Area: Technical Education
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NARTE and FCC approved test site

Degree: A.S. - Electronic Systems Technology
A.S. - Mechtronics

Certificates: Advanced Electronic Assembly and Repair
Basic Electronic Assembly and Repair
CMOS Mask Design
Digital Repair & Upgrade Technician
Electronic Systems Technology
Fiber Optics
Mechtronics
Robotics

Electronic equipment is present everywhere in our lives. From computerized traffic signals to personal computers and cellular telephones, modern electronic systems make our everyday lives easier, safer, and more efficient. Electronic technicians design, develop, build, install, repair and maintain many different types of sophisticated electronic devices.

The American River College Electronics program combines broad based Electronic and Telecommunications training with the newest specialty areas (such as Robotics, Fiber Optics, Programmable Interface Controllers and Stamp Microcontrollers). By working closely with our industry partners we ensure our curriculum is relevant and meets industry current and future needs. This relevant and up-to-date education prepares graduates for excellent career opportunities in the Electronics, Robotics or Telecommunications fields.

American River College is an official NARTE (National Association of Radio and Television Engineers) Federal Communication Commission (FCC) test site and offers an FCC license preparation course.

Electronic Systems Technology Degree and Certificate

The Electronics Systems Technology Degree or Certificate combines broad-based electronic and telecommunications training with specialty areas such as robotics, fiber optics, programmable interface controllers (PICs), and stamp microcontrollers.

Career Opportunities

This degree or certificate provides students with the knowledge to successfully enter a variety of electronics and telecommunication careers. Working closely with our industry partners and contacts ensures our curriculum is relevant and meets the current and future needs of the Electronics and Telecommunications Industry. American River College is an official test site of the National Association of Radio and Telecommunication Engineers (NARTE) for the Federal Communication Commission (FCC) General Radio Telephone License. Included in the electronics program is an FCC license preparation course. Obtaining the degree or certificate improves the opportunities for quality employment and career advancement.

Requirements for Degree		**37 Units**
ET 112	Communications Units	3
ET 115	Fiber Optics and Telecommunication Cabling	4
ET 143	Computer Upgrade, Repair, and Assembly	2
ET 302	Principles of Electricity and Electronics	4
ET 307	High Tech Soldering and Fabrication Techniques	2
ET 310	Mathematics for DC Circuit Fundamentals, Part I	1.5
ET 311	Mathematics for AC Circuit Fundamentals, Part II	1.5
ET 322	Semiconductor Devices and Applications	5
ET 335	Integrated Circuits with Computer Applications	5
ET 380	Introduction to Electronic Communications	4
ET 420	Microcontrollers and Digital Signal Processors	5

Associate Degree Requirements: The Electronic Systems Technology Associate in Science (A.S.) Degree may be obtained by completion of the required program, plus general education requirements, plus sufficient electives to meet a 60-unit total. See ARC graduation requirements.

Requirements for Certificate		**37 Units**
1st Semester		
ET 115	Fiber Optics and Telecommunication Cabling	4
ET 302	Principles of Electricity and Electronics (4)	4
ET 307	High Tech Soldering and Fabrication Techniques	2
Other Semesters		
ET 112	Communications Units	3
ET 143	Computer Upgrade, Repair, and Assembly	2
ET 310	Mathematics for DC Circuit Fundamentals, Part I	1.5
ET 311	Mathematics for AC Circuit Fundamentals, Part II	1.5
ET 322	Semiconductor Devices and Applications	5
ET 335	Integrated Circuits with Computer Applications	5
ET 380	Introduction to Electronic Communications	4
ET 420	Microcontrollers and Digital Signal Processors	5

Mechtronics Degree and Certificate

This degree or certificate provides training in a multi-disciplinary field of which the primary focus is industrial automation. Topics such as electricity, electronics, industrial motor controls, programmable logic controllers, robotics, AC/DC drives, mechanical design, and manufacturing technologies are covered in this program.

