be repeated for credit

EGG250. Energy and the Environment. 3 Credits.

Energy fundamentals, fossil based (coal, oil and gas), nuclear and renewable energy sources (such as solar, wind, hydro, geothermal, biomass, tidal and ocean thermal). Heat engines, use of energy in transportation, energy conservation and effect of energy consumption in the environment (locally and globally) are studied.

Attributes:

- Liberal Arts
- GE4: Natural Science Course
- GE5: Natural Science Course
- GE3: NSCI
- Systematic Inquiry

Prerequisites:

- Math Placement Level Minimum Score of 3 or MAT120 Minimum Grade of C- or MAT 151 Minimum Grade of C- or MAT053 Minimum Grade of C- or MAT121 Minimum Grade of C-

May not be repeated for credit

EGG293. Engineering Selected Topic. 1-12 Credits.

Restrictions:

- Must have the following level: Undergraduate

May be repeated for credit

EGG295. Indep Study General Engi. 1-12 Credits.

Restrictions:

- Must have the following level: Undergraduate

May be repeated for credit

EGG311. Engineering Statistics. 3 Credits.

This course will provide students with an understanding of the principles of engineering data analysis using basic probability theorems and statistical methods with emphasis on their application to real-world data processing problems.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Mechanical Engineering (521)

Prerequisites:

- MAT252 Minimum Grade of C-

May not be repeated for credit

EGG321. Technical Communication. 3 Credits.

Prepare proposal for Senior Design Project. Build high level statement, audience definition, product definition statement, product plan, risk assessment, and product verification and wrap-up plan. Also covers business memos, abstracts and summaries mechanical descriptions, poster sessions, business ethics, and business-oriented oral presentation. Two oral presentations are required.

Attributes:

- Liberal Arts
- Writing Intensive

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Mechanical Engineering (521)

Prerequisites:

- ENG180 Minimum Grade of C- or ENG170 Minimum Grade of C- or ENG206 Minimum Grade of C- or ENG207 Minimum Grade of C- or ENG 002 Minimum Grade of TC-

May not be repeated for credit

EGG393. Engineering Selected Topic. 3-12 Credits.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

May be repeated for credit

EGG399. Modular Course. 1-3 Credits.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

May be repeated for credit

EGG408. Senior Design Project I. 2 Credits.

Part 1 of the engineering capstone experience. Students produce a two-semester project plan and work in teams, with guidance from their project advisor(s), to design and implement a prototype that they will demonstrate and present at the end of the semester. Attendance at project-management lectures is required.

Attributes:

- Liberal Arts
- Writing Intensive

Restrictions:

- Must have the following level: Undergraduate
- Must be enrolled in the following class: Senior
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Mechanical Engineering (521)

May not be repeated for credit

EGG409. Sr Design Project 2. 2 Credits.

Part 2 of the engineering capstone experience, which culminates in a final design. Students, with guidance from their project advisor(s), improve on the prototype produced in EGG408. At the end of the course, students demonstrate and present their final design and submit a Senior Design Project Report that describes the entire (two-semester) design process.

Attributes:

- Critical Thinking Advanced
- Information Mgmt Advanced
- Liberal Arts
- Writing Intensive

Restrictions:

- Must have the following level: Undergraduate
- Must be enrolled in the following class: Senior
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Mechanical Engineering (521)

Prerequisites:

- EGG408 Minimum Grade of C-

May not be repeated for credit

EGG441. Microelectronics Reliability. 3 Credits.

This course will provide students with the practical background of operation and degradation physics in semiconductor devices, methods for reliability characterization, and data analysis methodology for the most important reliability wearout mechanisms in microelectronic. It will cover the necessary basics in semiconductor physics, materials science, transistor operation, reliability fundamentals and the latest trend in the industry. In addition, individual and team projects will offer students working knowledge of qualifying semiconductor technologies for both FEOL (front end of line) and BEOL (back end of line) fields.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

Prerequisites:

- EGG 340 Minimum Grade of C- or EGE320 Minimum Grade of C- or EGM322 Minimum Grade of C-

May not be repeated for credit

EGG472. Engineering Management. 3 Credits.

Prepares engineering students for a career in management. Through class discussions, group projects, various videos, and guest speakers, students find out what a managements role will entail, including ethical issues. Students learn how to go from being a practicing engineer to being and engineering manager.

