

# Robotics and Comm Sys Eng Tech (RCET)

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## Courses

### **RCET 0153A Basic Electricity and DC Circuit Theory: 4 semester hours.**

The fundamental principles of basic electricity and DC circuit theory will be covered. Topics covered will include related technical math, safety procedures, components, and the principles of electrical circuit analysis including voltage, current, resistance, and related laws. COREQ: RCET 0153B. F, S

### **RCET 0153B Basic Electricity and AC Circuit Theory: 4 semester hours.**

Introduction to the theoretical and mathematical principles applied to basic reactive (electrostatic and electromagnetic) components, and alternating current circuits. Includes algebraic and trigonometric analysis of passive high pass, low pass, resonant filter networks, and rectifying circuits. PRE-or-COREQ: RCET 0153A. COREQ: RCET 0155B. F, S

### **RCET 0154A Analog Control Devices Theory: 4 semester hours.**

Introduction and application of semiconductor transistor devices. Study of amplifier configurations and classifications. Exploration of differential and operational amplifiers with common applications. Coursework includes a combination of mathematical and theoretical principles applied to the various electronic circuits studied. COREQ RCET 0156A. PREREQ: RCET 0153A, RCET 0153B, RCET 0155A, and RCET 0155B. F, S, D

### **RCET 0154B Digital Control Devices Theory: 4 semester hours.**

Introduction and application of digital logic devices. Study of combinational logic circuits and common applications. Investigation of digital and logic based numerical systems and encoding formats. Coursework includes a combination of mathematical and theoretical principles applied to the various electronic circuits studied. PREREQ: RCET 0154A and RCET 0156A. COREQ: RCET 0156B. F, S, D

### **RCET 0155A Basic Electricity and DC Circuit Lab: 2 semester hours.**

Students will construct, analyze, predict and measure DC circuits while selecting and using appropriate test equipment. Project reports require design concepts, theoretical application, and demonstration of principles and practices learned in math, theory and laboratory. Students will learn to adhere to safe work practices. COREQ: RCET 0155B. F, S

### **RCET 0155B Basic Electricity and AC Circuit Lab: 2 semester hours.**

Emphasizes understanding of alternating current circuitry covered in RCET 0153B, by allowing students to design, construct, test, and troubleshoot using proper test equipment. PRE-or-COREQ: RCET 0155A. COREQ: RCET 0153B. F, S

### **RCET 0156A Analog Control Devices Laboratory: 2 semester hours.**

Experiments involving semiconductor transistor devices, discrete amplifiers, differential amplifiers, and operational amplifiers with common applications. Coursework includes utilization of test equipment and soldering tools for practical circuit development. PREREQ: RCET 0153A, RCET 0153B, RCET 0155A, and RCET 0155B. COREQ: RCET 0154A. F, S, D

### **RCET 0156B Digital Control Devices Laboratory: 2 semester hours.**

Experiments involving the utilization of digital logic devices to create common and custom combinational logic circuits. Coursework includes utilization of test equipment and soldering tools for practical circuit development. PREREQ: RCET 0154A and RCET 0156A. COREQ: RCET 0154B. F, S, D

### **RCET 0199 Experimental Course: 1-6 semester hours.**

The content of this course is not described in the catalog. Title and number of credits are -announced in the Class Schedule. Experimental courses may be offered no more than three times with the same title and content. May be repeated.

### **RCET 0251 Systems Analog and Digital Theory: 6 semester hours.**

Analog circuit analysis applied to amplifiers, power supplies, op-amps, and discrete switching circuits, with an emphasis on frequency limitations of discrete components and circuitry. Introduction to actuator, motor, and transducer control circuitry. COREQ: RCET 0253. F, S

### **RCET 0253 Systems Analog and Digital Laboratory: 5 semester hours.**

Emphasizes understanding of analog and digital circuitry by allowing students to design, construct, test, and troubleshoot using proper test equipment. Experiments involve subjects covered in RCET 0251 and RCET 0271. PREREQ: RCET 0156B. COREQ: RCET 0251. F, S

### **RCET 0264 Introductory Calculus: 4 semester hours.**

Correlations of algebraic, trigonometric and geographic topics as well as logarithms and their applications. Algebraic calculus concepts involving differentiation and integration and their applications to electronic circuits and waveform analysis. Supports RCET 0251. PREREQ: RCET 0154B or equivalent. F, S

### **RCET 0265 Computer Fundamentals and Introduction to Programming: 4 semester hours.**

Basic computer components and functions. Introduction to operating system file structures. Introduction to and use of element-driven programming languages and integrated development environments. F, S

### **RCET 0267 Radio Frequency Transmission Theory: 6 semester hours.**

Theory, analysis, and design of devices operating in the radio frequency spectrum. Fundamentals involving the phenomena of radio waves from audio frequencies through light rays. PREREQ: RCET 0251, RCET 0253, and RCET 0264. COREQ: RCET 0268. F, S

### **RCET 0268 Radio Frequency Transmission Lab: 5 semester hours.**

Maintenance, design, and adjustment of RF oscillators, amplifiers, AM, FM and single sideband, mobile and fixed station transmitters; transmission lines and antennas; microwave transmitters and measurement techniques. PREREQ: RCET 0251, RCET 0253, and RCET 0264. COREQ: RCET 0267. F, S

### **RCET 0271 Introduction to Lab Simulation Software: 2 semester hours.**

Introduction to lab simulation software environments used to build data acquisition and instrument control applications. F, S

