Electronics and Computer Technology

The Electronics and Computer Technology Department offers several concentrations in electronics and computer technology that are designed to prepare students for a variety of high-tech job/career opportunities in the fields of engineering and technology; electronics technology; computer technology; telecommunication technology; and related technologies.

The Electronics and Computer Technology Department offers an associate degree program in engineering technology with an emphasis in electronics, computers, and telecommunications. Technology certificates offered in areas of specialization include: electronics technology, computer technology, telecommunication technology, networking technology, electronic communication technology, and industrial electronics technology. Certificates/certifications offered in specific areas of electronics, computers, and related technology include: Certified Electronics Technician (Associate CET), A+ Certified Computer Service Technician, N+ Certified Networking Technician, CISCO Certified Network Associate (CCNA), CISCO Certified Network Professional (CCNP), Microsoft Certified Systems Engineer (MCSE), Certified Fiber Optics Installer, (FOIC), Electronics Communications (WCM, FCC license) and Digital and Microprocessor Electronics.

Career Opportunities

Electronics Engineering Technologist, Computer Engineering Technologist, Network Engineering Technologist, Telecommunications Engineering Technologist, Certified Electronics Technician - CET, A+ Certified Computer Technician, N+ Certified Network Technician, Certified Telecommunication Technician, CISCO Certified Network Associate (CCNA), CISCO Certified Network Professional (CCNP), Microsoft Certified Professional (MCP), Microsoft Certified Systems Engineer ,(MCSE), Networking Cable Installer, Fiber Optics Installer, Microwave/Radar Technician, Laser/Optical Technician, Industrial Electronics Technician, Consumer Electronics Technician, Biomedical Instrument Technician, Audio/Visual Systems Technician, Broadcast Radio and Television, Research and Development, Sales Representative, electronics and computer equipment, Quality Control Technician,

Faculty

Khalid Rubayi

Degrees and Certificates Awarded

Associate in Science, Electronics and Computer Technology
Associate in Science, Electronics Engineering Technology
Associate Degree Electronics Engineering Technology Certificate
A+ Certification Examination Preparation Certificate

CISCO Networking Academy I, II, III, IV, V, VI, VII Certificate
Computer Technology Certificate
Digital Electronics Certificate
Electronics Technology Certificate

Program Learning Outcomes

A student receiving a degree or certificate in this field will be able to:

• Apply principles of mathematics and applied science, to perform technical calculations and solve technical problems of the types commonly encountered in electronics and computer technology careers.

• Function competently in a laboratory setting, making measurements, operating technical equipment, critically examining experimental results, and properly reporting on experimental results, including their potential for improvement.

• Use modern computational tools for technical problem solving, including scientific calculators, computers, and appropriate software.

• Recognize the need for life-long learning and possess the skills to maintain and improve technical and non-technical abilities.

• Demonstrate an ability to communicate and function effectively with members of multidisciplinary teams from a variety of backgrounds.

• Demonstrate an ability to utilize computer software applications used in electronics and computer technology such as but not limited to: MultiSim, MathCad, Packet Tracer, LabView and basic programming.

Electronics and Computer Technology

Associate Degree

To earn an Associate in Science degree with a major in Electronics and Computer Technology (07558), complete a minimum of 18 units from any of the certificate requirements or from any Electronics and Computer Technology courses and meet all Victor Valley College graduation requirements. ELCT 138 (Cooperative Education) may be used as elective credit, but may not be used to fulfill major requirements.

To earn an Associate in Science degree with a major in Electronics Engineering Technology complete the requirements specified and all other Victor Valley College graduation requirements.

Transfer

Most Electronics and Computer Technology courses transfer as Electives or fulfill subject credit requirements. Students in this field sometimes choose to pursue a bachelor's degree in technology fields such as Industrial Technology at California State Polytechnic University, San Luis Obispo, or Engineering Technology at California State Polytechnic University, Pomona. Other students choose to pursue an Engineering degree which requires a more intense curriculum in mathematics, chemistry, and physics. See Engineering for transfer requirements.

Campuses that offer Electronics and Computer Technology majors include: CSU - Chico, Fullerton, Long Beach, Pomona and Sacramento. Visit www.assist.org for major preparation requirements.