Restrictions:

- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Computer Engineering AP (266)
  - Electrical Engineering (517)
  - Electrical Engineering AP (267)
  - Mechanical Engineering (521)

Prerequisites:

- EGE200 Minimum Grade of C-
- EGE201 Minimum Grade of C-

May not be repeated for credit

EGG493. Engineering Selected Topic. 1-12 Credits.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

May be repeated for credit

EGG495. Indep Study Generl Engin. 1-12 Credits.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

May be repeated for credit

Computer Engineering

EGC193. Engineering Selected Topic. 1-12 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.
May be repeated for credit

EGC220. Digital Logic Fundamentals. 3 Credits.

An introduction to digital logic analysis and design. Topics include: number representations used in today's digital systems and their arithmetic properties and conversion techniques; combinational switching theory of digital element networks where no feedback is present; analysis and design of clocked sequential circuits where feedback is present; and an introduction to modern programmable logic devices and their programming and synthesis techniques.

Attributes:

- Critical Thinking Introductory

Restrictions:

- Must have the following level: Undergraduate
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Computer Science (513)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- MAT251 Minimum Grade of C-
- EGC221 Minimum Grade of C-*

* May be taken at the same time
May not be repeated for credit

EGC221. Digital Logic Lab. 1 Credit.

Experiments in both combinational and sequential logic design. Breadboarding, schematic capture, and Verilog implementation of digital circuits of varying complexity. Use of software tools to design FPGA based circuits.

Restrictions:

- Must have the following level: Undergraduate
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Computer Science (513)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Corequisites:

- EGC220

May not be repeated for credit

EGC251. C/C++ Programming. 3 Credits.

A course in computer programming using high level programming languages (C/C++) as a tool to solve engineering problems. Topics include programming structure, decisions, repetition, arrays, functions, data files, addresses and pointers and object oriented design.

Attributes:

- Information Mgmt Intro

Restrictions:

- Must have the following level: Undergraduate
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGG101 Minimum Grade of C-

May not be repeated for credit

EGC293. Engr Selected Topics. 1-12 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.
May be repeated for credit

EGC295. Indep Study Comptr Engin. 1-12 Credits.

May be repeated for credit

EGC320. Digital Systems Design. 3 Credits.

State minimization, assignment, and design of synchronous sequential circuits. Verilog coding. Analysis and design of asynchronous sequential circuits. PLDS. Digital system design examples. Additional topics such as design of CMOS circuits, power reduction, testing etc.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGC220 Minimum Grade of C-
- EGC221 Minimum Grade of C-

May not be repeated for credit

EGC331. Microcontroller System Design. 3 Credits.

An introduction to Microcontroller Hardware and Software Design. Topics include organization and architecture; memory and I/O interfacing; and Assembly and C language programming. Interfacing and programming techniques with microcontroller peripherals that include: UART (Serial Communications), Counters and Timers, Interrupts, and Analog and Digital Interfacing.

Restrictions:

- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGC220 Minimum Grade of C-
- EGC221 Minimum Grade of C-
- EGC251 Minimum Grade of C-
- EGE200 Minimum Grade of C-
- EGE201 Minimum Grade of C-

Corequisites:

- EGC332

May not be repeated for credit

EGC332. Microcontroller Laboratory. 1 Credit.

Self-paced laboratory to provide hands-on experience encompassing Assembly and C programming languages and interfacing peripheral devices as applied to microcontroller systems.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGC220 Minimum Grade of C-
- EGC221 Minimum Grade of C-
- EGC251 Minimum Grade of C-
- EGE200 Minimum Grade of C-
- EGE201 Minimum Grade of C-

Corequisites:

- EGC331

May not be repeated for credit

EGC412. Data Communications. 3 Credits.

A first course in Data Communications, which introduces the problems, solutions, and limitations associated with interconnecting computers by communication networks (LAN or WAN). The seven layer ISO Open Systems Interconnect (OSI) reference model serves as framework for the course with major emphasis on layers one through four (physical, data link, network, and transportation.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGC331 Minimum Grade of C-

May not be repeated for credit

EGC433. Embedded Systems. 3 Credits.

Analysis and design processes required for utilizing advanced functionality, real-time (interrupt) interfacing, and bare-metal and RTOS programming techniques (using C) as applied to an industry standard microcontroller-based embedded system. Topics include: analog interfacing and data acquisition, sensors, actuators, signal conditioning, timers and PWM, parallel and serial interfacing, communication and networking and control concepts.

Attributes:

- Critical Thinking Intermediate

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGC331 Minimum Grade of C-
- EGC332 Minimum Grade of C-

May not be repeated for credit

EGC442. Introduction to 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.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGC331 Minimum Grade of C-
- EGC332 Minimum Grade of C-

May not be repeated for credit

EGC445. VLSI Design. 3 Credits.

