

Department of Electrical Engineering and Computer Science

Contact Information

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Computer Engineering Program Educational Objectives

- a. Graduates will be capable of pursuing professional careers and/or advanced studies.
- b. Graduates will pursue state-of-the-art solutions to computer engineering problems and evaluate/embrace new technologies.
- c. Graduates will exhibit personal commitment to continuous learning, high ethical standards, sound business decisions and professional excellence.

Computer Science Program Educational Objectives

- a. Graduates will demonstrate a synthesis of theory and practice in computer science that will be expanded upon throughout their professional careers.
- b. Graduates will act according to their ethical, global, social, legal, information security and other professional responsibilities.
- c. Graduates entering industry positions will contribute effectively to the technology projects carried out by their respective employers.
- d. Graduate who continue to advanced studies will successfully complete their chosen degree programs.

Electrical Engineering Program Educational Objectives

- a. Graduates will be capable of pursuing professional careers and/or advanced studies.
- b. Graduates will pursue state-of-the-art solutions to engineering problems and evaluate/embrace new technologies.
- c. Graduates will exhibit personal commitment to continuous learning, high ethical standards, sound business decisions and engineering excellence.

Computer Science (CSEN)

In addition to the listed prerequisite for the following 3000 and 4000 level courses, a student must have an overall grade point average of 2.0 or higher.

CSEN 2303 Intro to Comp Basic and Excel **3 SCH (3-0)**

Problem solving methods and algorithm development. Computer programming using Visual Basic. How to use Excel. Designing, coding, debugging and documenting programs using techniques of good programming style. Prerequisites: MATH 1314 and MATH 1316 or equivalent.

CSEN 2304 Introd to Computer Science **3 SCH (3-0)**

Introduction to computer systems, problem solving methods and algorithm development. Structured programming using a programming language such as C. Designing, coding, debugging and documenting programs using techniques of software development cycle.

CSEN 2306 Object-Oriented Programming **3 SCH (3-0)**

Fundamental features of C++ programming, introduction to objects and classes, major concepts of object-oriented programming such as data abstraction, encapsulation, polymorphism, and inheritance. Prerequisite: CSEN 2304.

CSEN 2310 Object-Oriented Software Eng **3 SCH (3-0)**

Object-oriented analysis and modeling, object-oriented design, implementation using an object-oriented language, such as JAVA, object-oriented software development, Unified Modeling Language (UML), Graphical User Interface (GUI). Prerequisite: CSEN 2304.

CSEN 2328 Data Structures & Algorithms **3 SCH (3-0)**

Specification and implementation of data types and associated algorithms: lists, stacks, queues, trees, hashing, priority queues, sorting, and graphs. Prerequisite: CSEN 2304.

CSEN 3314 Database Systems **3 SCH (3-0)**

File and database organization techniques. Network, hierarchical and relational data models. Normalization. Commercially-available DBMS. Query languages. DBMS design and implementation.

CSEN 3315 Computer Graphics **3 SCH (3-0)**

Man-machine communication in graphical form. Graphics hardware and software. Use of a commercial graphics package. Representation and manipulation of two-and three dimensional data. Use of color. Prerequisite: CSEN 2304.

CSEN 3316 Software Engineering I 3 SCH (3-0)

Introduction to formal software design principles. An engineering approach to software development. Software project management. Software requirements analysis, specification, design, development and validation. Prerequisite: 6 semester hours of Computer Science or Information Systems.

CSEN 3330 Android Mobile App Dev 3 SCH (3-0)

Strategies and techniques for designing and developing Android mobile applications, including user interface screen layouts, the definition of program logic, and the connection between them. Prerequisite: CSEN 2310.

CSEN 3331 iOS Mobile App Dev 3 SCH (3-0)

Technologies, tools, and techniques used to develop iOS mobile applications including user interface development, gender-based interfaces, integrated location services, multi-touch event handling, Apple iOS platform, Xcode IDE, Objective-C, and Swift programming languages. Prerequisite: CSEN 2310.

CSEN 3340 Intro to Cyber Security 3 SCH (3-0)

Provides an introduction to all aspects of cybersecurity fundamentals and technologies. Fundamental topics include cyber threats and vulnerabilities, data security frameworks, network security, cryptography, system defense, how to analyze threats, information security policy, legal issues, political issues and safety administration. The course incorporates hands-on experiments, case studies, and projects. Prerequisite: CSEN 2304 and junior standing in a STEM discipline.