ELECTRONICS ENGINEERING TECHNOLOGY, AS AND CERTIFICATES

Professional Preparation

Units Required: : 52.0 – 58.0

All of the following must be completed:

ELCT 131	DC Circuit Theory and Analysis	4.0
ELCT 132	AC Circuit Theory and Analysis	4.0
ELCT 133	Solid State Devices and Circuits	4.0
ELCT 134	Solid State Circuit Analysis	4.0
ELCT 50	A+ Operating Systems Technologies	4.0
ELCT 51	C++ Programming for Electronics and Computer Technology	4.0
ELCT 71	Principles of Digital Logic and Circuits	4.0
ELCT 73	Microprocessor Principles	4.0

One of the following two groups must be completed:

Electronics Emphasis (AS-07557) (Cert - 20539)

ELCT 53	Electronic Communication Principles	4.0
ELCT 54	Electronic Communication Systems	4.0

Computer Emphasis (AS-10797) (Cert - 20540)

ELCT 61	Basic Maintenance of Personal Computers	4.0
ELCT 77A	Networking Technology and Practices I	4.0

Individualized instruction courses require 108 hours of supervised laboratory activities.

All of the following must be completed:

ELCT 57	Technical Mathematics for Electronics I	3.0
ELCT 58	Technical Mathematics for Electronics II	3.0
ELCT 59	Technical Calculus for Electronics I	3.0
ELCT 60	Technical Calculus for Electronics II	3.0

Students planning to transfer to an Electrical engineering program should take the following mathematics courses (instead of ELCT 57, 58, 59, and 60)

MATH 105	College Algebra	4.0
MATH 104	Trigonometry	4.0
MATH 226	Analytic Geometry and Calculus	5.0
MATH 227	Analytic Geometry and Calculus	5.0

Complete all other General Education, proficiency and graduation requirements for the A.S. degree

Electronics and Computer Technology

COMPUTER TECHNOLOGY CERTIFICATE OF ACHIEVIEMENT (07560)		
Professional Preparation		
Units Required: : 44.0		
All of the following must be completed:		
ELCT 131	DC Circuit Theory and Analysis	4.0
ELCT 132	AC Circuit Theory and Analysis	4.0
ELCT 133	Solid State Devices and Circuits	4.0
ELCT 134	Solid State Circuit Analysis	4.0
ELCT 50	A+ Operating Systems Technologies	4.0
ELCT 57	Technical Mathematics for Electronics I	3.0
ELCT 58	Technical Mathematics for Electronics II	3.0
ELCT 61	Basic Maintenance of Personal Computers	4.0
ELCT 71	Principles of Digital Logic and Circuits	4.0
ELCT 73	Microprocessor Principles	4.0
Career Option - 6 Units		
Career specialty options include individualized instruction courses that are designed to provide the student with skills and/or knowledge in a specific area of digital/microprocessor technology. Supervised time will be spent with computers, audiovisual material, and laboratory equipment to meet specific objectives. Each specialty course requires 108 hours to complete, or an average of 6 hours per week.		
One of the following career options must be completed:		
Option 1: Microprocessor Systems		
ELCT 91	Microprocessor Interfacing	3.0
ELCT 92	Microprocessor Applications	3.0
Option 2: Computer Systems		
ELCT 62	PC Servicing	3.0
ELCT 63	PC Troubleshooting	3.0
CISCO NETWORKING ACADEMY CERTIFICATE LEVEL I CERTIFICATE OF CAREER PREPARATION		
Units Required: : 17.0		
All of the following must be completed:		
ELCT 50	A+ Operating Systems Technologies	4.0
ELCT 61	Basic Maintenance of Personal Computers	4.0
ELCT 69	Network Topologies and Cabling	2.0
ELCT 80	Fiber Optics Cabling	3.0
ELCT 78A	Network Fundamentals	4.0
CISCO NETWORKING ACADEMY CERTIFICATE LEVEL II CERTIFICATE OF CAREER PREPARATION		
Units Required: : 17.0		
All of the following must be completed:		
ELCT 50	A+ Operating Systems Technologies	4.0
ELCT 61	Basic Maintenance of Personal Computers	4.0
ELCT 69	Network Topologies and Cabling	2.0
ELCT 80	Fiber Optics Cabling	3.0
ELCT 78B	Routing Protocols and Concepts	4.0

CISCO NETWORKING ACADEMY CERTIFICATE LEVEL III CERTIFICATE OF CAREER PREPARATION

Units Required: : 17.0

All of the following must be completed:

ELCT 50	A+ Operating Systems Technologies	4.0
ELCT 61	Basic Maintenance of Personal Computers	4.0
ELCT 69	Network Topologies and Cabling	2.0
ELCT 80	Fiber Optics Cabling	3.0
ELCT 78C	LAN Switching and Wireless	4.0

CISCO NETWORKING ACADEMY CERTIFICATE LEVEL IV CERTIFICATE OF CAREER PREPARATION

Units Required: : 17.0

All of the following must be completed:

ELCT 50	A+ Operating Systems Technologies	4.0
ELCT 61	Basic Maintenance of Personal Computers	4.0
ELCT 69	Network Topologies and Cabling	2.0
ELCT 80	Fiber Optics Cabling	3.0
ELCT 78D	Accessing the WAN	4.0