Introduction to CMOS, MOS transistor theory. IC technology and layout design rules. Design of CMOS circuits. Circuit characterization and performance estimation. Memory, clocking and input/output circuits. Microarchitecture of VLSI systems. Chip design projects. Testability.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGC220 Minimum Grade of C- and EGC221 Minimum Grade of C-
- EGE320 Minimum Grade of C- and EGE322 Minimum Grade of C-

Corequisites:

- EGC446

May not be repeated for credit

EGC446. VLSI Design Lab. 1 Credit.

Static and dynamic characteristics of CMOS logic gates. Design of CMOS circuits using transistor schematics, and verification through simulation. Layout of CMOS circuits using state-of-the-art VLSI tools, design rule check, and verification through simulation.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Corequisites:

- EGC445

May not be repeated for credit

EGC447. Functional Verfication of Hardware Systems. 3 Credits.

An introduction to the hardware verification practices used in industry. Students will learn how to create architecture for test benches, object-oriented approach, stimulus generation techniques, results checking, and how to analyze coverage using SystemVerilog.

Attributes:

- Information Mgmt Intrmd

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGC 450 Minimum Grade of C-
- EGC455 Minimum Grade of C-

May not be repeated for credit

EGC448. Software Defined Networks. 3 Credits.

Broadband and Carrier Ethernet Networks and technologies. Role of SDN in defining architecture of the next generation of networks. Determination of conformance criteria for network standards and protocols to support industry solutions and applications.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Computer Engineering AP (266)
  - Electrical Engineering (517)
  - Electrical Engineering AP (267)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- CPS210 Minimum Grade of C- or EGE331 Minimum Grade of C-

May not be repeated for credit

EGC451. Real-Time Systems. 3 Credits.

Practical experience of real-time operating systems (RTOS) and real-time debugging as applied to real-time embedded systems. Design and implementation of real-time embedded systems: controllers, data storage, data acquistion, and communication using a commercially available RTOS.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGC433 Minimum Grade of C- or EGC 416 Minimum Grade of C-

May not be repeated for credit

EGC455. Design and Verification of System on Chip. 3 Credits.

System-on-chip (SoC) design and verification, IP (intellectual property) reuse in design and verification, hardware/software co-design, embedded software, functional verification using SystemVerilog and Universal Verification Methodology (UVM).

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGC320 Minimum Grade of C-
- EGC442 Minimum Grade of C-
- EGC445 Minimum Grade of C-
- EGC446 Minimum Grade of C-

May not be repeated for credit

EGC493. Comp Eng Select Topics. 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.

Restrictions:

- Must not be enrolled in the following class: Freshman

Prerequisites:

- EGC220 Minimum Grade of C-

May be repeated for credit

EGC494. Fieldwork Computer Engin. 0 Credits.

Restrictions:

- Must not be enrolled in the following class: Freshman

May not be repeated for credit

EGC495. Indep Study Comptr Engin. 1-12 Credits.

Restrictions:

- Must not be enrolled in the following class: Freshman

May be repeated for credit

Electrical Engineering

EGE193. 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.

Restrictions:

- Must have the following level: Undergraduate

May be repeated for credit

EGE200. Circuit Analysis. 3 Credits.

Electrical circuit parameters; Kirchhoff's laws; circuit theorems; transient analysis of first and second-order circuits; sinusoidal excitation: phasor analysis, complex power; frequency response; resonance and filters; magnetically-coupled circuits and transformers; three-phase circuits.

Attributes:

- Critical Thinking Introductory

Restrictions:

- Must have the following level: Undergraduate
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- PHY202 Minimum Grade of C- and MAT359 Minimum Grade of C-
- EGE201 Minimum Grade of C-*

* May be taken at the same time
May not be repeated for credit

EGE201. Circuits Laboratory. 1 Credit.

Computer simulation and hardware experimentation on equivalent resistance, nodal and mesh approaches. Thevenin theorem, maximum power transfer, step response of first and second order circuits, power factor correction, and resonant circuits.

Attributes:

- Information Mgmt Intro

Restrictions:

- Must have the following level: Undergraduate
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- PHY202 Minimum Grade of C- and MAT359 Minimum Grade of C-

Corequisites:

- EGE200

May not be repeated for credit

EGE293. Engineering Selected Topic. 1-12 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.

Restrictions:

- Must have the following level: Undergraduate

Prerequisites:

- PHY202 Minimum Grade of C-

May be repeated for credit

EGE295. Indep Study Elec Engineering. 1-12 Credits.

Selected research areas specific to faculty.

Restrictions:

- Must have the following level: Undergraduate

May be repeated for credit

EGE302. Antenna Laboratory. 1 Credit.

