**American River College**

Phone: (916)484 - 8011

Catalog: http://web.arc.losrios.edu/catalog/Catalog.pdf

Website: http://www.arc.losrios.edu/

**Computer Science – Associates (Transfer)**

**Program Information**

This program is a comprehensive exposure to programming languages, algorithms and problem solving in preparation for upper division computer science courses. The Computer Science degree includes substantial course work in mathematics as is required by most university computer science programs.

**Career Opportunities**

Technical positions include computer operator, computer program­mer, system analysts, database administrators, computer support, or help desk specialists, Web developers, and application develop­ers.

Opportunities in networking include network support specialists, network administrators and technicians, network security special­ist, computer forensics specialist, Webmasters, Web developers, and Web site designers.

**Upon completion of this program, the student will be able to:**

• Evaluate various programming language solutions to a pro-posed problem.

• Recommend tools and techniques for each step in the development of a computer program.

• Integrate the basic mathematical knowledge that is fundamental to Computer Science into the solutions of proposed problems.

• Evaluate the theories and core techniques of computer science using scientific methods.

**Database Management – Certificate**

**Program Information**

The CIS: Database Management degree focuses on relational database technology used in the business environment. The emphasis is on selecting the appropriate system platform for database deployment. Course work includes database system design and programming for desktop, enterprise and Internet platforms, structure query language (SQL) programming, introductory principles of modular programming, system design and problem solving, desktop operating systems, electronic spreadsheets and a variety of introductory business courses.

The CIS: Database Management certificate involves the study of relational database technology used in the business environment. The emphasis is on selecting the appropriate system platform for database deployment. Course work includes database system design and programming for desktop, enterprise and Internet platforms, structure query language (SQL) programming, introductory principles of modular programming, system design and problem solving, desktop operating systems, and electronic spreadsheets.

**Career Opportunities**

Technical positions include computer operator, computer program­mer, system analysts, database administrators, computer support, or help desk specialists, Web developers, and application develop­ers.

Opportunities in networking include network support specialists, network administrators and technicians, network security special­ist, computer forensics specialist, Webmasters, Web developers, and Web site designers.

**Upon completion of this program, the student will be able to:**

• describe relational database technologies for desktop, enterprise and Internet platforms.

• explain and discuss database theory and principles.

• employ relational database technologies for either desktop, enterprise and Internet platforms to solve common business problems using standard database principles and practices.

• assess and document information system requirements.

• employ modular programming concepts in program development.

• design and code elementary programs encountered in business and government.

• identify interactive web publishing situations requiring data-base solutions.

• create interactive web database.

• analyze practical business problems and utilize critical thinking in the determination of alternative solutions.

• apply communication theory, effective writing techniques, and interpersonal communication skills to business situations.

• analyze and explain the nature and purpose of accounting and its function in business.

**Microcomputer Application – Associates, Certificate**

**Program Information**

This degree focuses on the use of the microcomputer and current, commonly used software to solve problems in a business environment. Course work includes microcomputer applications in database management, desktop publishing, electronic spreadsheets, presentation graphics, operating systems, word processing, and at least one programming language.

**Career Opportunities**

This program is designed for Comput­er Information Science students pursuing employment in the area of programming and maintaining microcomputer systems.

**Upon completion of this program, the student will be able to:**

• design and manage database tables, queries and forms.

• produce reports for use in a typical business environment.

• evaluate the basic computing needs of a business by developing associated documentation and presentations.

• create spreadsheet formulas and manipulate business data.

• compose and format typical business communications documents according to industry standards.

• combine data from different software applications into one document.

• compose simple computer programs using basic logic.

• apply file management techniques in organizing computer data.

**Information System Security – Associates, Certificate**

**Program Information**

This program provides the information and skills necessary for network administration professionals to implement security from internal and external threats for an enterprise network. It covers client and server security on different operating systems, disaster recovery planning, and forensics. This program also provides preparation for several computer information security certification exams, including the Computer Technology Industry Association CompTIA) Security+ exam, Microsoft Certified Systems Engineer (MCSE) exams and several of the Certified Information Systems Security Professional (CISSP) certification exams.

**Career Opportunities**

Information Security Systems Specialist, Computer Technician, Network Administrator, Network Systems Engineer.

**Upon completion of this program, the student will be able to:**

• define best practices for configuring network operating system services to provide optimum security.

• compare and contrast the benefits of firewalls vs. intrusion detection devices and software.