CISCO NETWORKING ACADEMY CERTIFICATE LEVEL V CERTIFICATE OF CAREER PREPARATION

Units Required: : 17.0

All of the following must be completed:

ELCT 50	A+ Operating Systems Technologies	4.0
ELCT 61	Basic Maintenance of Personal Computers	4.0
ELCT 69	Network Topologies and Cabling	2.0
ELCT 80	Fiber Optics Cabling	3.0
ELCT 78E	Advanced Network Routing	4.0

CISCO NETWORKING ACADEMY CERTIFICATE LEVEL VI CERTIFICATE OF CAREER PREPARATION

Units Required: : 17.0

All of the following must be completed:

ELCT 50	A+ Operating Systems Technologies	4.0
ELCT 61	Basic Maintenance of Personal Computers	4.0
ELCT 69	Network Topologies and Cabling	2.0
ELCT 80	Fiber Optics Cabling	3.0
ELCT 78F	Implementing Secure Converged Wide-Area Networks	4.0

CISCO NETWORKING ACADEMY CERTIFICATE LEVEL VII CERTIFICATE OF CAREER PREPARATION

Units Required: : 17.0

All of the following must be completed:

ELCT 50	A+ Operating Systems Technologies	4.0
ELCT 61	Basic Maintenance of Personal Computers	4.0
ELCT 69	Network Topologies and Cabling	2.0
ELCT 80	Fiber Optics Cabling	3.0
ELCT 78G	Building Multilayer Switched Networks	4.0

Electronics and Computer Technology

Electronics and Computer Technology

DIGITAL ELECTRONICS CERTIFICATE OF ACHIEVEMENT (07561)

Units Required: : 30.0		
All of the following must be completed:		
ELCT 131	DC Circuit Theory and Analysis	4.0
ELCT 132	AC Circuit Theory and Analysis	4.0
ELCT 133	Solid State Devices and Circuits	4.0
ELCT 134	Solid State Circuit Analysis	4.0
ELCT 57	Technical Mathematics for Electronics I	3.0
ELCT 58	Technical Mathematics for Electronics II	3.0
ELCT 71	Principles of Digital Logic and Circuits	4.0
ELCT 73	Microprocessor Principles	4.0

ELECTRONICS TECHNOLOGY CERTIFICATE OF ACHIEVEMENT (10798)

Units Required: : 36.0	*Career Preparation*	
All of the following must be completed:		
ELCT 131	DC Circuit Theory and Analysis	4.0
ELCT 132	AC Circuit Theory and Analysis	4.0
ELCT 133	Solid State Devices and Circuits	4.0
ELCT 134	Solid State Circuit Analysis	4.0
ELCT 57	Technical Mathematics for Electronics I	3.0
ELCT 58	Technical Mathematics for Electronics II	3.0
ELCT 71	Principles of Digital Logic and Circuits	4.0
ELCT 73	Microprocessor Principles	4.0

Career Option - 6 Units

Career specialty options are individualized instruction courses and are designed to provide the student with skills and/or knowledge in a specific area of Electronics technology. Supervised time will be spent with computers, audiovisual material, and laboratory equipment to meet specific objectives. Each specialty option requires 108 hours to complete, or an average of 6 hours per week.

One of the following career options must be completed:

Option 1: Optoelectronics		
ELCT 85	Optoelectonics: Fiber Optics	3.0
ELCT 86	Optoelectonics: Lasers	3.0
Option 2: Telecommunications		
ELCT 97	Telecommunications: Digital Communications	3.0
ELCT 99	Telecommunications: Microwave Communications	3.0
Option 3: Television and Video Systems		
ELCT 93	TV Servicing	3.0
ELCT 94	VCR/Camcorder Servicing	3.0
Option 4: Industrial Electronics		
ELCT 87	Industrial electronics: Industrial Control Systems	3.0
ELCT 88	Industrial electronics: Industrial Process Control Applications	3.0
Option 5: Biomedical Electronics		
ELCT 89	Biomedical Instrumentation	3.0
ELCT 90	Advanced Biomedical Instrumentation	3.0

MICROSOFT CERTIFIED SYSTEMS ENGINEER (MCSE) EXAMINATION PREPARATION CERTIFICATE LEVEL I - CERTIFICATE OF CAREER PREPARATION

Units Required: 14.0

All of the following must be completed:

ELCT 50	A+ Operating Systems Technologies	4.0
ELCT 61	Basic Maintenance of Personal Computers	4.0
ELCT 69	Network Topologies and Cabling	2.0
ELCT 79A	Microsoft Certified Systems Engineer	4.0