Measurement of the far field pattern and characteristics of wire antennas and arrays for VHF. Measurement of the field pattern and characteristics of reflector type antennas in the X-band, and of aperture type antennas and arrays in the X-band.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGE445 Minimum Grade of C-*

* May be taken at the same time
May not be repeated for credit

EGE303. Microwave Fundamentals Laboratory. 1 Credit.

Measurement of VSWR and wavelength in waveguides, stub tuners and matching, calibration of altenuators, time domain reflectometry and frequency domain network analyzer measurement. Prerequisite/Corequisite: EGE342.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGE342 Minimum Grade of C-

May not be repeated for credit

EGE306. Microwaves Circuits Laboratory. 1 Credit.

Design, build and test planar microwave devices such as power divider, coupler, filter, mixer, amplifier, and oscillator.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

May not be repeated for credit

EGE311. Signals and Systems. 3 Credits.

Continuous and discrete-time signals, systems, and their properties; linear time-invariant systems: convolution; system descriptions using differential and difference equations; Fourier series, Fourier Transform and their properties. Laplace transform and Z-transform.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGE200 Minimum Grade of C- or EGE 250 Minimum Grade of C-

May not be repeated for credit

EGE320. Electronics I. 3 Credits.

Op-amp as a device, semiconductors, diodes, Zener diodes, diode circuits, bipolar junction transistors: physics, biasing and amplification. Metal-oxide semiconductor field effect transistor: physics, biasing and amplification. Bipolar translator as a switch.

Attributes:

- Critical Thinking Intermediate

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGE200 Minimum Grade of C- or EGE 250 Minimum Grade of C-
- EGE322 Minimum Grade of C-*

* May be taken at the same time
May not be repeated for credit

EGE321. Electronics II. 3 Credits.

Multistage amplifiers (direct coupled, capacitor coupled), differential amplifiers. Advance current sources. Applications of operational amplifiers. Frequency response of amplifiers. Tuned amplifiers. Oscillators Waveform generators. Feedback amplifiers, and stablity of feedback amplifiers. Power amplifiers.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGE320 Minimum Grade of C-

Corequisites:

- EGE323

May not be repeated for credit

EGE322. Electronics I Laboratory. 1 Credit.

Laboratory exercises covering op-amps, characterization of diodes, BJT, and MOSFET, diode circuits, biasing and amplication of BJT and MOSFET, including simple current source.

Attributes:

- Information Mgmt Intrmd

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Corequisites:

- EGE320

May not be repeated for credit

EGE323. Electronics II Laboratory. 1 Credit.

Laboratory exercises covering the multistage amplifier, direct coupled amplifier, difference amplifier, op-amp applications, frequency response, oscillator, waveform generator, power amplifier, and frequency response.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Corequisites:

- EGE321

May not be repeated for credit

EGE331. Computer Simulation. 3 Credits.

Problem Solving and Engineering Methods, Algorithm Development, MATLAB Interactive Environment, MATLAB Programming Elements, Control Structures, Arrays and Matrix Operations, Plotting and Graphing, Recursion, Fundamentals of Database, Developing tables using Excel, Importing and exporting Excel tables to MATLAB.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGE200 Minimum Grade of C-* or EGE 250 Minimum Grade of C-*

* May be taken at the same time
May not be repeated for credit

EGE340. Applied Electromagnetics. 3 Credits.

Transmission line theory. Graphical solutions using Smith Chart. Impedance matching. Transients on lossless lines. Electrostatis, capacitance and electric energy. Magnetostatic, Inductance and magnetic energy. Maxwell's equations, the wave equation, and uniform plane waves.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGE200 Minimum Grade of C- or EGE 250 Minimum Grade of C-
- MAT353 Minimum Grade of C-

May not be repeated for credit

EGE342. Microwave Fundamentals. 3 Credits.

Review of Maxwell's equations, propagation of plane waves, reflection and transmission of plane waves, transmission line analysis, strip lines and microstrip lines, waveguide analysis, microwave networks.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGE340 Minimum Grade of C-

May not be repeated for credit

EGE350. Electric Energy Systems. 3 Credits.

Electric energy generation by using resources such as fossil fuels, nuclear, wind, water, and waves. Power plant equipment, such a s boilers, reactors, turbines, generators, transformers and switchgear. Electric power transmission, distribution, utilization and conversion to other energy forms.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGE340 Minimum Grade of C-

Corequisites:

- EGE351

May not be repeated for credit

EGE351. Electric Energy Systems Laboratory. 1 Credit.

Experimental verification of material studied in EGE350 such as single phase and three phase circuit, two watt meter method for measurement of three phase power, in balanced and unbalanced circuits, characteristics of single phase and three phase transformers, synchronous generators, electric power transmission, and distribution, three phase and single phase induction motors.