Career Opportunities

This degree or certificate prepares the student for the following career opportunities: Industrial mechanical/electrical systems technician, food processing machine service technician, facilities systems technician, waste water systems technician, manufacturing coordinator, field service technician, mechanical electrical machine systems installer. Obtaining the degree or the certificate improves the opportunities for quality employment and career advancement.

Requirements for Degree or Certificate		36 Units
1st Semester		
ET 302	Principles of Electricity and Electronics	4
DESGN 100	Introduction to Computer Aided Drafting and Design (CADD)	3
WELD 300	Introduction to Welding	3
Other Semesters		
DESGN 102	Intermediate Computer Aided Drafting and Design (CADD)	3
ENGR 307	Industrial Materials Testing	3
ET 143	Computer Upgrade, Repair, and Assembly	2
ET 192	Introduction to Robotics	2
ET 194	Intermediate Robotics	2
ET 195	Electrical and Mechanical Power and Control Systems	3
MATH 100	Elementary Algebra	5
MGMT 360	Management Communication	3
PHYS 310	Conceptual Physics	3

Associate Degree Requirements: The Mechtronics Associate in Science (A.S.) Degree may be obtained by completion of the required program, plus general education requirements, plus sufficient electives to meet a 60-unit total. See ARC graduation requirements.

Basic Electronics and Telecommunications Certificate

The Basic Electronics and Telecommunication certificate provides training in basic electronics theory and applications, telecommunication copper and fiber optic systems, and surface mount soldering devices (SMD). It also includes schematic symbol interpretation, and basic electronic troubleshooting. The courses required for this certificate can be completed in one semester, making it an ideal stepping stone to the Advanced Electronics and Telecommunications certificate.

Career Opportunities

The Basic Electronics and Telecommunications certificate is designed for anyone wanting to enter the electronics or telecommunications industry. This certificate satisfies the requirements of a variety of entry-level positions such as printed circuit board (PCB) assembler, telecommunication field technician, or rework technician.

Requirements for Certificate		10 Units
ET 115	Fiber Optics and Telecommunication Cabling	4
ET 302	Principles of Electricity and Electronics	4
ET 307	High Tech Soldering and Fabrication Techniques	2

Advanced Electronics and Telecommunications Certificate

This Advanced Electronics and Telecommunications certificate provides training in electronic system component identification and characteristics; computer component identification, repair, and upgrading; semiconductor theory and application; power supply design and operation; telecommunication copper and fiber optic systems; and advanced troubleshooting. This certificate is designed to be completed in two semesters.

Career Opportunities

The Advanced Electronics and Telecommunications certificate enables those students who have completed this certificate or are currently working in industry to quickly progress up the career ladder. More skills in the critical areas along with added electronics and telecommunications theory and laboratory practice make this an ideal certificate for those wishing to upgrade and update their electronics skills.

Requirements for Certificate		17 Units
1st Semester		
ET 115	Fiber Optics and Telecommunications Cabling	4
ET 302	Principles of Electricity and Electronics	4
ET 307	High Tech Soldering and Fabrication Techniques	2
Other Semesters		
ET 143	Computer Upgrade, Repair, and Assembly	2
ET 322	Semiconductor Devices and Applications	5

CMOS Mask Design Certificate

The CMOS Mask Design Certificate presents advanced semiconductor theory. Topics include semiconductor physical design rules and integrated circuit concepts. State of the art design software provides hands on experience.

Career Opportunities

By earning a CMOS Mask Design Certificate students are qualified for a wide variety of employment opportunities at an entry level position in the semiconductor industry. Experience using state of the art design software allows students hands on experience using the same programs used by industry. Incorporating semiconductor theory along with semiconductor physical design rules and concepts make this an ideal certificate for those desiring employment in the semiconductor manufacturing industry.