MICROSOFT CERTIFIED SYSTEMS ENGINEER (MCSE) EXAMINATION PREPARATION CERTIFICATE LEVEL II - CERTIFICATE OF CAREER PREPARATION

Units Required: 14.0

All of the following must be completed:

ELCT 50	A+ Operating Systems Technologies	4.0
ELCT 61	Basic Maintenance of Personal Computers	4.0
ELCT 69	Network Topologies and Cabling	2.0
ELCT 79B	Microsoft Certified Systems Engineer II	4.0

NETWORK CABLING TECHNICIAN CERTIFICATE OF CAREER PREPARATION

Units Required: 16.0

All of the following must be completed:

ELCT 131	DC Circuit Theory and Analysis	4.0
ELCT 57	Technical Mathematics for Electronics I	3.0
ELCT 132	AC Circuit Theory and Analysis	4.0
ELCT 58	Technical Mathematics for Electronics II	3.0
ELCT 69	Network Topologies and Cabling	2.0

FIBER OPTIC CABLING TECHNICIAN CERTIFICATE OF CAREER PREPARATION

Units Required: 17.0

All of the following must be completed:

ELCT 131	DC Circuit Theory and Analysis	4.0
ELCT 57	Technical Mathematics for Electronics I	3.0
ELCT 132	AC Circuit Theory and Analysis	4.0
ELCT 58	Technical Mathematics for Electronics II	3.0
ELCT 80	Fiber Optics Cabling	3.0

A+ CERTIFICATION EXAMINATION PREPARATION CERTIFICATE OF CAREER PREPARATION

Units Required: 15.0

All of the following must be completed:

ELCT 50	A+ Operating Systems Technologies	4.0
ELCT 61	Basic Maintenance of Personal Computers	4.0
ELCT 65	PC Monitors	3.0
ELCT 69	Network Topologies and Cabling	2.0
ELCT 7	A+ Certification Exam Preparation	2.0

Electronics and Computer Technology

N+ CERTIFICATION EXAMINATION PREPARATION CERTIFICATE OF CAREER PREPARATION

Units Required: 17.0		
All of the following must be completed:		
ELCT 50	A+ Operating Systems Technologies	4.0
ELCT 61	Basic Maintenance of Personal Computers	4.0
ELCT 77A	Networking Technology and Practices I	4.0
ELCT 69	Network Topologies and Cabling	2.0
ELCT 80	Fiber Optics Cabling	3.0

WIRELESS COMMUNICATION TECHNOLOGY CERTIFICATE OF CAREER PREPARATION

Units Required: 38.0		
All of the following must be completed:		
ELCT 131	DC Circuit Theory and Analysis	4.0
ELCT 132	AC Circuit Theory and Analysis	4.0
ELCT 133	Solid State Devices and Circuits	4.0
ELCT 134	Solid State Circuit Analysis	4.0
ELCT 53	Electronic Communication Principles	4.0
ELCT 54	Electronic Communication Systems	4.0
ELCT 57	Technical Mathematics for Electronics I	3.0
ELCT 58	Technical Mathematics for Electronics II	3.0
ELCT 71	Principles of Digital Logic and Circuits	4.0
ELCT 73	Microprocessor Principles	4.0

Electronics and Computer Technology Courses

ELCT 7 A+ CERTIFICATION EXAMINATION PREPARATION

Units: 2.0 | **64-72 hours individualized instruction**

(No prerequisite) This course does not apply to the Associate Degree.

The A+ Certification examination preparation course is designed to test student knowledge with an extensive set of questions, discussions and simulations to further enhance and sharpen student technical skills prior to taking the CompTIA A+ exam. The course thoroughly tests student knowledge based on the A+ outlined exam objectives which include: Personal Computer (PC) hardware, operating systems, PC troubleshooting, networking, printers, and other important and related topics such as safety and customer service.

ELCT 50 A+ OPERATING SYSTEMS TECHNOLOGIES

Units: 4.0 | **48-54 hours lecture and 48-54 hours laboratory**

(No prerequisite)

This course is designed to prepare students to take the A+ Operating Systems Technologies Examination. Topics include operating system fundamentals; Windows 2000, Windows XP and Windows XP Media Edition; installing, configuring and upgrading windows; diagnosing, troubleshooting common problems; dual booting, registry editing, command line troubleshooting; network capabilities, configuring and connecting to resources and networks on the client side.

ELCT 57 TECHNICAL MATHEMATICS FOR ELECTRONICS I

Units: 3.0 | **48-54 hours lecture**

(No prerequisite)

This course is designed to provide a basis for a clear mathematical understanding of the principles of DC electricity and electronics and their analysis. Covered are algebra, equations, power of 10, units and dimensions, special products and factoring, algebraic fractions, fractional equations, graphs, simultaneous equations, determinants and matrices, exponents and radicals, and quadratic equations.

