COMPUTER INFORMATION SYSTEMS (CIS)

CIS 010 INTRODUCTION TO INFORMATION SYSTEMS
3 unit
Transfer Credit: CSU; UC
C-ID: ITIS 120
Examination of information systems and their role in business. Focus on information systems, database management systems, system development, networking, Internet and web, e-commerce, security, application development languages and tools, computer systems hardware and software components. Application of these concepts and methods through hands-on projects developing computer-based solutions to business problems. Total of 36 hours lecture and 54 hours laboratory.
Grade Mode: *Letter Grade*

CIS 011 INFORMATION AND COMMUNICATION TECHNOLOGY ESSENTIALS
4 unit
Transfer Credit: CSU
C-ID: ITIS 110
Introduction to the computer hardware and software skills needed to help meet the growing demand for entry-level Information and Communication Technology (ICT) professionals. Topics covered are mobile devices, Linux, macOS, virtualization and cloud computing, as well as expanded information about Microsoft Windows operating systems, security, networking, troubleshooting, and the responsibilities of an IT professional. Preparation for the CompTIA A+ certification exams. Total of 54 hours lecture and 54 hours laboratory.
Grade Mode: *Letter Grade*

CIS 012 INTRODUCTION TO PROGRAMMING USING PYTHON
3 unit
Transfer Credit: CSU; UC
C-ID: ITIS 130
Recommended Preparation: *CIS 010 and MATH 003*

Fundamental concepts and models of application development using Python programming language. Coverage of structured and object-oriented programming principles and techniques. Topics include the basic concepts of program design, variables, declarations, statements, expressions, basic I/O (input and output), flow control structures, functions and modules, lists (arrays), tuples, dictionaries, file access, classes and objects, class attributes and methods, inheritance, abstraction, encapsulation, and polymorphism. Preparation for the Microsoft Technology Associate (MTA): Introduction to Programming using Python, Python Institute Certified Entry-Level Python Programmer (PCEP), and Python Institute Certified Associate in Python Programming (PCAP) exams. Total of 36 hours lecture and 54 hours laboratory.
Grade Mode: *Letter Grade*

CIS 014 C++ PROGRAMMING
3 unit
Transfer Credit: CSU; UC
Prerequisite(s): *CIS 012 or equivalent*

Application development using C++ programming language. Coverage of object-oriented programming principles and techniques. Topics include C++ basics, control structures, functions, arrays, pointers, classes, overloading, data abstraction, encapsulation, inheritance, polymorphism, virtual functions, file processing, templates, exceptions, and STL (Standard Template Library). Preparation for the C++ Institute's C++ Certified Associate Programmer (CPA) and C++ Certified Professional Programmer (CPP) exams.Total of 36 hours lecture and 54 hours laboratory.
Grade Mode: *Letter Grade*

CIS 016 JAVA PROGRAMMING
3 unit
Transfer Credit: CSU; UC
Prerequisite(s): *CIS 012 or equivalent*

Application development using Java programming language. Coverage of object-oriented programming principles and techniques. Topics include Java basics, control structures, arrays, classes, methods, overloading, encapsulation, inheritance, polymorphism, collections, Lambda expressions, exceptions, Java I/O, Java API, and database applications. Preparation for the Oracle Certified Associate (OCA) - Java SE Programmer and Oracle Certified Professional (OCP) - Java SE Programmer exams. Total of 36 hours lecture and 54 hours laboratory.
Grade Mode: *Letter Grade*

CIS 031 INTRODUCTION TO DATABASE MANAGEMENT SYSTEMS
3 unit
Transfer Credit: CSU; UC
C-ID: ITIS 180
Recommended Preparation: *CIS 011*

Introduction to concepts in data and information management centered around the core skills of identifying organizational information requirements, conceptual data modeling techniques, conversion of conceptual data models into relational data models, verification of structural characteristics with normalization techniques, and implementation of a relational database using an industrial-strength database management system. Overview of data quality and data security tasks, database application development, and data and information management technologies that provide decision support capabilities under the broad business intelligence umbrella. Total of 36 hours lecture and 54 hours laboratory.
Grade Mode: *Letter Grade*