Requirements for Certificate		12 Units
CISC 320	Operating Systems	1
ET 205	CMOS Mask Design I	3
ET 206	CMOS Mask Design II	3
ET 335	Integrated Circuits with Computer Applications	5

Digital Repair and Upgrade Technician Certificate

The Digital Repair and Upgrade Technician certificate combines basic electronics theory and application with computer repair and support skills. Topics including high-tech soldering along with component and system level electronics are focused on in the electrical area. Computer repair skills and support are covered in the computer area.

Career Opportunities

The Digital Repair and Upgrade Technician certificate prepares the student for a wide variety of jobs in the computer industry such as network communication cable installer, interface troubleshooter, and fiber optic installer.

Requirements for Certificate		11-14 Units
CISC 320	Operating Systems	1
CISC 361	Microcomputer Support And Repair	3
CISC 363	Advanced Microcomputer Support and Repair	2
ET 143	Computer Upgrade, Repair, and Assembly	2
ET 298	Work Experience in Electronics Technology	1 - 4
ET 307	High Tech Soldering and Fabrication Techniques	2

Fiber Optics Certificate

The Fiber Optics certificate is an introduction into fiber optics technology. Topics include fusion and mechanical splicing, fiber connectivity, optical time domain reflectometer (OTDR), and other specialized test equipment operations. System design, installation, troubleshooting, and repair are emphasized. Courses in communication theory and copper cabling are included in the certificate, producing a technician with a wide variety of skills.

Career Opportunities

The Fiber Optic certificate prepares the student to obtain entry level employment in a wide variety of positions in the telecommunication and fiber optic industry. It is also valuable for people working in the industry to upgrade their skill level to include the newest advancements in fiber technology.

Requirements for Certificate		17 Units
ET 115	Fiber Optics and Telecommunication Cabling	4
ET 302	Principles of Electricity and Electronics	4
ET 380	Introduction to Electronic Communications	4
ET 386	Fiber Optic Splicing, Connectivity and Testing	3
ET 387	Advanced Fiber Optics	2

Robotics Certificate

The Robotics certificate provides an overview of electronics and robotic theory and application, programming, design, and modification. Electronics theory and application are stressed along with sensors and controllers, an important part of the next generation of robotics. Various robotic platforms are used to give a wide understanding of all types of current and future systems.

Requirements for Certificate		15 Units
ET 192	Introduction to Robotics	2
ET 194	Intermediate Robotics	2
ET 195	Electrical and Mechanical Power and Control Systems	3
ET 196	Sensors, Measurement, and Control	2
ET 302	Principles of Electricity and Electronics	4
ET 307	High Tech Soldering and Fabrication Techniques	2

ET 20 Mobile and Cellular Radio Systems 2 Units

Prerequisite: ET 102.
Hours: 36 hours LEC
Nature of mobile radio signal and its properties. Statistical communication theory introduced and applied in four areas of mobile communications: propagation, received signal characteristics, functional design and system performance. Historic, legal and regulatory aspects of cellular radio industry. Covers specific services and features of the technology, control architectures and switching systems, and siting and economic considerations.

ET 100 Introduction to Telecommunications Systems 3 Units

Hours: 54 hours LEC
This course is an overview of the Telecommunication Industry focusing on both voice and data communication. Terminology, concepts and telecommunication practices are covered along with new and emerging changes in switching systems caused by the next generation of Internet. Additionally, this course focuses on systems that transfer data from one location to another. Field trips are required.

ET 102 Advanced Telecommunication Systems 3 Units

Prerequisite: ET 100 with a grade of "C" or better, or Telecommunications Industry Experience.
Hours: 54 hours LEC
This course expands on the concepts mastered in the Introduction to Telecommunication Systems course. Voice/data switching and transmission theory including system operation and design are covered in detail. Emphasis is placed on fiber optics and the newest methods of high speed data transfer. Also included are advanced high speed switching/routing systems along with their associated hardware/software. Dense Wave Division Multiplexing (DWDM) is also covered. Field Trips are required.