ELCT 58 TECHNICAL MATHEMATICS FOR ELECTRONICS II

Units: 3.0 | **48-54 hours lecture or 96-108 hours Individualized Instruction**

(No prerequisite)

This course is designed to provide a basis for a clear mathematical understanding of the principles of AC electricity and electronics and their analysis. Covered are inequalities, series, angles, trig functions, solution of right triangles, trig identities and equations, plane vectors, periodic functions, phasor algebra, and logarithms.

ELCT 59 TECHNICAL CALCULUS FOR ELECTRONICS I

Units: 3.0 | **48-54 hours lecture or 96-108 hours Individualized Instruction**

(No prerequisite)

This course is designed for students who are preparing for careers in electronics, electricity, computers, and related technical fields. Topics include: Introduction to Calculus for Electronics, Functions, Rates, Limits, Derivatives, Graphical Application of the Derivative, Differentiation, Trigonometric, Logarithmic and Exponential Functions, First-Order Linear Differential Equation, Maximum, Minimum, and Inflection Points.

ELCT 60 TECHNICAL CALCULUS FOR ELECTRONICS II

Units: 3.0 | **48-54 hours lecture or 96-108 hours Individualized Instruction**

(No prerequisite)

This course in technical calculus for electronics continues the study of functions and further operations. Topics includes trig functions, logarithmic and exponential functions, hyperbolic functions, partial derivatives, integration techniques, double integrals, infinite series, MacLaurin series, Taylor series, Fourier series, and introduction to differential equations.

Electronics and Computer Technology Courses

ELCT 61 BASIC MAINTENANCE OF PERSONAL COMPUTERS

Units: 4.0 | **48-54 hours lecture and 48-54 hours laboratory**

(No prerequisite)

This hands-on course is designed to provide non-technical personal computer (PC) users with the skills necessary to service and upgrade PCs. Activities include: computer assembly and disassembly, disk drive removal and installation, and memory expansion with integrated circuit (IC) chips. Installation and check out of special functions boards, such as FAX/modem, also will be demonstrated. Lectures describing the PC and its components are augmented with computer-aided individualized instruction modules covering selected electronic principles related to the PC. Satisfies computer industries A+ certification requirements.

ELCT 71 PRINCIPLES OF DIGITAL LOGIC AND CIRCUITS

Units: 4.0 | **48-54 hours lecture and 48-54 hours laboratory**

(No prerequisite)

This course will introduce students to digital logic circuits. Students will cover basic concepts in digital electronics, and discrete digital components. Hands-on lab will cover steps to build, verify and troubleshoot digital circuits with emphasis on practical applications and proper use of test equipment. Topics include binary systems, logic gates, combinational logic, synchronous sequential logic. Flip-Flops, asynchronous sequential logic, register, counters, memory, and digital integrated circuits.

ELCT 73 MICROPROCESSOR PRINCIPLES

Units: 4.0 | **48-54 hours lecture and 48-54 hours laboratory**

(No prerequisite)

Introduction to the principles of microprocessor design, topics include microprocessor architecture, bus architecture, memory (R/W Memory, ROM, EPROM, and EEPROM) maps, I/Os, interfacing devices, introduction to the instruction set of the microprocessor, assembly language programming techniques, introduction to various I/O techniques such as parallel I/O, serial I/O and interrupts. Laboratory projects include emphasis on designing and building microprocessor-based systems and hardware interfacing.

ELCT 76 MICROPROCESSOR INTERFACING AND APPLICATIONS

Units: 4.0 | **48-54 hours lecture and 48-54 hours laboratory**

(No prerequisite)

Development of microprocessor based systems for embedded applications. Topics include Interfacing to input/output peripherals such as displays, keypads, sensors, digital-to-analog and analog-to-digital converters, and communication devices among others. Laboratory component is an integral part of this course emphasizing a hands-on approach for students to design, build, and test embedded micro-controller systems.

ELCT 78A NETWORK FUNDAMENTALS

Units: 4.0 | **48-54 hours lecture and 48-54 hours laboratory**

(No prerequisite)

The goal of this course is to introduce students to fundamental networking concepts and technologies. It will assist students in developing the skills necessary to plan implement small networks across a range of applications. Topics include OSI and TCP/IP models, different network topologies, IP addressing and sub-netting. Satisfies Cisco Certified Network Associate (CCNA) certification exam requirements.

