Department of Electrical Engineering

The Department of Electrical Engineering offers students a hands-on laboratory oriented Bachelor of Science educational experience in Electrical Engineering and Electrical Engineering Technology (EET). The EET program no longer accepts entering students. The Master of Science in Applied Engineering degree provides a master's level education in Mechatronics, Engineering Management, Energy Science, Electrical and Electronic Systems, and Information Technology. EET degree programs are accredited by the Engineering Technology Accreditation Commission of ABET, http://www.abet.org.

EENG 5090G Selected Topics in Electrical Engineering
1-4 Credit Hours. 1-3 Lecture Hours. 0-3 Lab Hours.
Students in this course will have the opportunity to study selected topics in Electrical Engineering not currently offered by the program. Graduate students will complete an independent research project which involves a written and oral presentation not required at the undergraduate level.
Prerequisite(s): Permission of instructor.
Cross Listing(s): EENG 5090.

EENG 5242G Power Systems
0,4 Credit Hours. 0,3 Lecture Hours. 0,2 Lab Hours.
Introduction to conventional power systems is covered including generation, transmission, and distribution with emphasis on power flow and parameters affecting the transfer of energy over the transmission lines. The course also includes laboratory activities in support of instruction. Graduate students will complete an independent research project which involves a written and oral presentation not required at the undergraduate level.
Prerequisite(s): A minimum grade of "C" in EENG 3241 or Permission of Instructor.
Cross Listing(s): EENG 5242.

EENG 5243G Power Electronics
0,4 Credit Hours. 0,3 Lecture Hours. 0,2 Lab Hours.
A coverage of the concepts of power electronics and converters including the use of thyristors, triacs, timers, logic control circuits, optical devices, and sensors. The course also includes laboratory activities in support of instruction. Graduate students will complete an independent research project which involves a written and oral presentation not required at the undergraduate level.
Prerequisite(s): EENG 3241 and EENG 3341.
Cross Listing(s): EENG 5243.

EENG 5341G Robotic Systems Design
0,4 Credit Hours. 0,3 Lecture Hours. 0,2 Lab Hours.
The basic elements of robotics are introduced with emphasis on mobile robots and applications. Topics include coordinate transformations, sensors, path planning, kinematics, effectors, and control. Students will work in teams to design and build increasingly complex robotic systems. The course also includes laboratory activities in support of instruction. Graduate students will complete an independent research project which involves a written and oral presentation not required at the undergraduate level.
Prerequisite(s): A minimum grade of "C" in EENG 3340 or MENG 3521 or Permission of Instructor.
Cross Listing(s): EENG 5341.

EENG 5342G Computer Systems Design
0,4 Credit Hours. 0,3 Lecture Hours. 0,2 Lab Hours.
Digital computers with emphasis on design and simulation are covered including instruction set design, processor implementation, pipelining, cache design, memory hierarchy, and input/output. The course also includes laboratory activities in support of instruction. Graduate students will complete an independent research project which involves a written and oral presentation not required at the undergraduate level.
Prerequisite(s): A minimum grade of "C" in EENG 3340 or Permission of Instructor.
Cross Listing(s): EENG 5342.

EENG 5431G Control Systems
3 Credit Hours. 2 Lecture Hours. 2 Lab Hours.
Introduction to classical control theory and applications is presented with emphasis on feedback and its properties including the concept of stability, stability margins, and the different tools that can be used to analyze the system properties. Students will develop a working knowledge of the basic elements of linear control techniques. The course also includes laboratory activities in support of instruction. Graduate students will complete an independent research project which involves a written and oral presentation not required at the undergraduate level.
Prerequisite(s): A minimum grade of "C" in EENG 3420 or Permission of Instructor.
Cross Listing(s): EENG 5431.

EENG 5432G Programmable Logic Controllers
0,3 Credit Hours. 0,2 Lecture Hours. 0,2 Lab Hours.
Topics covered include sequential programmable logic controllers (PLC's) with emphasis on ladder diagrams, input/output devices, networking, and programming design through advanced functions. The course also includes laboratory activities in support of instruction. Graduate students will complete an independent research project which involves a written and oral presentation not required at the undergraduate level.
Prerequisite(s): A minimum grade of "C" in EENG 3420 or MENG 3521 or Permission of Instructor.
Cross Listing(s): EENG 5432.