ET 110 Communications Systems 5 Units

Prerequisite: ET 330 or 335; and ET 380 with a grade of "C" or better.
Hours: 54 hours LEC; 108 hours LAB
This course is a comprehensive study of high frequency communication concepts including antennas, transmission lines, transmitters and receivers. Commercial telecommunication equipment and schematics are used to simulate equipment that is utilized in industry. System design, component and equipment analysis and troubleshooting are stressed. Extensive use of laboratory experiments enhances theory. A field trip is required.

ET 112 Federal Communication Commission License Preparation 3 Units

Advisory: ET 380 or Communication industry experience.
Hours: 54 hours LEC
This course is preparation for the Federal Communication Commission (FCC) General Radiotelephone license examination. The course covers both the electronics theory required and the rules and regulations mandated by the FCC. Field trips are required. This course may be taken four times for credit.

ET 114 Basic Electricity and Electronics for Installation Specialists 5 Units

Advisory: ENGWR 102 or 103, and ENGRD 116; or ESLR 320 and ESLW 320; or placement through assessment process.
Hours: 54 hours LEC; 108 hours LAB
This course is an introduction to the concepts of Direct and Alternating Current Theory. It includes a detailed study of commonly used circuit components, mathematical concepts necessary for calculating circuit values, relationships of components in series, parallel and combination DC and AC circuit configurations and reading electrical diagrams and schematics. Emphasis is on applying electronic concepts to practical situations.

ET 115 Fiber Optics and Telecommunication Cabling 4 Units

Advisory: ET 307.
Hours: 54 hours LEC; 54 hours LAB
This course is an introduction to the concepts of telecommunication cable installation and connection practices and standards. It includes the study of commonly used fiber and copper cable types and connectors, installation tools, and test equipment. Emphasis is on installation techniques in practical situations. Laboratory activities provide practical experience in the operation and use of tools and test equipment specific to the telecommunication industry. Field trips are required.

ET 130 Introduction to High Definition Digital Television 3 Units

Hours: 54 hours LEC

This course covers the theory and operation of High Definition Digital Television. It covers the concepts and circuitry involved in this medium. Analogies between analog and digital systems are featured enabling an understanding of current technology. Field trips are required.

ET 143 Computer Upgrade, Repair, and Assembly 2 Units

Hours: 18 hours LEC; 54 hours LAB

This course covers basic personal computer upgrading, repair, and assembly. Safety, terminology, component identification, file management, upgrades, and virus protection are among the topics that are covered. This class may be taken twice for credit.

ET 154 Wireless Communication Systems 1.5 Units

Hours: 18 hours LEC; 27 hours LAB

This is an introduction to wireless communication designed for electronic technicians. The course includes wireless communication terminology and instruction in the proper use of hardware and test equipment used in installation, maintenance and operation. Topics include the study of individual system component theory and operation as well as the entire wireless communication system.

ET 162 Home Electronics and Power 1 Unit

Hours: 18 hours LEC

This course is an overview of the power and electronics used in the modern home. It covers the power distributed through the home as well as the appliances and communication systems used. The topics of home security, power conservation, alternate energy sources, and home automation are also covered.

ET 180 Circuit Review and Application 3 Units

Prerequisite: ET 330 with a grade of "C" or better.
Hours: 54 hours LEC

This course is a thorough review of electronics theory and devices with emphasis on circuit analysis and troubleshooting techniques. Commercial schematics are used in the review of DC/AC fundamentals, digital systems, analog circuits (bipolar and field effect transistors as well as op amps) and non-linear devices such as SCR's and triacs. This course is helpful in preparing for job interviews and is also a refresher course for technicians currently employed in the field of electronics. This course may be taken twice for credit.

ET 190 Introduction to Programmable Logic Controllers (PLCs) 2 Units

Corequisite: ET 330.
Hours: 36 hours LEC

This course is an introduction to the operation and use of the Programmable Logic Controller (PLC), an electronic device that controls machines and processes. The PLC uses a programmable memory to store instructions and executes specific functions that include on/off control, timing, counting sequencing arithmetic, and data handling. Ladder logic is used in programming and troubleshooting the PLC. May be taken twice for credit.