ELCT 78B ROUTING PROTOCOLS AND CONCEPTS

Units: 4.0 | **48-54 hours lecture and 48-54 hours laboratory**

(No prerequisite)

This course describes the architecture, components, and operation of routers, and explains the principles of routing and routing protocols. Students with hands-on approach will be able to analyze, configure, verify and troubleshoot routing protocols RIPv1, RIPv2, EIGRP, and OSPF. Satisfies Cisco Certified Network Associate (CCNA) certification exam requirements.

Electronics and Computer Technology Courses

ELCT 78C LAN SWITCHING AND WIRELESS

Units: 4.0   **48-54 hours lecture and 48-54 hours laboratory**

(No prerequisite)

This course provides a comprehensive and practical approach to learning the technologies and protocols needed to design and implement a converged switched network. Students will learn how to select network devices for each layer. The course explains how to configure a switch and how to implement Virtual LANs, VTP, Inter-VLAN routing. It also discusses the implementations of Spanning Tree Protocol. Students will develop the skills necessary to implement a Wireless LAN in a small to medium network. Satisfies Cisco Certified Network Associate (CCNA) certification exam requirements.

ELCT 78D ACCESSING THE WAN

Units: 4.0   **48-54 hours lecture and 48-54 hours laboratory**

(No prerequisite)

This course discusses the Wide Area Network (WAN) technologies and network services required to gain access outside the Local Area Network (LAN). Students learn in a hands-on approach how to implement and configure different technologies to access the WAN. Topics include Point-to-Point Protocol (PPP), Frame Relay, Network Security, Access Control Lists (ACLs), Virtual Private Networks (VPN), Network Address Translation (NAT) DHCP and IPv6. Satisfies Cisco Certified Network Associates (CCNA) certification exam requirements.

ELCT 78E ADVANCED NETWORK ROUTING

Units: 4.0   **48-54 hours lecture and 48-54 hours laboratory**

(No prerequisite)

This course is the first of a four course series designed to prepare students towards the Cisco Certified Network Professional (CCNP) certification. It introduces students to advanced IP address management, scaling IP networks, IP addressing using VLSM, private addressing, and NAT to optimize address utilization. Majority of the course deals with advanced topics in configuring routing protocols (RIPv2, EIGRP, ISIS, multi-area OSPF, and BGP), also covers important topics and techniques for route filtering, route optimization and route redistribution.

ELCT 78F IMPLEMENTING SECURE CONVERGED WIDE-AREA NETWORKS

Units: 4.0   **48-54 hours lecture and 48-54 hours laboratory**

(No prerequisite)

This is the second course of a four course series designed to prepare students for Cisco's (CCNP) certification. This course will cover advanced topics in Wide Area Network (WAN). Students learn with hands-on approach how to configure and implement different WAN technologies with focus on VPN configuration and securing network access. Topics include teleworker configuration and access, frame-mode MPLS, site-to-site IPSEC VPN, Cisco EZVPN, strategies used to mitigate network attacks, Cisco device hardening and IOS firewall features.

ELCT 78G BUILDING MULTILAYER SWITCHED NETWORKS

Units: 4.0   **48-54 hours lecture and 48-54 hours laboratory**

(No prerequisite)

This is the third of a four course series designed to prepare students for Cisco's (CCNP) certification. This course will cover advanced topics in building Multilayer Switched Networks. Students learn with hands-on approach how to deploy state-of-the-art campus LANs. Topics include VLANs, Spanning Tree Protocol (STP), VTP, Inter-VLAN Routing, Layer three Switches, Wireless Client Access, Voice over IP (VoIP) Switch Configuration, Redundancy and Fault Tolerance.

ELCT 78H OPTIMIZING AND TROUBLESHOOTING NETWORKS

Units: 4.0   **48-54 hours lecture and 48-54 hours laboratory**

(No prerequisite)

This is the fourth and last course of a four course series designed to prepare students for Cisco's CCNP certification. This course will cover advanced topics in optimizing and troubleshooting converged networks. Students learn with hands-on approach how to implement, optimize and troubleshoot networks operating voice, wireless and security applications. Topics include implementing a Voice over IP (VoIP) network, implementing Quality of Services (QoS) on converged networks, specific IP QoS mechanisms for implementing the DiffServ QoS model, AutoQoS, wireless security and basic wireless management.

Electronics and Computer Technology Courses

ELCT 78I FUNDAMENTALS OF NETWORKING SECURITY

Units: 4.0 | **48 hours lecture and 48 hours laboratory**

(No prerequisite)

The curriculum provides an introduction to the core security concepts and skills needed for the installation, troubleshooting, and monitoring of network devices to maintain the integrity, confidentiality, and availability of data and devices. It provides students with both the technical knowledge and skill experience through extensive hands-on experience needed to prepare for entry-level security specialist careers. The curriculum aims to provide students with hands-on experience with Cisco routers, switches, PIX, ASA security appliance and to develop in-depth understanding of network security principles and tools such as: protocol sniffers/analyzers, Cisco IOS Software, and Cisco VPN client. The curriculum is designed to prepare students for the CCNA Security Certification, which is recognized, by the National Security Agency (NSA) and the Committee on National Security Systems (CNSS) to meet CNSS 4011 training standard.