### **RCET 0296 Independent Study: 1-8 semester hours.**

Addresses specific learning needs of individuals for the enhancement of knowledge and skills within the program area under the guidance of an instructor. May be repeated. Graded S/U; may be letter graded. PREREQ: Permission of instructor. D

### **RCET 0298 Special Topics: 1-8 semester hours.**

Addresses the specific needs of industry, enabling students to upgrade technical skills that are not included in the current program curriculum. May be repeated. Graded S/U; may be letter graded. PREREQ: Permission of instructor. D

### **RCET 1372 Calculus for Advanced Electronics: 4 semester hours.**

Algebraic, trigonometric, logarithmic and exponential functions, derivatives and integrals with electronic and other physical applications. Also included McClaurin's, Taylor's and Fourier's series and introduction to differential equations. Supports RCET 0374. Satisfies Objective 3 of the General Education Requirements. F, S

### **RCET 3331 Laser Systems and Optics Theory: 4 semester hours.**

Theory and analysis of lasers and associated devices. Laser safety, components, maintenance, and repair. Wave and geometric optics, electro-optic devices and components, interferometry, holography, and fiber-optics. PREREQ: RCET 0154B. COREQ: RCET 3332. D

**RCET 3332 Laser Systems and Optics Laboratory: 3 semester hours.**

Experiments using lasers and associated devices. Focus on laser safety, components, maintenance, and repair. Experiments include applications of geometric optics, electro-optic devices, interferometry, holography, fiber-optics, and characterization of multiple wavelength laser devices. PREREQ: RCET 0156B. COREQ: RCET 3331. D

**RCET 3370 Electronic Drafting for PCB Design: 3 semester hours.**

The utilization of computer aided drafting software, manufacturer's technical documentation, and high-accuracy measuring tools for printed circuit board development. Schematic capture, symbol creation, footprint development, netlist generation, routing techniques, file generation, and bill of material finalization. Investigation into high current and high frequency applications. PREREQ: RCET 0251. D

**RCET 3371 Advanced Programming Techniques and GUI Development: 4 semester hours.**

An in depth analysis of graphical based programming development, data collection and sorting/searching with multi-level arrays, and peripheral device communication techniques. Examination of compilers and interpreters for utilization of high level programming languages. Detailed study of software debugging techniques and practices. The course includes extensive exercises and projects in various programming languages. PREREQ: RCET 0265, RCET 0271. D

**RCET 3373 Advanced Computer Architecture and Embedded Systems Theory: 5 semester hours.**

Design, application, and assessment of computer systems and peripheral devices. A study of microprocessors, embedded systems, memory devices, arithmetic logic units, and analog to digital / digital to analog converters. Development of sensory input devices and hardware interfacing techniques. Analysis of address / data bus management, and single-cycle, multicycle, and pipeline operation. PREREQ: RCET 0154B, RCET 0251. COREQ: RCET 3375. D

**RCET 3374 Advanced Systems Analysis Theory: 4 semester hours.**

Advanced exploration of complex electronic circuitry and schematic analysis. Investigation of multicomponent system integration, timing, termination, and calibration. A study of electronically generated mixed signals, filtering, wave-shaping, and applications. An emphasis on large system troubleshooting techniques. PREREQ: RCET 0251, RCET 0267. COREQ: RCET 3376. D

**RCET 3375 Advanced Computer Architecture and Embedded Systems Laboratory: 5 semester hours.**

Laboratory experiments and projects to investigate the design, application, and assessment of computer systems and peripheral devices. Connect, interface, and develop firmware for microprocessors and embedded systems, and various peripheral devices. Utilization of high speed data bus analysis and communication protocol test equipment. PREREQ: RCET 0156B, RCET 0253. COREQ: RCET 3373. D

**RCET 3376 Advanced Systems Analysis Theory: 5 semester hours.**

Laboratory experiments investigating complex multicomponent system integration, timing, termination, and calibration with electronically generated mixed signals, filtering, wave-shaping, and applications. An emphasis on large system troubleshooting techniques and teamwork. Includes a capstone project. PREREQ: RCET 0253, RCET 0268. COREQ: RCET 3374. D

**RCET 3382 Rapid Prototyping Technologies: 2 semester hours.**

Application of the software, technologies, and techniques used in modern rapid prototyping processes related to robotics design. PREREQ: RCET 0267. F

**RCET 3383 Advanced Laser Systems and Optics Theory: 5 semester hours.**

Advanced theory and analysis of lasers and associated devices. Covers advanced laser topics, wave and geometric optics, electro-optics devices and components. PREREQ: Permission of Instructor. D

**RCET 3384 Advanced Laser Systems and Optics Laboratory: 3 semester hours.**

Practical application of advanced theory and analysis in analyzing laser/optics systems. PREREQ: Permission of Instructor. D

**RCET 3396 Independent Study: 1-8 semester hours.**

Addresses specific learning needs of individuals for the enhancement of knowledge and skills within the program area under the guidance of an instructor. May be repeated. Graded S/U; may be letter graded. PREREQ: Permission of instructor. D

**RCET 3398 Special Topics: 1-8 semester hours.**

Addresses the specific needs of industry, enabling students to upgrade technical skills that are not included in the current program curriculum. May be repeated. Graded S/U; may be letter graded. PREREQ: Permission of instructor. D