Attributes:

- Writing Intensive

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Corequisites:

- EGE350

May not be repeated for credit

EGE393. Engineering Selected Topics. 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.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

May be repeated for credit

EGE399. Modular Course. 1-3 Credits.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

May be repeated for credit

EGE412. Communication Systems. 3 Credits.

Signal analysis, signal transmission. Digital communication systems. Amplitude modulation; angle modulation.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGE311 Minimum Grade of C-

May not be repeated for credit

EGE413. Communication Systems Laboratory. 1 Credit.

AM communication circuits. FM communication. SSB communication circuits. RF power transmitting. Phase-locked loop circuits, frequency synthesis, time division multiplexing (sampling, PCM, DM), frequency division multiplexing, amplitude shift keying, phase shift keying, frequency shift keying.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGE412 Minimum Grade of C- or EGE 312 Minimum Grade of C-

May not be repeated for credit

EGE416. Control Systems. 3 Credits.

Feedback and robustness; transfer function, block diagram and signal-flow graph: Mason's gain formula; stability: Routh-Hurtwitz array; steady-state error; state-space: relation to transfer function, state-diagram; design of PID controllers; design of state-feedback controllers.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGE311 Minimum Grade of C- or EGM312 Minimum Grade of C-

May not be repeated for credit

EGE417. Digital Control Systems. 3 Credits.

Analysis and design of control systems that use digital controllers. Representation of digital systems with difference equations and the Z-transform; Representation of Hybrid control systems (digital controller-analog plant); Stability analysis; Design of digital controller algorithms; Verification of digital controller design via MAT:LAB simulation.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGE416 Minimum Grade of C-

May not be repeated for credit

EGE418. Control Systems Laboratory. 1 Credit.

Simulation and hardware experiments on the following topics: plant parameter identification, robustness, steady-state error, transient duration, absolute and relative stability. Verification via simulation of controller design in the same time domain and in the frequency domain.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGE416 Minimum Grade of C-*

* May be taken at the same time
May not be repeated for credit

EGE421. Microelectronic Technology. 3 Credits.

Miller indices, Crystal growth, Major steps in the fabrication of microelectronic devices (diffusion ion implantation, thermal oxidation, film deposition (physical and chemical), etching, lithography, contacts and interconnections and yield.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Mechanical Engineering (521)

Prerequisites:

- EGE320 Minimum Grade of C-

May not be repeated for credit

EGE422. Electronic Design Automation Lab. 1 Credit.

Principles of electronic design, schematic design, electronic packaging technologies, PCB materials, PCB Layout, PCB Assembly, PCB manufacturing processes, principles of 3D modeling, 3D modeling of electronic components and enclosures.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGC331 Minimum Grade of C-*

* May be taken at the same time
May not be repeated for credit

EGE423. Solid State Devices. 3 Credits.

This course introduces the basics of semiconductor physics and modeling and devices such as pn junction diode, bipolar transistor, metal-semiconductor contacts, field effect translator (MESFET and MOSFET), optical (solar cell LED, laser diode), power and microwave devices.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGE320 Minimum Grade of C-

May not be repeated for credit

EGE424. Microelectronic Technology Lab. 1 Credit.

This course introduces students to various processing involved in fabrication of integrated circuits such as thermal oxidation, film deposition, lithography, cleaning and etching, rapid thermal processing and characterization.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGE320 Minimum Grade of C-
- EGE 436 Minimum Grade of C-*

* May be taken at the same time
May not be repeated for credit

EGE435. VLSI Design. 3 Credits.

Introduction to MOS devices and circuits (N-MOS, CMOS), MOS transistor theory. Integrated system processing technology and design rules (N-MOS and CMOS), circuit characterization and performance estimation, N-MOS and CMOS circuits and logic design. Interfacing. Introduction to VLSI design tools. Testability analysis. Microarchitecture of VLSI systems. Chip design projects? .

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGC 230 Minimum Grade of C- or EGC220 Minimum Grade of C-
- EGE320 Minimum Grade of C-

May not be repeated for credit

EGE441. Transmission Line Theory. 3 Credits.

Analysis and design of short, medium, and long transmission lines. Bundled conductors, skin effect, proximity effect, and geometric mean distance. Ferranti effect. Standing waves and traveling waves.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Computer Engineering AP (266)
  - Electrical Engineering (517)
  - Electrical Engineering AP (267)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGE340 Minimum Grade of C-

May not be repeated for credit

EGE445. Antenna Systems. 3 Credits.