ELCT 78J FUNDAMENTALS OF WIRELESS LANS

Units: 4.0 | **48-54 hours lecture and 48-54 hours laboratory**

(No prerequisite)

This course focuses on the design, installation, configuration, operation and troubleshooting of 802.11a, 802.11b, 802.11g, 802.11n wireless LANs. It delivers a comprehensive overview in a hands-on lab environment of wireless technologies, security, design, and best practices with emphasis on real world applications and case studies. Topics include wireless radio technology, wireless topologies, antennas, access points, bridges, wireless security, Guest VLAN, site survey, installation, management, diagnostic tools, monitoring, and discussions on wireless emerging technologies. It also prepares students towards obtaining Cisco Wireless LAN Support Specialist certificate.

ELCT 78K VOICE OVER IP (VoIP) FOUNDATIONS

Units: 4.0 | **48-54 hours lecture and 48-54 hours laboratory**

(No prerequisite)

This course provides a practical hands-on approach to Voice over IP (VoIP) implementation. Topics include Internet Protocol carries a VoIP packet, configuring DHCP and DNS for supporting IP telephony, Real-Time Transport Protocol, Session Initiation Protocol, call set up, Instant Messaging, Presence, Session Description Protocol, and the H.323 protocol suite, gatekeepers, gateways, Media Gateway Control Protocol and architecture, comparing H.323, SIP, and MGCP, implementing QoS for the highest possible voice quality over IP networks, and how jitter, latency, and packet loss impact VoIP networks, troubleshooting RTP, MGCP, SIP, and H.323 call flows, and softphones, and security considerations for VoIP setups. Lab is an important and integral part of this course; student will train on Cisco routers and switches to implement VoIP and CallManager.

ELCT 85 OPTOELECTRONICS: FIBER OPTICS

Units: 3.0 | **144-162 hours laboratory or 96-108 hours individualized instruction**

(No prerequisite)

This hands-on self-paced course will provide students with the fundamentals of optical fiber, connectors, couplers, and other components and their application within a fiber optic system. Through hands-on LABs, students will learn key characteristics and principals of operation for critical electro-optic components such as LED's, lasers and detectors. In addition students will cover the operation of transmitters, receivers, and fiber optic communication systems with special emphasis on digital data links and fiber video links. In the LAB students will acquire skills to inspect, install and test connectors using the epoxy polish method, identify damage to cables and associated causes, Test fiber optic cable for losses, fiber cable splicing, optical performance, communications and systems.

ELCT 87 INDUSTRIAL ELECTRONICS: INDUSTRIAL CONTROL SYSTEMS, DEVICES AND CIRCUITS

Units: 3.0 | **96-108 hours individualized instruction**

(No prerequisite)

This course is designed to provide the student an opportunity to study a wide range of applications of electronics found in industrial automation and robotics. Topics include: operational amplifiers, linear integrated circuits, generators and motors, control devices and circuits, transducers, programmable logic controllers (PLCs), PLC functions, ladder logic, programming and applications.

Electronics and Computer Technology Courses

ELCT 110 ELECTRONICS AND COMPUTER TECHNOLOGY

Units: 3.0   *CSU* | **48-54 hours lecture**

(No prerequisite)

This course is designed to expose students to a wide range of electronics and computer technologies in a simplified, practical and non-mathematical hands-on approach. Topics will include electronics and computers applied to automotive and medical fields, global positioning satellites (GPS), home entertainment systems, surround sound and digital flat panel TVs, digital music compression and recording, Internet, wireless and wired networking in the house, computer hardware setup and operation, how to use personal computer (PC) applications, basic PC diagnostics, upgrade and troubleshooting.

ELCT 131 D.C. CIRCUIT THEORY AND ANALYSIS

Units: 4.0   *CSU* | **48-54 hours lecture and 48-54 hours laboratory**

(No prerequisite)

Introduction to DC circuits analysis, a theoretical and practical hands-on approach to DC fundamentals. Topics include Ohm's Law, Series, Parallel and Series-Parallel Circuits, Network Theorems, Methods of Analysis, Equivalent Circuits, Capacitive and Inductive Circuits, Timing Circuits, Measuring Instruments, Magnetism and Magnetic Circuits. A laboratory component is an integral part of this course emphasizing a hands-on approach for students to use different test instruments and software tools to design, build, test, and analyze DC circuits.