• explain and configure a network firewall to provide optimum security from external threats and exploits.

• analyze organizational needs and implement internal security policies for the enterprise.

• evaluate and implement the required security programs and policies to protect the enterprise against viruses, Trojans, worms, rootkits, and spyware.

• assess and configure secure data transfer protocols for internal and external needs, including Windows IP Security (IPSec) and the Virtual Private Network (VPN) tunneling protocols.

• apply Windows group policy to secure the internal network and shared resources.

• construct NTFS file system permissions and shares to allow only the minimum levels of access needed by users to use network resources.

• prioritize and establish a disaster recovery plan for the enterprise.

• construct and apply group policies and NTFS file system permissions to secure files and network resources.

**Engineering / Engineering Technology – Associates (Transfer)**

**Program Information**

ARC’s program provides the foundation in mathematics, physics, and engineering necessary to transfer to a four-year institution and complete a bachelor’s degree in engineering. Students should consult the institution to which they wish to transfer for the specific lower division requirements. This degree and certificate emphasizes the knowledge and skills required for entry level success in the engineering professions. These include a basic preparation within the scientific fields including physics, mathematics, chemistry, and material sciences. These sciences are applied to technical analysis and graphic communication standards and practices. In addition, projects include environmental and sustainable design issues, product economics, and legal considerations. Current computer technologies and various analytical design and documentation software are emphasized throughout the program.

**Career Opportunities**

Upon completion of the degree or certificate program the engineering technician will be prepared to go directly into the employment market as a technical assistant to engineers, or other technical employment. For every engineer, several support technicians are required. Engineering technicians are needed in the fields of manufacturing, architecture, construction, materials testing, public utilities, and many other fields.

**Upon completion of this program, the student will be able to:**

• Apply the principles of engineering.

• Identify, analyze, and solve technical problems.

• Plan, conduct, analyze, and interpret experiments.

• Communicate about engineering solutions effectively through speaking, writing, and graphics.

**Electronic Systems Technology – Associates**

**Program Information**

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 micro-controllers.

**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.

**Upon completion of this program, the student will be able to:**

• Design and build several of the most common circuits used in electronic communication systems.

• Develop skills in building, testing, analyzing, and troubleshooting electronic communication systems.

• Apply theory and mathematics for evaluating the design, operation, and troubleshooting of integrated amplifier circuits such as comparators and operational amplifiers.

• Interpret data from a variety of test and measurement equipment used in analysis of electronic control systems.

• Identify and diagram schematic symbols used in electric and electrical industrial applications.

• Diagram and evaluate the components of Global Positioning Systems (GPS), satellite receivers and transmitters, AM and FM transmitters and receivers, and fiber optic communication links.

• Compare the differences between a mechanical splice and a fusion splice when working with fiber optic cable.

• Employ common hand tools in the mechanical installation of a sophisticated communication system.

• Analyze aviation, marine and commercial communication systems that are covered in the FCC General Class Radiotele-phone license examination.

• Apply FCC rules and regulations governing commercial, aviation, and marine communication systems to practical communication systems.

**Mechatronics – Associates, Certificate**

**Program Information**

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.

**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, and mechanical electrical machine systems installer. Obtaining the degree or the certificate improves the opportunities for quality employment and career advancement.

**Upon completion of this program, the student will be able to:**

• integrate the principles of mechtronics to the design of mechtronic systems.

• evaluate mechanical and electrical solutions to solve technological problems.

• analyze data to create trouble shooting processes.

• apply mechtronic principles to the field of robotics and machine automation.

**Digital Home Technology Integrator – Certificate**

**Program Information**

This certificate provides training to configure, integrate, maintain, and troubleshoot electronic and digital home integration systems. Coursework provides the essential skills for residential networking concepts, components, and information on home network installation. This includes techniques to install, trim, terminate, and troubleshoot cabling systems. In addition, it provides the training and skills necessary to integrate audio, security and environmental controls in a complete system.

**Career Opportunities**

The Digital Home Technology Integrator certificate prepares individuals to design, install, and support residential networks and home integration for employment in the home technology industry. This program develops the technician’s ability to configure, integrate, maintain and troubleshoot home theater, music, security, and home networks.