ET 192 Introduction to Robotics 2 Units

Hours: 36 hours LEC

This course is an introduction to robotics utilizing the Parallax stamp microcontroller and Boe-Bot robotic vehicle. It explores how robots and micocontrollers interface with common electronic applications. It also investigates unusual and innovative applications for robots and microcontrollers. Field trips are required.

ET 194 Intermediate Robotics 2 Units

Hours: 36 hours LEC

This course covers advanced robotics utilizing the Parallax stamp microcontroller and Boe-Bot robotic vehicle. Topics include the operation and design of robots using the Robix robotic platform. This course includes how robotics and automation are utilized in industry. Hardware component selection, assembly, and software programming of various types of robotic assemblies are emphasized. The principles of electronics, physics, and engineering as they apply to robotic design are presented. Field trips are required.

ET 195 Electrical and Mechanical Power and Control Systems 3 Units

Hours: 54 hours LEC

This course is a study of electrical and mechanical power components and systems used in the control and transmission of mechanical and electrical power. Topics include the analysis of electric circuits and controls; programmable logic controllers (PLC's), electromagnetic devices and their use in systems; discrete semiconductor switching devices; hydraulic and pneumatic power devices; types and uses of electric motors and generators as well as power distribution systems. Troubleshooting and repair of hydraulic, pneumatic control equipment and electrical / electronic systems are studied through a number of industry-based projects.

ET 196 Sensors, Measurement, and Control 2 Units

Hours: 36 hours LEC

This course is a detailed study of the physical world and the sensors which measure its properties. Signals from these sensors are converted for display and used to control physical properties such as temperature or pressure. Lecture and demonstrations reinforce theory and provide experience in sensor identification and troubleshooting. PLC's and STAMP micro controllers are used to simulate industrial situations.

ET 205 CMOS Mask Design I 3 Units

Corequisite: ET 330.
Hours: 54 hours LEC

This course is an entry level integrated circuit (IC) layout and design in CMOS (Complementary Metal-Oxide-Silicon) technology. This course provides practical experience in drawing logic diagrams, transistor level schematics, cross sectional views, STIK diagrams, and in converting STIKS to the actual layout of the layers that will be used to manufacture the IC. The course stresses application of design rules, area estimation, and pin and bus placements.

ET 206 CMOS Mask Design II 3 Units

Prerequisite: ET 205 with a grade of "C" or better.
Hours: 36 hours LEC; 54 hours LAB

CMOS Mask Design II is a continuation of CMOS Mask Design I (ET 205). This course introduces more complex logic and design rules for integrated circuit layout. This course also includes practical experience in the use of a Unix-based integrated circuit design tool, Cadence VLE, from Cadence Design Systems.

ET 250 Employability Skills for Technical Careers 2 Units

Same As: AT 107 and WELD 150
General Education: AA/AS Area III(b)
Hours: 36 hours LEC

This course provides the opportunity of exploring technical careers while developing valuable work and life skills. It is an introduction to a variety of technically-related occupations. Emphasis is placed on exploring technical careers in the Sacramento area. Activities are designed to enhance personal development, employability skills, and self esteem through leadership, citizenship, and character development.

ET 251 Automotive Electronic Accessories and Installation 2 Units

Same As: AT 251
Hours: 27 hours LEC; 27 hours LAB
This course covers the electrical principles and processes involved in the installation of stereo sound, alarm and other entertainment, electrical and electronic systems and components. Installation safety, circuit diagrams, inspection, and wiring techniques are covered along with installation techniques of fiber optics, Global Positioning (GPS), and other related systems. Steps for aquiring the Mobile Electronics Certified Professional (MECP) certification are covered to complete the course content. A field trip is required. This course in not open to students who have taken the AT 251 course.