ELCT 132 A.C. CIRCUIT THEORY AND ANALYSIS

Units: 4.0   *CSU* | **48-54 hours lecture and 48-54 hours laboratory**

(No prerequisite)

Introduction to AC circuits analysis, a theoretical and practical hands-on approach to AC fundamentals. Topics include AC waveform analysis, Inductive and Capacitive Circuits, Impedance, Power in AC Circuits, AC Series-Parallel Circuits Design, Methods of AC Analysis, AC Network Theorems, Resonance, and Filters. A laboratory component is an integral part of this course emphasizing a hands-on approach for students to use different test instruments and software applications to design, build, test, and analyze AC circuits.

ELCT 133 SOLID STATE DEVICES AND CIRCUITS

Units: 4.0   *CSU* | **48-54 hours lecture and 48-54 hours laboratory**

(No prerequisite)

This course is an introduction to Solid State Devices and circuit analysis, a theoretical and practical hands-on approach to Solid State fundamentals. Topics include Semiconductor Diodes, Bipolar Transistor Theory, DC Biasing of Bipolar Junction Transistors (BJTs), Field-Effect Transistor (FETs) Theory, FET Biasing, Circuit Design with BJT and FET Transistors, BJT and FET Small Signal Analysis, Large Signal Amplifiers, Introduction to Operational Amplifiers (OP-Amps), Linear Integrated Circuits (ICs) Regulators, Feedback Amplifiers and Oscillator Circuits. A laboratory component is an integral part of this course emphasizing a hands-on approach for students to use different test instruments and software tools to design, build, test, and analyze Solid State circuits.

ELCT 134 SOLID STATE CIRCUIT ANALYSIS

Units: 4.0   *CSU* | **48-54 hours lecture and 48-54 hours laboratory**

(No prerequisite)

This course is an introduction to Operational Amplifiers, a theoretical and practical hands-on approach to Op-Amps and Linear Integrated Circuit design and analysis. Topics include Differential Amplifiers, Operational Amplifiers, Op-Amp with Negative Feedback, Frequency Response of an OP-Amp, Active Filters and Oscillators, Comparators, General Linear Applications, and Specialized Applications. Laboratory component is an integral part of this course emphasizing a hands-on approach for students to use different test instruments and software tools to design, build, test, and analyze various Op-Amps and Linear Integrated circuits.

ELCT 138 COOPERATIVE EDUCATION

See Cooperative Education. **Units: 1 - 8 units**   *CSU*

Electronics and Computer Technology Courses

ELCT 202 COMPUTER METHODS FOR ENGINEERS

Units: 4.0   *CSU* | **48-54 hours lecture and 48-54 hours laboratory**

(Prerequisite: MATH 227 or MATH H227 minimum grade C.)

This course is an introduction to methods and techniques for solving engineering problems using numerical-analysis computer-application programs, technical computing and visualization using MATLAB software. The course is structured to allow students to have a thorough hands-on experience with examples and exercises applied to a wide variety of practical engineering problems.

ELCT 210 ENGINEERING CIRCUIT ANALYSIS I

Units: 4.0   *CSU* | **48-54 hours lecture and 48-54 hours laboratory**

(Prerequisite: PHYS 203 and MATH 226 or MATH H226 minimum grade C.)

Introduction to engineering circuit analysis, topics include Ohm's Law, Series, Parallel and Series-Parallel Circuits, Network Theorems, Methods of Analysis, Mesh Equations, Equivalent Circuits, Capacitive and Inductive Circuits, First-Order Circuits, Timing Circuits, Measuring Instruments, Magnetism and Magnetic Circuits, Introduction to Electromagnetic radiation and Electric Machinery. Laboratory experiments and the use of Computer Aided Circuit Analysis software (MultiSim and MATLAB) is an integral part of the course to supplement classroom lectures.

ELCT 211 ENGINEERING CIRCUIT ANALYSIS II

Units: 4.0   *CSU* | **48-54 hours lecture and 48-54 hours laboratory**

(Prerequisite: ELCT 210 minimum grade C)

Introduction to engineering circuit analysis II, topics include analysis of RLC passive networks in response to single and multiple sinusoidal, ramp, and pulse sources, Network Theorems, Impedance, Power in AC circuits, Methods of AC analysis, Second-Order circuits, Sinusoidal Steady-State, The Laplace Transform, Fourier analysis, Two-Port Networks, Resonance and Filters. Laboratory experiments and the use of Computer Aided Circuit Analysis software (MultiSim and MATLAB) is an integral part of the course to supplement classroom lectures.

Electronics and Computer Technology