Antenna parameters, wire antennas, arrays of wire antennas, aperture and printed circuit type antennas, reflectors and feeds.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGE340 Minimum Grade of C-

May not be repeated for credit

EGE446. Antenna Systems Laboratory. 1 Credit.

Measurement of the far field pattern and characteristics of wire antennas and arrays for VHF. Measurement of the field pattern and characteristics of reflector type antennas in the X-band, and of aperture and printed circuit type antennas and arrays in the X-band.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGE445 Minimum Grade of C-*

* May be taken at the same time
May not be repeated for credit

EGE451. Electromechanical Energy Conversion. 3 Credits.

Advanced topics in electromechanical energy conversion and drives. Transformers. Induction machines, three phase and single phase, Synchronous machines, Electric drives, Induction generators.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGE350 Minimum Grade of C-

May not be repeated for credit

EGE452. Electric Power Systems. 3 Credits.

Energy courses, transmission line parameters, transmission line modeling, power flow analysis, voltage frequency control, power system protection.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGE350 Minimum Grade of C-

May not be repeated for credit

EGE455. Electromechanical Energy Conversion Laboratory. 1 Credit.

Operation of single and three phase transformers. Characteristics of single phase and three phase induction motors. Characteristics of three phase synchronous machines. Characteristics of various types of direct current machines.

Restrictions:

- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGE451 Minimum Grade of C-*

* May be taken at the same time
May not be repeated for credit

EGE493. Engineering Selected Topics. 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.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

May be repeated for credit

EGE494. Fieldwork Engineering. 1-12 Credits.

Complete a prearranged and supervised industry-based project and submit a final technical report.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

May be repeated for credit

EGE495. Indep Study Elec Engineering. 1-12 Credits.

Selected research areas specific to faculty.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

May be repeated for credit

Mechanical Engineering

EGM101. Design With Additive Manufacturing. 1 Credit.

This course will present students with practical experience in the design of products. Students will learn the principals of design including the design, build, analyze paradigm. Students will leverage the power of 3D printing to take a novel product from concept to manufacture.

Attributes:

- Critical Thinking Introductory

Restrictions:

- Must have the following level: Undergraduate
- Must be enrolled in the following field(s) of study (major, minor or concentration): Mechanical Engineering (521)

Prerequisites:

- EGG101 Minimum Grade of C-*
- PHY201 Minimum Grade of C-
- PHY211 Minimum Grade of C-

* May be taken at the same time
May not be repeated for credit

EGM193. Engineering - Mechanical Selected Topics. 1-12 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.

Restrictions:

- Must have the following level: Undergraduate

May be repeated for credit

EGM201. Design Using Reverse Engineering. 1 Credit.

Building upon the practical experiences in Design with Additive Manufacturing (EGM101), students will use the principals of design by reverse engineering an existing product. Emphasis will be placed on improved design and functionality by reverse engineering as existing product from initial inspection to manufacture during this laboratory.

Attributes:

- Information Mgmt Intro

Restrictions:

- Must have the following level: Undergraduate
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGM101 Minimum Grade of C-

May not be repeated for credit

EGM211. Statics. 3 Credits.

Statics is the branch of engineering mechanics that is concerned with the analysis of forces on physical systems in static equilibrium. This class will help you interpret the forces supporting objects we encounter in our daily lives. Topics include: force systems, equilibrium, structural analysis, distributed forces, internal forces, friction, and virtual work. Finally, an introduction to mechanics of materials will be covered.

Restrictions:

- Must have the following level: Undergraduate
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- PHY201 Minimum Grade of C-
- PHY211 Minimum Grade of C-
- MAT252 Minimum Grade of C-

May not be repeated for credit

EGM212. Dynamics. 3 Credits.

Analysis of motions of particles and rigid bodies encountered in engineering. Topics include: velocity, acceleration, relative motion, work, energy, impulse, and momentum. Further development of mathematical modeling and problem solving. Vector mathematics where appropriate.

Restrictions:

- Must have the following level: Undergraduate
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGM211 Minimum Grade of C-
- MAT359 Minimum Grade of C-*

* May be taken at the same time
May not be repeated for credit

EGM213. Dynamics Laboratory. 1 Credit.

An introduction to experimental methods in Mechanical Engineering relating to rigid body kinematics, and dynamics of vibrating systems. Experimentation, data acquisition and analysis / interpretation of experimental data, comparison of measurements to numerical/analytical predictions, and formal engineering report writing.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGM212 Minimum Grade of C-

May not be repeated for credit

EGM221. Engineering Materials. 3 Credits.

The relationship between the structure of materials and the resulting mechanical, thermal, electrical, and optical properties. Topics include: Atomic structure, bonding, atomic arrangement; crystal symmetry, crystal structure, habit, lattices, defects and the use of X-ray diffusion, phase quilibria, and micro-structural development. Applications to design.