CSEN 4201 Software Eng Project 2 SCH (1-3)

A major project of an original nature carried to completion over a period of two semesters. Normally taken in the final academic year prior to graduation. Prerequisite: senior standing in Computer Science.

Fee: \$5.00

CSEN 4202 Software Eng Project (WI) 2 SCH (1-3)

A major project of an original nature carried to completion over a period of two semesters. Normally taken in the final academic year prior to graduation. Prerequisite: senior standing in Computer Science.

Fee: \$5.00

CSEN 4317 Software Engineering II 3 SCH (3-0)

Advanced software design principles. An engineering approach to software development emphasizing advanced techniques for validation and verification. Prerequisite: CSEN 3316.

CSEN 4320 Computer Networks 3 SCH (3-0)

Data communication networks and ISO reference model, the electrical interface, data transmission, data link and its protocols, distributed and parallel processing, local area network and its protocols, and wide area network and its protocols. Prerequisite: 6 hours of upper level Computer Science.

CSEN 4332 Web Mobile App Dev 3 SCH (3-0)

Concepts and technologies to design and develop mobile web applications, including system environment and architecture, system development methodologies, user interface design, data processing, and operations of data management. Prerequisite: CSEN 2310.

CSEN 4335 Selected Topics 1-3 SCH (1-3)

One or more topics of computer science. May be repeated for a total of 6 semester hours. Prerequisite: consent of instructor.

CSEN 4336 Special Problems 1-3 SCH (1-3)

Individual solution of selected problems in computer science conducted under direct supervision of a faculty member. May be repeated for up to 6 semester hours. Prerequisite: consent of instructor.

CSEN 4340 Computer Security 3 SCH (3-0)

Theory and practice of computer security. Cryptographic tools used to provide security, such as shared key encryption, public key encryption, key exchange, and digital signature, with application to security in computer programs, operating systems, database management systems, and networks. Prerequisite: CSEN 4320.

CSEN 4360 Cloud Computing 3 SCH (3-0)

Models, technologies, techniques, and applications of Cloud Computing. Principles and architectural foundations upon which cloud computing is based. Software design and implementation strategies that support the integration and exploitation of cloud based resources. Integration of cloud infrastructure facilities into the design of software systems. Security considerations associated with cloud computing including the use of public, private, and hybrid cloud resources. Prerequisite: CSEN 2304.

CSEN 4362 Operating Systems 3 SCH (3-0)

Study of operating system principles, including process management, memory management, resource allocation and input, output and interrupt processing. Prerequisite: EEEN 3449.

CSEN 4366 Programming Languages 3 SCH (3-0)

Formal definition of programming languages including specification of syntax and semantics. Precedence, infix, prefix and postfix notation. Global properties of algorithmic languages. List processing, string manipulation, data description and simulation languages. Run-time representation of program and data structures. Prerequisite: CSEN 2328.

CSEN 4367 Data Mining 3 SCH (3-0)

Data mining techniques; implementation, benefits, and the outcome expectations from this new technology. Prerequisite: CSEN 2304 and Senior standing in a STEM discipline.

CSEN 4370 Cyber Intelligence 3 SCH (3-0)

Analyze attacks by potential adversaries who pose a threat, including attack methods that target people to penetrate systems. Provide a blend of technical skills: network operations, communications, digital forensics or malware reverse engineering; analytical skills: hypothesis testing and alternative testing; and artificial intelligence, machine learning, and data mining techniques to collect, analyze, and interpret cyber-attacks. Prerequisite: CSEN 4372 and at least one of the following: CSEN 4367, CSEN 4375 or CSEN 4380.

CSEN 4372 Cyber Security 3 SCH (3-0)

Cyber threats and vulnerabilities, data security frameworks, network security, cryptography, system defense, how to analyze threats, information security policy, legal issues, political issues, and safety administration. The course incorporates case studies and projects. Prerequisite: CSEN 2304 and junior standing in a STEM discipline.

CSEN 4375 Machine Learning 3 SCH (3-0)

The course covers machine learning algorithms and methods to create models from data and evaluate the models for prediction and decision-making. The course covers supervised and unsupervised learning methods, optimization, computational statistics, and logistic regression. Also, it covers machine learning methods such as decision trees, Bayesian networks, support vector machines, k-nearest neighbors, neural networks, logistic regression, and discriminant analysis. Prerequisite: CSEN 2328 (Data Structures and Algorithms).

