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# COURSE DESCRIPTIONS

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## ELECTRICAL ENGINEERING

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### **ELEG 5113: Digital Signal Processing**

Prerequisites: ELEG 3123 and 3133.

The study of discrete-time signals and systems, convolution, z-transform, discrete-time Fourier transform, analysis and design of digital filters. Students write software for real-time implementation of selected signal processing algorithms using DSP microcomputer hardware.

Note: May not be taken for credit after completion of ELEG 4113.

### **ELEG 5133: Advanced Digital Design**

Prerequisites: ELEG 2130 and 2134.

A project oriented course in which students develop and test custom digital integrated circuits (IC's). An overview of IC design systems and manufacturing processes is presented. Economics of IC production are discussed. Hardware Description Languages (HDL's) are studied. Students design and implement custom IC's using schematic based entry and HDL's.

Note: May not be taken for credit after completion of ELEG 4133.

### **ELEG 5153: Communication Systems II**

Prerequisite: ELEG 4143.

Continuation of ELEG 4143. Design and analysis of analog and digital communication systems, taking into account the effects of noise. Random variables, random processes, analog and digital communication systems in the presence of noise.

Note: May not be taken for credit after completion of ELEG 4153.

### **ELEG 5313: Modern Control Systems**

Prerequisite: ELEG 4303.

A continuation of ELEG 4303 Control Systems. Topics include: frequency response design, state space analysis, controllability, observability, state space design, robustness and introduction to digital control.

Note: May not be taken for graduate credit after completion of ELEG 4313.

### **ELEG 5993: Special Problems in Engineering I**

Prerequisites: Permission of instructor

An individual or group study in an advanced area of engineering under the direction of a faculty member. May be taught in conjunction with an associated ELEG 4993 section with the same topic.

Note: May not be taken for credit after gaining credit for a 4993 section with the same topic.

Note: May be repeated for credit if course content varies.

### **ELEG 6103: Power Electronics**

Prerequisite: ELEG 4103 or permission of instructor.

The course will cover the following topics: Characteristics of thyristors, sequential switching, triggering and synchronizing circuitry. Conversion and control of electric power, design of electric power controller; rectifiers, converters, inverters, and cycloconverters, controlling techniques for DC and AC machines will be presented.

### **ELEG 6123: Advanced Semiconductors**

Prerequisites: ELEG 3003 and ELEG 4103 or permission of the instructor

An in depth overview of coverage of semiconductor devices and materials. The course presents and examines semiconductor fundamentals required in the operational analysis of microelectronic devices.

### **ELEG 6133: Introduction to Nanoelectronics**

This course is designed to give the graduate student an introduction to the engineering problems and concepts that are involved in electrical and electromechanical devices at the nanoscale. The course will cover the wave properties of matter, quantum mechanics, optical properties of materials, nanolithography, and various nanostructure devices such as field-effect transistors, light-emitting diodes and lasers and nanoelectromechanical devices.

### **ELEG 6143: Digital Image Processing**

Prerequisites: ELEG 3133, ELEG 4113, ELEG 3003 and COMS 2104 or permission of the instructor

The course will cover the following topics: components of digital image processing systems, histograms, point processing, neighborhood processing, image restoration, image segmentation, 2-D discrete Fourier transform, image data compression, color image processing.

### **ELEG 6153: Statistical Signal Processing**

Prerequisites: ELEG 4113, ELEG 3003, COMS 2104 or permission of the instructor

The course will cover the following topics: minimum variance unbiased estimators, Cramer-Rao lower bound, maximum likelihood estimators, Least Squares, Kalman filter.

**ELEG 6163: Biomedical Signal Processing**

Prerequisites: ELEG 4113 or permission of the instructor

The study, analysis, and implementation of advanced method in signal processing applied to biomedical signals and systems. Engineers working in the biomedical field routinely design and build signal processing algorithms and devices to analysis biomedical signals for diagnostic analysis and prosthetic control. In order to appropriately design systems for biomedical signal processing it is necessary to have a basic understanding of the origin and characteristic of these signals. The course will focus on single dimensional deterministic and random signal processing.

**ELEG 6303: Robotics**

Prerequisites: ELEG 3133, ELEG 4303, ELEG 3003, COMS 2104 or permission of the instructor

The course will cover the following topics: robotics paradigms, path planning, motion planning, configuration space, potential functions, localization and mapping, sensors and actuators.

**ELEG 6881: Special Topics in Engineering**

Special topics in engineering relating to 2022 engineering topics not covered in other courses.

Note: May be repeated for credit if course content varies.

**ELEG 6882: Special Topics in Engineering**

Special topics in engineering relating to 2022 engineering topics not covered in other courses.

Note: May be repeated for credit if course content varies.

**ELEG 6883: Special Topics in Engineering**

Special topics in engineering relating to 2022 engineering topics not covered in other courses.

Note: May be repeated for credit if course content varies.

**ELEG 6884: Special Topics in Engineering**

Special topics in engineering relating to 2022 engineering topics not covered in other courses.

Note: May be repeated for credit if course content varies.

**ELEG 6891: Independent Study**

Prerequisites: Completion of 18 hours toward program requirements and approval of advisor

Students will complete an electrical engineering project approved by their Advisory Committee. The project must include elements of engineering design and project management with a subject relevant to electrical engineering. Successful completion of the project will include a professional report and full presentation of the project findings/results.

Note: May be repeated for credit if course content varies.

**ELEG 6892: Independent Study**

Prerequisites: Completion of 18 hours toward program requirements and approval of advisor

Students will complete an electrical engineering project approved by their Advisory Committee. The project must include elements of engineering design and project management with a subject relevant to electrical engineering. Successful completion of the project will include a professional report and full presentation of the project findings/results.

Note: May be repeated for credit if course content varies.

**ELEG 6893: Independent Study**

Prerequisites: Completion of 18 hours toward program requirements and approval of advisor

Students will complete an electrical engineering project approved by their Advisory Committee. The project must include elements of engineering design and project management with a subject relevant to electrical engineering. Successful completion of the project will include a professional report and full presentation of the project findings/results.

Note: May be repeated for credit if course content varies.

**ELEG 6894: Independent Study**

Prerequisites: Completion of 18 hours toward program requirements and approval of advisor

Students will complete an electrical engineering project approved by their Advisory Committee. The project must include elements of engineering design and project management with a subject relevant to electrical engineering. Successful completion of the project will include a professional report and full presentation of the project findings/results.

Note: May be repeated for credit if course content varies.

**ELEG 6895: Independent Study**

Prerequisites: Completion of 18 hours toward program requirements and approval of advisor

Students will complete an electrical engineering project approved by their Advisory Committee. The project must include elements of engineering design and project management with a subject relevant to electrical engineering. Successful completion of the project will include a professional report and full presentation of the project findings/results.

Note: May be repeated for credit if course content varies.

**ELEG 6896: Independent Study**

Prerequisites: Completion of 18 hours toward program requirements and approval of advisor

Students will complete an electrical engineering project approved by their Advisory Committee. The project must include elements of engineering design and project management with a subject relevant to electrical engineering. Successful completion of the project will include a professional report and full presentation of the project findings/results.

Note: May be repeated for credit if course content varies.