EENG 5532G Wireless Communications
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
The concepts and techniques of wireless communication systems are covered in this course including propagation channels, communication link analysis, transceivers, signal processing, and multiple access schemes. Graduate students will complete an independent research project which involves a written and oral presentation not required at the undergraduate level.
Prerequisite(s): A minimum grade of "C" in EENG 3230 and EENG 5540 or Permission of Instructor.
Cross Listing(s): EENG 5532.

EENG 5533G Optical Fiber Communications
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
This course offers an introduction to the physics of optical fiber communication components and the applications to communication systems. Topics include light and its behavior in the fiber, fiber attenuation, dispersion and nonlinear effects, laser modulation, photo detection and noise, receiver design, bit error rate calculations, and coherent communications. Graduate students will be required to complete an individual research project not required of undergraduate students.
Prerequisite(s): A minimum grade of "C" in EENG 5540 or Permission of Instructor.
Cross Listing(s): EENG 5533.
EENG 5535G Smart Antennas
3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.
A theoretical and practical understanding of fundamentals of smart antennas including beamforming, single antennas, array antennas, phased arrays, adaptive techniques, angle-of-arrival estimation, digital beamforming, fixed beam arrays, channel characteristics, random processes, propagation and electromagnetics. Graduate students will be required to complete individual advanced level research in an area beyond the scope of the undergraduate requirements that demonstrates a higher level of mastery in the subject matter with additional required deliverables representative of graduate level work, as determined by the instructor.
Prerequisite(s): A minimum grade of "C" in EENG 3230, EENG 3421, ENGR 1732 and ENGR 2341.
Cross Listing(s): EENG 5535.

EENG 5540G Communication Systems
0.4 Credit Hours. 0.3 Lecture Hours. 0.2 Lab Hours.
The theory and principles of communication systems are presented in this course. Topics covered include AM and FM modulations, transmission and reception, noise and random processes, pulse modulation, and digital transmission techniques. Laboratory emphasizes modeling and simulation using MATLAB programming. Graduate students will complete an independent research project which involves a written and oral presentation not required at the undergraduate level.
Prerequisite(s): A minimum grade of "C" in EENG 3420 and EENG 3421 or Permission of Instructor or Departmental Approval.
Cross Listing(s): EENG 5540.

EENG 5541G Digital Communications
0.4 Credit Hours. 0.3 Lecture Hours. 0.2 Lab Hours.
Theory and applications of digital communications systems are covered. Topics include ASK, FSK, DPSK, QAM, signaling over AWGN, band-limited and fading channels, inter-symbol interference, and error-correction codes. The course also includes laboratory activities in support of instruction. Graduate students will complete an independent research project which involves a written and oral presentation not required at the undergraduate level.
Prerequisite(s): A minimum grade of "C" in EENG 5540 or Permission of Instructor.
Cross Listing(s): EENG 5541.

EENG 5543G Antennas
4 Credit Hours. 3 Lecture Hours. 2 Lab Hours.
This course introduces basic concepts of dipoles and monopoles, solution to radiation problems, antenna parameters, different types of antennas, antenna aperture/array theory, radio wave propagation, impact of antenna performance in communication links. The course also includes laboratory activities in support of instruction. Graduate students will be required to complete additional assignments and a culminating research project commensurate with graduate level work that is not required of undergraduate students.
Prerequisite(s): A minimum grade of “C” in EENG 3230 or Permission of Instructor.
Cross Listing(s): EENG 5543.

EENG 5891G Special Problems in Electrical Engineering
1-3 Credit Hours. 1-3 Lecture Hours. 0-2 Lab Hours.
This course provides for specialized study in the area of Electrical Engineering not currently offered by the program. Graduate students will complete an independent research project which involves a written and oral presentation not required at the undergraduate level.
Prerequisite(s): As determined by Instructor.
Cross Listing(s): EENG 5891.