ET 294 Topics in Electronics Technology .5-5 Units

Prerequisite: To be determined for each topic.
Hours: 9-90 hours LEC; 27-270 hours LAB
This is an individualized course developed in cooperation with industry to meet specialized training needs. It may be taken four times with no duplication of topics.

ET 298 Work Experience in Electronics Technology 1-4 Units

Corequisite: Maintain a minimum of 7 units.
Hours: 9-90 hours LEC; 27-270 hours LAB
This course gives practical experience to students who are training for careers in the electronics industry by providing actual supervised work at various electronics firms within the Sacramento area.

ET 302 Principles of Electricity and Electronics 4 Units

Course Transferable to CSU
Hours: 54 hours LEC; 54 hours LAB
This introductory course explores the field of electronics and electricity. Complete systems such as robotics, Global Positioning Systems (GPS), computers, and home electronics are used to demonstrate component application. The use of electronic simulation software combined with actual hands on lab experiments reinforces theory. Various test equipment such as digital four channel color oscilloscopes, Digital Multi Meters and programmable function generators are used to demonstrate electronic principles and theory of AC, DC, Ohm's law, inductance and capacitance as they apply to voltage and frequency response. Field trips to local electronics industries are required.

ET 307 High Tech Soldering and Fabrication Techniques 2 Units

Advisory: ET 302.
Course Transferable to CSU
Hours: 18 hours LEC; 54 hours LAB
This course teaches fundamental soldering techniques required in the Electronics industry. Lecture and lab exercises introduce state of the art processes involving safety, component and tool identification, diagrams, terms, standards, soldering [plated through hole (PTH), surface mount (SMT), fine and ultra fine pitch], de-soldering, electrostatic discharge (ESD), devices and assembly. Field trips are required. This course may be taken twice for credit.

ET 310 Mathematics for DC Circuit Fundamentals, Part I 1.5 Units

General Education: AA/AS Area II(b)
Course Transferable to CSU
Hours: 27 hours LEC
This course covers mathematics for direct current (DC) circuit fundamentals. Powers of ten, algebra and other mathematical concepts necessary for calculation of resistance, DC voltage and current distribution in series, parallel, and combination circuits are covered.

ET 311 Mathematics for AC Circuit Fundamentals, Part II 1.5 Units

Prerequisite: ET 310 with a grade of "C" or better
Advisory: ET 301
General Education: AA/AS Area II(b)
Course Transferable to CSU
Hours: 27 hours LEC
This course covers the application of algebra and trigonometry for the mathematical analysis of AC concepts involving resistances and/or reactances in series, parellel and combination circuits. Computer aided learning software including MultiSim 2001 (Electronic WorkBench) will be used to assist in applying mathematical equations to electronic circuitry.

ET 322 Semiconductors and Nanotechnology 5 Units

Prerequisite: ET 302 with a grade of "C" or better.
Advisory: ET 310 and 311.
Course Transferable to CSU
Hours: 54 hours LEC; 108 hours LAB
This course is a detailed study of semiconductor and nanotechnology devices and their applications. Semiconductor manufacturing and components such as diodes, transistors, op-amps, and field programmable analog arrays (FPAA), including their use in complex circuits are covered. Nanotechnology theory and devices including their present and possible future applications are studied. Field trips are required.

ET 335 Integrated Circuits with Computer Applications 5 Units

Prerequisite: ET 302 with a grade of "C" or better.
Course Transferable to CSU
Hours: 54 hours LEC; 108 hours LAB
This course covers integrated circuits (IC's) and applications used in industrial and consumer products. Digital theory and applications start with standard transistor-transistor logic (TTL) and complementary metal oxide semiconductor (CMOS) logic circuits and progress into complex circuits built on programmable logic devices (PLDs) using very-large-scale-integration hardware description language (VHDL). Field trips are required.