**Upon completion of this program, the student will be able to:**

• design a home data network

• construct a home telephone network

• evaluate and troubleshoot a home network

• assemble a home audio and video network

• build a wireless home network

• certify a home’s data and telephone network

• set up a security and fire alarm system in a home

• apply industry standards to system design for a home

**Solar Energy System Design, Estimation, and Sales – Certificate**

**Program Information**

The Solar Energy Systems Design, Estimation, and Sales certificate provides training in all aspects of solar photovoltaic

(PV) system design, cost estimation, sales, and installation. It also includes training in oral presentations and management skills. The courses included in the certificate also qualify students to take the North American Board of Certified Energy Practitioners (NABCEP) PV Entry Level Certificate of Knowledge Exam.

**Career Opportunities**

This certificate prepares students for entry level employment in a wide variety of positions in the photovoltaic industry.

It is also valuable for people working in the PV industry to upgrade their skills to include the newest advancements in

solar technology. Students also meet the requirements to take the North American Board of Certified Energy Practitioners (NABCEP) PV Entry Level Certificate of Knowledge Exam. Career opportunities include PV system designers, PV systems outside sales, PV equipment and associated component sales representatives, and a variety of other emerging careers in this field.

**Upon completion of this program, the student will be able to:**

• describe the components in a complete grid tie photovoltaic system.

• construct solar photovoltaic battery charging systems.

• analyze test equipment data to determine the location of the “sweet spot” on a solar photovoltaic panel’s Current-Voltage(IV) curves.

• identify tools and test equipment necessary for solar photovoltaic panel installations.

• identify different sizes of wire according to American Wire Gauge (AWG) tables.

• describe the advantages of obtaining the NABCEP Entry Level Certificate of Knowledge Certificate.

• construct a simulated roof system using industry standard building materials.

• calculate the amount of yearly solar radiance in relationship to shading using the Solmetrics SunEye predictor and software.

• inspect and repair malfunctioning components in a functioning grid tie solar photovoltaic system.

• estimate the yearly power output (Wh/year) for a solar photovoltaic system using both the SunEye and the Pathfinder sun angle and shade predictor.

• identify typical locations of electrical/mechanical failures in PV systems.

• maximize communication effectiveness by specifying, planning for, and adapting to the specific audience.

• identify and analyze factors that contribute to effective design, development, and delivery of presentations.

• relate the communication process to public speaking situations.

• assess the ways to start a business and which form of business organization should be used. Describe the financing process and how to access capital.

• explain the importance of a business plan, a financial plan, and a marketing plan. Apply principles of management and marketing relevant to the small business.

• evaluate financial reports.

• analyze the impact of legal requirements and government regulations as related to the operation of the small business.

**Solar Energy Technology – Certificate**

**Program Information**

The Solar Energy Technology certificate provides training in all aspects of Solar Photovoltaic (PV) System design, installation, troubleshooting and repair. The courses included in the certificate also qualify students to take the North American

Board of Certified Energy Practitioners (NABCEP) PV Entry Level Certificate of Knowledge Exam.

**Career Opportunities**

This certificate prepares the student for entry level employment in a wide variety of positions in the Photovoltaic industry. It is also valuable for people working in the PV industry to upgrade their skills to include the newest advancements in solar technology. Students also meet the requirements to take the North American Board of Certified Energy Practitioners

(NABCEP) PV Entry Level Certificate of Knowledge Exam. Career opportunities include PV installers, PV service technicians, and other emerging careers in this field.

**Upon completion of this program, the student will be able to:**

• describe the components in a complete grid tie photovoltaic system.

• construct solar photovoltaic battery charging systems.

• analyze test equipment data to determine the location of the “sweet spot” on a solar photovoltaic panel’s Current--Voltage(IV) curves.

• identify tools and test equipment necessary for solar photovoltaic panel installations.

• identify different sizes of wire according to American Wire Gauge (AWG) tables.

• analyze and describe the advantages of obtaining the NABCEP Entry Level Certificate of Knowledge Certificate.

• construct a simulated roof system using industry standard building materials.

• calculate the amount of yearly solar radiance in relationship to shading using the Solmetrics SunEye predictor and software.

• inspect and repair malfunctioning components in a functioning grid tie solar photovoltaic system.

• assess safety hazards in respect to fire, shock, and falls when installing or repairing photovoltaic systems.

• estimate the yearly power output (Wh/year) for a solar photovoltaic system using both the SunEye and the Pathfinder sun angle and shade predictor.

• identify typical locations of electrical/mechanical failures in PV systems

• calculate the correct gauge wire and number of wires in a metal raceway according to National Electrical Code standards

• calculate the battery Amperage required for a stand-alone PV system