CSEN 4380 Artificial Intelligence 3 SCH (3-0)

The course will introduce the principles, techniques, and applications of AI. Students will be exposed to knowledge representation, problem-solving, logic, inference, search algorithms, game theory, neural networks, planning, learning, agent design, expert systems, and fuzzy logic. Students will learn programming to develop appropriate AI tools and algorithms for cybersecurity problems. Prerequisite: CSEN 2304 (Introduction to Computer Science)

CSEN 4385 Digital Forensics 3 SCH (3-0)

Computer forensics investigation and analysis. Gather and analyze digital evidence and use critical thinking skills to solve computer-based crimes. Historical and current computer forensic and investigative security issues; a systematic approach to computer investigations; digital forensics, email, image file analysis; and guidelines for investigation reporting. Prerequisite: CSEN 2304.

CSEN 4399 Internship in Computer Sci 1-3 SCH (1-3)

An off-campus learning experience allowing the acquisition, development, and application of computer science and information technology skills. Prerequisites: Approval of program head or department head.

Electrical Engineering (EEEN)

In addition to the listed prerequisite for the following 3000 and 4000 level courses, a student must have an overall grade point average of 2.0 or higher.

EEEN 2323 Network Analysis I 3 SCH (3-0)

Introduction to linear network analysis techniques. Phasor analysis and sinusoidal steady-state response. Single-phase and polyphase circuits. Prerequisites: MATH 2414; Corequisites: PHYS 2326/PHYS 2126 and MATH 3320.

EEEN 2340 Digital Logic Design 3 SCH (3-0)

Hardware implementation of arithmetic and logical functions, organization and design of digital systems.

EEEN 3212 Circuits and Electronics Lab 2 SCH (1-3)

Laboratory course to correlate with circuits and electronics. Prerequisite: credit for or registration in EEEN 3325. Fee: \$5.00

EEEN 3321 Network Analysis II 3 SCH (3)

Two-port networks, Fourier analysis, time domain response, transient response and Laplace transform techniques. Prerequisites: EEEN 2323 and MATH 3320.

EEEN 3324 Electromagnetics 3 SCH (3-0)

Vector analysis, electrostatics, steady magnetic fields. Maxwell's equations, uniform plane waves, circuit concepts, propagation and radiation. Prerequisites: PHYS 2326/PHYS 2126 and MATH 3320.

EEEN 3325 Electronics I 3 SCH (3-0)

Solid state fundamentals. Nonlinear devices and networks. Fabrication of integrated circuits. Two-port models. Prerequisites: EEEN 2323 and PHYS 2326/PHYS 2126.

EEEN 3331 Circuits and Electmag Devices 3 SCH (3-0)

General network analysis, steady-state AC/DC circuits. Energy conversion and applications. Prerequisite: PHYS 2326/2126.

EEEN 3333 Linear Systems and Signals 3 SCH (3-0)

Signal representation, sampling and quantization, Laplace and z-transforms, transfer functions and frequency response, convolution, stability, Fourier series, Fourier transforms and applications. Prerequisite: EEEN 3321.

EEEN 3334 Random Signals 3 SCH (3-0)

Probability, random variables, white noise and band-limited system, narrowband Gaussian process, pseudorandom signals and random signal response of linear systems. Prerequisite: MATH 2414.

EEEN 3449 Microprocessor Systems 4 SCH (3-3)

Basic computer structure, the instruction set, addressing modes, assembly language programming, assembly language subroutines, arithmetic operations, programming in C, implementation of C procedures, elementary data structures, input and output and a survey of microprocessor design. Prerequisites: EEEN 2340.

Fee: \$5.00

EEEN 4224 Elec & Comp Eng Proj Lab (WI) 2 SCH (6)

Participation in engineering design activity. Prerequisite: EEEN 4252.

Fee: \$5.00

EEEN 4252 Advanced Laboratory 2 SCH (1-3)

Capstone design project development to completion over two semesters in EEEN 4252 and EEEN 4224. The design project will take into account global, societal, environmental and economic constraints to solve or analyze practical electrical engineering problems. Students first research and develop a Capstone Design Project proposal in EEEN 4252 and then complete the design in EEEN 4224. The two-course sequence is normally taken in the final academic year prior to graduation. Prerequisites: EEEN 3212, EEEN 3321, EEEN 3449 and communication elective.

Fee: \$5.00

EEEN 4310 Intro to VLSI Circuit Design 3 SCH (3-0)

Introduction to design and fabrication of micro-electronic circuits via Very Large Scale Integrated circuitry (VLSI); structured design methods for VLSI systems, use of computer-aided design (CAD) tools and design projects of small to medium scale integrated circuits. Prerequisites: EEEN 3325 and EEEN 2340.