CIS 040 UNIX/LINUX ADMINISTRATION
3 unit
Transfer Credit: CSU
Prerequisite(s): *CIS 011 or valid CompTIA A+ certification or equivalent*

Installation, configuration, and troubleshooting of Unix/Linux operating systems in a small or enterprise environment: types of installation, device drivers, kernel, process management, scripting, packages, networking services, system services, storage, cloud computing, remote management, updates, monitoring, system and data recovery, authorization and authentication, and advanced management tools. Preparation for the CompTIA Linux+, LPIC-1: Certified Linux Administrator, and LPIC-2: Certified Linux Engineer certification exams. Total of 36 hours lecture and 72 hours laboratory.
Grade Mode: *Letter Grade*

CIS 041 CCNA: INTRODUCTION TO NETWORKS
3 unit
Transfer Credit: CSU
C-ID: ITIS 150
Recommended Preparation: *CIS 011 and MATH 003*

Architecture, structure, functions, components, and models of the Internet and other computer networks. Principles and structure of IP (Internet Protocol) addressing and the fundamentals of Ethernet concepts, media, and operations are introduced to provide a foundation for further study of computer networks. Use of the OSI (Open Systems Interconnection) and TCP/IP (Transmission Control Protocol / Internet Protocol) layered models to examine the nature and roles of protocols and services at the application, network, data link, and physical layers. Preparation for the CompTIA Network+, Cisco CCT Routing and Switching, and Cisco CCNA certification exams. No credit if taken after CIS 161. Total of 36 hours lecture and 54 hours laboratory.
Grade Mode: *Letter Grade*

CIS 042 CCNA: ROUTING, SWITCHING, AND WIRELESS ESSENTIALS
3 unit
Transfer Credit: CSU
C-ID: ITIS 151
Prerequisite(s): *CIS 041*

Configuring and troubleshooting enterprise networks. Topics include: static routing, Routing Information Protocol (RIP), Open Shortest Path First (OSPF), Virtual LANs (VLANs), Inter-VLAN routing, Spanning Tree Protocol (STP), EtherChannel, Dynamic Host Configuration Protocol (DHCP), First-Hop Redundancy Protocol (FHRP), Access Control Lists (ACLs), Network Address Translation (NAT), and Wireless LAN (WLAN). Preparation for the CompTIA Network+, Cisco CCT Routing and Switching, and Cisco CCNA certification exams. No credit if taken after CIS 162. Total of 36 hours lecture and 54 hours laboratory.
Grade Mode: *Letter Grade*

CIS 045 MCP: MICROSOFT WINDOWS SYSTEM ADMINISTRATION
4 unit
Transfer Credit: CSU
C-ID: ITIS 155
Prerequisite(s): *CIS 011 or valid CompTIA A+ certification or equivalent; and CIS 042 or equivalent*

Deploy, configure, maintain, troubleshoot, and support server hardware and server software technologies in a small to enterprise environment, including a cloud computing environment with an emphasis on the administration of Microsoft Windows Server operating systems infrastructure. Topics include storage solutions, server virtualization using Hyper-V, Microsoft Azure cloud services, ADDS, ADCS, DNS, DHCP, WDS, WSUS, DirectAccess, VPNs, IPv6 transition technologies, failover clustering, and disaster recovery. Preparation for the CompTIA Server+ and Microsoft MCP Windows System Administration certification exams. Total of 54 hours lecture and 72 hours laboratory.
Grade Mode: *Letter Grade*

CIS 061 INTRODUCTION TO INFORMATION SYSTEMS SECURITY
3 unit
Transfer Credit: CSU
C-ID: ITIS 160
Prerequisite(s): *CIS 011 or valid CompTIA A+ certification or equivalent, and CIS 042 or equivalent*

Principles of information systems security related to providing, managing, and maintaining secure systems at various organizational levels. Administration of network protocols, analysis of hardware/software processes, communications, applications, policies, and procedures. Principles of cybersecurity, risk management/assessments, reporting, dealing with social challenges and demands, legal and ethical issues, security planning, physical security, and technology. Preparation for the CompTIA Security+, Cisco Certified CyberOps Associate, and Cisco Network Security certification exams. Total of 36 hours lecture and 72 hours laboratory.
Grade Mode: *Letter Grade*