ET 337 Advanced Integrated Circuit Applications 3 Units

Prerequisite: ET 330 or ET 335 with a grade of "C" or better.
Course Transferable to CSU
Hours: 36 hours LEC; 54 hours LAB
This course is a continuation of Integrated Circuit Applications, ET 335. It includes a comprehensive study of advanced circuits used in various industrial and consumer applications. Topics include advanced operational amplifier circuits; electrical-mechanical transducers; voice recognition and reproduction circuits; motor driver circuits; global positioning circuits (GPS); and computer and human interface circuits. Field trips are required.

ET 369 The Design and Fabrication of Electronics Projects 2 Units

Prerequisite: ET 322 with a grade of "C" or better.
Course Transferable to CSU
Hours: 18 hours LEC; 54 hours LAB
This course provides an opportunity for students to design and build advanced projects. It enables students to work on approved electronics projects outside the scope of typical classroom applications. Students learn the process of planning, design, prototyping, and fabrication while building an actual working project. Completed projects are entered in county and statewide technology such as the California State Fair Industrial Technology competition. A completed project is a course requirement. Projects can be completed individually or in teams. Field trips are required. This course may be taken three times on different projects.

ET 380 Introduction to Electronic Communications 4 Units

Prerequisite: ET 301 or ET 302 with a grade of "C" or better.
Course Transferable to CSU
Hours: 54 hours LEC; 54 hours LAB
This course covers UHF, VHF, microwave, satellite, and fiber optics. AM and FM transmitters, transmission lines, antennas, and receivers are analyzed down to the component level. Propagation, wave theory, decibels, and signal transmission limitations are also covered. Technician safety and proper test equipment use are stressed throughout the course. Field trips are required.

ET 386 Fiber Optic Splicing, Connectivity and Testing 3 Units

Course Transferable to CSU
Hours: 54 hours LEC
This is an introductory course in fiber optic theory and operation including the complete fiber optic communication system. It includes fiber optic terminology and instruction in the proper use of tools and equipment associated with fiber optic installation and maintenance. Tests of the fiber optic systems are performed using sophisticated equipment such as optical power meters and Optical Time Domain Reflectometer (OTDR). A field trip is required. This course may be taken twice for credit using different equipment.

ET 387 Advanced Fiber Optics 2 Units

Prerequisite: ET 386 with a grade of "C" or better.
Course Transferable to CSU
Hours: 36 hours LEC
This course covers advanced fiber optic theory and operation. Fiber optic systems are vital communication links that enable high speed transfer of video, telephone, and data to occur. Testing of fiber optic systems using sophisticated electra-optical test equipment such as the Optical Time Domain Reflectometer (OTDR) is included. This course also introduces the use of computer based software to simplify fiber optic system design. May be taken twice for credit.

ET 420 Microcontrollers and Digital Signal Processors 5 Units

Prerequisite: ET 302 with a grade of "C" or better.
Course Transferable to CSU
Hours: 54 hours LEC; 108 hours LAB
This course is an in-depth study of microcontrollers and digital signal processors (DSP). The focus is on digital concepts such as data flow, internal architecture, programming, memory, data converters and the interfacing of input/output devices, sensors and motors. Field trips are required.

ET 421 Advanced Microprocessors, Microcontrollers, and Programmable Logic Devices 3 Units

Prerequisite: ET 420 with a grade of "C" or better.
Course Transferable to CSU
Hours: 36 hours LEC; 54 hours LAB
This course is a continuation of ET 420. It focuses on the advanced features of microprocessors, microcontrollers, and Programmable Logic Devices (PLD). Topics include microcontroller assembly language; optical, RF and serial communication techniques; output display design; and developing Reduced Instruction Set Controller (RISC) microprocessors from PLD's. Field trips are required.

ET 490 Advanced Student Projects Laboratory 2 Units

Prerequisite: ET 330 with a grade of "C" or better.
Course Transferable to CSU
Hours: 108 hours LAB
This course provides an opportunity for students to pursue advanced projects selected by the Electronics department. This course may be taken twice for credit.