Restrictions:

- Must have the following level: Undergraduate
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- CHE201 Minimum Grade of C-
- CHE211 Minimum Grade of C-

May not be repeated for credit

EGM293. Engineer-Mechanical Sel Topics. 1-12 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.

Restrictions:

- Must have the following level: Undergraduate

May be repeated for credit

EGM295. Indep Study Mechanical Engineering. 1-12 Credits.

Restrictions:

- Must have the following level: Undergraduate

May be repeated for credit

EGM301. Design of Measurement Instrumentation. 1 Credit.

Building upon the practical experiences in EGM101 & EGM201, students will use the principles of design, to design an experiment to measure a physical quantity. In addition to designing the experiment, students will be required to design and manufacture the instrumentation for the experiment. Students will be expected to plan the design process of both the experiment and the instrumentation, as well as, prepare a proposal detailing the design including time and cost schedules.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGM101 Minimum Grade of C-
- EGE201 Minimum Grade of C-

May not be repeated for credit

EGM302. Intro to Finite Element Analysis. 3 Credits.

An introduction to the theory and practice of finite element analysis. Basic computation of one and two-dimensional structural elements (such as truss, beams, and plane elements) are introduced. Complex applications of commercial finite element packages in the areas of statics, strength of materials, and heat transfer are covered through in-class (hands-on) experiences, and projects.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGM322 Minimum Grade of C-
- EGM331 Minimum Grade of C-*

* May be taken at the same time
May not be repeated for credit

EGM303. Advanced Computer Aided Design. 3 Credits.

Building from a foundation of existing fundamental Computer Aided Design skills, students will develop requisite skills and management techniques to gain an understanding and appreciation to effectively use CAD from project inception to completion.

Restrictions:

- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - BS CE/MS Elec. Engineering (268)
  - BS EE/MS Elec. Engineering (269)
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGG101 Minimum Grade of C-

May not be repeated for credit

EGM304. Design of Machine Elements. 3 Credits.

Using concepts of failure prevention, this course introduces machine component design. A wide range of engineered mechanical elements (such as fasteners, shafts, and springs) are analyzed considering manufacturing, design, and implementation. The principles of material selection and processing (including welding, machining, casting, forming, and molding) and their design are introduced. Finally, geometric interaction of elements is considered through fits and tolerances with emphasis on function, performance, and reliability.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - BS CE/MS Elec. Engineering (268)
  - BS EE/MS Elec. Engineering (269)
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGM311 Minimum Grade of C-
- EGM322 Minimum Grade of C-

May not be repeated for credit

EGM311. Kinematics of Machines. 3 Credits.

This course will focus on the application of kinematics to the analysis, synthesis, and design of mechanisms. Specific topics covered will include linkage synthesis (graphically and analytically), position analysis, velocity analysis, acceleration analysis, cam design, and gear trains.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGM212 Minimum Grade of C-

May not be repeated for credit

EGM312. System Dynamics. 3 Credits.

This course will focus on the modeling of dynamic systems in the mechanical. Electrical, thermal, and fluid domains. Steady-state and transient response will be addressed within the time domain and frequency domain techniques.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGM311 Minimum Grade of C-
- EGE200 Minimum Grade of C- or EGE 250 Minimum Grade of C-
- EGE201 Minimum Grade of C- or EGE 209 Minimum Grade of C-

May not be repeated for credit

EGM322. Mechanics of Materials. 3 Credits.

An introduction to solid mechanics, with topics including stress and strain in structural elements, mechanical properties of materials, extension / torsion / bending of members, combined loadings, static indeterminacy, stress / strain transformations, Mohr's circle, failure theories, buckling and strain energy.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGM221 Minimum Grade of C-
- EGM211 Minimum Grade of C-

May not be repeated for credit

EGM323. Materials Lab. 1 Credit.

Study of the properties, behavior, and performance of engineering materials including: stress-strain relations, strength, deformation, and fracture. Introduction to experimental techniques common to mechanical engineering: interpretation of experimental data, comparison of measurements to numerical/analytical predictions, and formal engineering report writing.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGM322 Minimum Grade of C-*

* May be taken at the same time
May not be repeated for credit

EGM331. Thermodynamics. 3 Credits.

Properties of working fluids and fundamental relations for processes involving the transfer of energy. Topics include: First and second laws of thermodynamics, entropy, reversible and irreversible processes, properties of pure substance. Application to engineering problems.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- CHE201 Minimum Grade of C-
- CHE211 Minimum Grade of C-
- PHY202 Minimum Grade of C-
- PHY212 Minimum Grade of C-
- MAT252 Minimum Grade of C-

May not be repeated for credit

EGM332. Fluid Mechanics. 3 Credits.

