

ENGINEERING-COMPUTER (EGC)

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.

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.

Prerequisites:

- MAT 251 with a minimum grade of C- and EGC 221 (may be taken concurrently) with a minimum grade of C-

Restrictions:

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

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 have the following field(s) of study (major, minor or concentration):
 - Mechanical Engineering (521)
 - Computer Engineering (518)
 - Computer Science (513)
 - Electrical Engineering (517)

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.

Prerequisites:

- (EGG 101 with a minimum grade of C-)

Restrictions:

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

EGC293. Engr Selected Topics. 1-12 Credits.

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

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.

Prerequisites:

- EGC 220 with a minimum grade of C- and EGC 221 with a minimum grade of C-

Restrictions:

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

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.

Prerequisites:

- EGC 220 with a minimum grade of C- and EGC 221 with a minimum grade of C- and EGC 251 with a minimum grade of C- and EGE 200 with a minimum grade of C- and EGE 201 with a minimum grade of C-

Restrictions:

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

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.

Prerequisites:

- EGC 220 with a minimum grade of C- and EGC 221 with a minimum grade of C- and EGC 251 with a minimum grade of C- and EGE 200 with a minimum grade of C- and EGE 201 with a minimum grade of C-

Restrictions:

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

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).

Prerequisites:

- EGC 331 with a minimum grade of C-

Restrictions:

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

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.

Prerequisites:

- EGC 331 with a minimum grade of C- and EGC 332 with a minimum grade of C-

Restrictions:

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

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.

Prerequisites:

- EGC 331 with a minimum grade of C- and EGC 332 with a minimum grade of C-

Restrictions:

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

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.

Prerequisites:

- (EGC 220 with a minimum grade of C- and EGC 221 with a minimum grade of C-) and (EGE 320 with a minimum grade of C- and EGE 322 with a minimum grade of C-)

Restrictions:

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

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 have the following field(s) of study (major, minor or concentration):
 - Computer Engineering (518)
 - Mechanical Engineering (521)
 - Electrical Engineering (517)

EGC447. Functional Verification 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.

Prerequisites:

- EGC 450 with a minimum grade of C- and EGC 455 with a minimum grade of C-

Restrictions:

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

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.

Prerequisites:

- CPS 210 with a minimum grade of C- or EGE 331 with a minimum grade of C-

Restrictions:

- Must have the following level: Undergraduate
- Must have the following field(s) of study (major, minor or concentration):
 - Mechanical Engineering (521)
 - Electrical Engineering (517)
 - Computer Engineering (518)
 - BS Computer Engineering/MS EE (266)
 - BS Elec. Engineering/MS EE (267)

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 acquisition, and communication using a commercially available RTOS.

Prerequisites:

- (EGC 433 with a minimum grade of C- or EGC 416 with a minimum grade of C-)

Restrictions:

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

EGC455. System-on-Chip (SoC). 3 Credits.

System-on-chip (SoC) design methodology and IP (intellectual property) reuse, system modeling and analysis, hardware/software co-design, behavioral synthesis, embedded software, reconfigurable computing, design verification and test, and design space exploration.

Prerequisites:

- EGC 320 with a minimum grade of C- and EGC 442 with a minimum grade of C- and EGC 445 with a minimum grade of C- and EGC 446 with a minimum grade of C-

Restrictions:

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

EGC493. Comp Eng Select Topics. 3-12 Credits.

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Prerequisites:

- EGE 230 with a minimum grade of C- or EGE 220 with a minimum grade of C-

EGC494. Fieldwork Computer Engin. 0 Credits.**EGC495. Indep Study Compnr Engin. 1-12 Credits.**