EEEN 4329 Communications Engineering 3 SCH (3-0)

Transmission of information. Probability, stochastic process and spectral analysis. Sampling, quantization, decision theory, coding and decoding. Digital communication system and secure communications. Introduction to DSP. Prerequisites: EEEN 3333 and EEEN 3334.

EEEN 4335 Special Problems 1-3 SCH (1-3)

Individual solution of selected problems in electrical engineering conducted under direct supervision of a faculty member. May be repeated for up to 6 hours. Prerequisite: consent of instructor.

EEEN 4336 Selected Topics 1-3 SCH (1-3)

One or more topics of electrical engineering. May be repeated when topic changes. Prerequisite: consent of instructor.

EEEN 4340 Power Electronics 3 SCH (2-3)

Classical and modern design and analysis methods of power electronic circuits and the feedback control designs of power electronic converters and related laboratory experiments. Topics include diode rectifiers, thyristor converters, DC-DC converters and associated controls, DC/AC inverters, power-factor correction and control, isolated switch-mode power supplies, applications of power electronic converters and related hardware and virtual laboratory experiments. Prerequisite: EEEN 3325 or consent of instructor.

EEEN 4342 Electronic II 3 SCH (3-0)

Analysis and design of analog electronic circuits; differential, multistage and power amplifiers; frequency response; feedback and stability. Prerequisite: EEEN 3325.

EEEN 4343 Microprocesr Based Contrl Sys 3 SCH (3-0)

Design of micro-controller based real-time control systems. Application of theoretical principles in electrical engineering to control small-scale systems, such as a mobile robot incorporating sensors, actuators and intelligence. Controller design; signal conditioning and drive circuits for interfacing with various sensors and actuators; programming and programmable logic controllers. Prerequisites: EEEN 3333 and EEEN 3449.

EEEN 4344 Computr Architectr and Design 3 SCH (3-0)

Basic computer organization, data representation and arithmetic, instruction sets and addressing modes, assembly language, data path and control, memory, input and output and communication. Prerequisites: EEEN 2340 and EEEN 3449.

EEEN 4354 Linear Control Systems 3 SCH (0-2-0-3)

Analysis and design techniques for linear feedback control systems. Controller functions and compensation, applications to servo and process control problems. Prerequisite: EEEN 3333.

EEEN 4355 Digital Systems Engineering 3 SCH (2-3)

Principles in digital system design and testing, digital integrated circuits, digital system design with PLDS and FPGAS, introduction to an HDL, memory, microprocessors and design for testability. Prerequisites: EEEN 3325 and EEEN 2340.

Fee: \$5.00

EEEN 4357 Wireless Sensor Networks 3 SCH (3-0)

Foundations of wireless sensor networks, localization, routing, optimization, security, energy-aware systems and algorithms, design/analysis and applications of wireless sensor networks. Prerequisites: Completed General Education natural sciences requirement.

EEEN 4358 Embedded Systems 3 SCH (2-3)

System level embedded design exploring hardware/software co-design, Linux sysfs, bash shell, firmware partitioning, I/O interfaces, IP cores, system specifications to hardware-software implementation and synthesis. Prerequisites: EEEN 3449 and EEEN 4355.

EEEN 4360 Robotics II 3 SCH (3-0)

Multidisciplinary development to robotics, combining concepts from electrical engineering, mechanical engineering and computer science. Topics include sensing, communication, localization, planning and navigation. Prerequisite: MEEN 4355 or consent of instructor.

EEEN 4422 Electric Drives 4 SCH (3-3)

Introduction to power electronic converters for motor drives and controls, single and three phase transformers, DC motors and generators, feedback control design of DC motor drives, PMAC drives, synchronous generators, induction motor drives, speed and vector control of induction motor drives. Laboratory experiments to identify electric machine parameters and characteristics, and DC/AC motor drive controls, by designing and conducting experiments using digital computers. Prerequisite: EEEN 3321.

Fee: \$5.00

Majors

- Computer Engineering, B.S.
- Computer Science, B.S.
- Computer Science, B.S. with Teacher Certification
- Electrical Engineering, B.S.

Minor

- Computer Science, Minor
- Cyber Intelligence, Minor

Certificate

- Cyber Intelligence, Transcribed Certificate
- Mobile Applications Development, Transcribed Certificate