Analysis of steady ideal and viscous fluid flow systems using the continuity, Bernoulli and momentum equations. Boundary layer theory is treated in terms of viscous and pressure drag, lift, and its importance in heat and mass transfer. Dimensional analysis and dynamic similitude are studied to provide an understanding of flow systems analysis and modeling. Introduction to pipe flow and open channel flow.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGM212 Minimum Grade of C-
- EGM331 Minimum Grade of C-*
- MAT359 Minimum Grade of C-

* May be taken at the same time
May not be repeated for credit

EGM333. Thermo-Fluids Lab. 1 Credit.

An introduction to experimental methods in Mechanical Engineering: review and use of pressure, temperature, and flow measuring devices. Experimentation, data acquisition and analysis selected from within the thermo-fluids area.

Attributes:

- Critical Thinking Intermediate
- Information Mgmt Intrmd

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGM331 Minimum Grade of C-
- EGM332 Minimum Grade of C-*

* May be taken at the same time
May not be repeated for credit

EGM334. Heat Transfer. 3 Credits.

The course discusses quantitatively the three main modes of heat transfer; which are conduction, convection, and radiation. A combined approach will be followed that will stress both the fundamentals of the rigorous differential description of the involved phenomena and the empirical correlations used for engineering design.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGM331 Minimum Grade of C-
- EGM332 Minimum Grade of C-
- EGE200 Minimum Grade of C- or EGE 250 Minimum Grade of C-
- EGE201 Minimum Grade of C- or EGE 209 Minimum Grade of C-

May not be repeated for credit

EGM335. Thermo System Design. 3 Credits.

Thermodynamics of power cycles, refrigeration, air conditioning, and combustion processes; analysis, design, and testing of systems involving both conventional and renewable energy sources for power generation, heating, and cooling applications.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGM331 Minimum Grade of C-
- EGM332 Minimum Grade of C-*

* May be taken at the same time
May not be repeated for credit

EGM336. HVAC. 3 Credits.

Fundamentals of single and multistage vapor-compression refrigeration cycles and their component devices will be studied in depth. Psychrometric fundamentals and air treatment techniques common in air conditioning systems will be covered. Load estimation calculations will be performed.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - BS CE/MS Elec. Engineering (268)
  - BS EE/MS Elec. Engineering (269)
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGM331 Minimum Grade of C-
- EGM332 Minimum Grade of C-*

* May be taken at the same time
May not be repeated for credit

EGM340. Mechanical Measurements. 3 Credits.

This course will explore the background, theory, and practice of engineering measurements. Topics will include design of measurement systems, test plans, statistics, analog/digital sampling methods, and measurement instrumentation.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGE200 Minimum Grade of C-

May not be repeated for credit

EGM393. Engineer-Mechanical Sel Topics. 1-12 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.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

May be repeated for credit

EGM421. Mechanical Behavior of Materials. 3 Credits.

Fundamentals for understanding and manipulating the mechanical behavior of engineering materials. Building upon the principles of materials science and solid mechanics, this course covers the mechanisms, as well as the material structure-property relationship, behind material failure that includes fracture, fatigue and creep. Further, the theories and models for predicting and preventing material failure will be introduced through case studies on machinery and IC circuitry.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - BS CE/MS Elec. Engineering (268)
  - BS EE/MS Elec. Engineering (269)
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGM322 Minimum Grade of C-

May not be repeated for credit

EGM441. Mechanical Vibrations. 3 Credits.

The objective of this course is for students to learn analytical, experimental, and numerical treatment of vibration phenomena. Topics include linear oscillator analysis (Laplace transforms, complex harmonic balance, Fourier transforms, eigenvalue problems, modal analysis, and simulation), experimental methods, and an introduction to nonlinear dynamic systems. Free and forced vibrations of mechanical systems with lumped inertia, springs, and dampers are the primary emphasis.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration):
  - Computer Engineering (518)
  - Electrical Engineering (517)
  - Engineering (EGG)
  - Mechanical Engineering (521)

Prerequisites:

- EGM212 Minimum Grade of C-
- MAT362 Minimum Grade of C-

May not be repeated for credit

EGM493. Engineer-Mechanical Sel Topics. 1-12 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.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

May be repeated for credit

EGM494. Fieldwork Mechanical Engineering. 1-12 Credits.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

May be repeated for credit

EGM495. Indep Study Mech Engineering. 1-12 Credits.

Restrictions:

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

May be repeated for credit

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