CIS 062 INTRODUCTION TO SYSTEMS ANALYSIS
3 unit
Transfer Credit: CSU
C-ID: ITIS 140
Prerequisite(s): *CIS 010*

Information systems and the discipline of systems analysis to analyze solutions to a variety of realistic IT problems. Develops skills in applying the tools, techniques, and concepts of systems analysis to information systems development in order to identify and apply constraints to determine feasibility. Apply criteria to select the best information technology solution from alternatives. Total of 54 hours lecture.
Grade Mode: *Letter Grade, Pass/No-Pass*

CIS 063 INTRODUCTION TO CYBERSECURITY: ETHICAL HACKING
3 unit
Transfer Credit: CSU
C-ID: ITIS 164
Prerequisite(s): *CIS 061 or equivalent, and CIS 012 or equivalent*

Concepts, principles, and techniques for attacking and disabling a network within the context of properly securing a network. Emphasis on network attack methodologies and appropriate defenses and countermeasures. Preparation for the EC Council's Certified Ethical Hacking certification exam. Total of 36 hours lecture and 54 hours laboratory.
Grade Mode: *Letter Grade*

CIS 065 DIGITAL FORENSICS FUNDAMENTALS
3 unit
Transfer Credit: CSU
C-ID: 165
Prerequisite(s): *CIS 061 or equivalent*

Methods used to properly conduct a computer forensics investigation based on objectives of the International Association of Computer Investigative Specialists (IACIS) certification. Topics covered include an overview of computer forensics as a profession, the computer investigation process, ethics, operating systems boot processes and disk structures, data acquisition and analysis; technical writing, and computer forensics tools. Total of 36 hours lecture and 54 hours laboratory.
Grade Mode: *Letter Grade*

CIS 070A WORK EXPERIENCE IN INFORMATION TECHNOLOGY (PAID)
0.5-8 unit
Transfer Credit: CSU
Prerequisite(s): *Completion of one semester at Pasadena City College and completion of one course in major*

Enrollment Limitation: *Instructor approval*

Provides students on-the-job learning in a paid position in the field of information technology. Development of effective work habits, attitudes, and career awareness so as to enable students to become productive employees. Credit may be accrued at the rate of 0.5 to 8 units per semester. One unit of credit for each 75 hours of paid work experience.
Grade Mode: *Letter Grade, Pass/No-Pass*

CIS 070B WORK EXPERIENCE IN INFORMATION TECHNOLOGY (UNPAID)
0.5-8 unit
Transfer Credit: CSU
Prerequisite(s): *Completion of one semester at Pasadena City College and completion of one course in major*

Enrollment Limitation: *Instructor approval*

Provides students on-the-job learning in an unpaid position in the field of information technology. Development of effective work habits, attitudes, and career awareness so as to enable students to become productive employees. Credit may be accrued at the rate of 0.5 to 8 units per semester. One unit of credit for each 60 hours of unpaid work experience.
Grade Mode: *Letter Grade, Pass/No-Pass*

CIS 112 ADVANCED PROGRAMMING USING PYTHON
3 unit
Prerequisite(s): *CIS 012*

Application development using advanced Python programming techniques. Topics include the advanced Object-Oriented programming, advanced functions and modules, packages, process management, network programming, web programming, GUI (Graphical User Interface) programming, and testing principles and techniques. Preparation for the Python Institute Certified Associate in Python Programming (PCAP) and Python Institute Certified Professional in Python Programming (PCPP) exams Total of 36 hours lecture and 54 hours laboratory.
Grade Mode: *Letter Grade*

CIS 112D DATA STRUCTURES AND ALGORITHMS
3 unit
Prerequisite(s): *CIS 014, CIS 016, or CIS 112*

Emphasizes the choice and application of data structures and efficient algorithms in implementing applications, covering the most commonly used data structures such as linked lists, stacks and queues, search trees, maps, hashing, priority queues, sorting, and graphs. Total of 36 hours lecture and 54 hours laboratory.
Grade Mode: *Letter Grade*

CIS 146 MCSA: MICROSOFT WINDOWS SYSTEM ADMINISTRATION 2
4 unit
Prerequisite(s): *CIS 045*

Implementation and administration of Active Directory Domain Services (AD DS), distributed AD DS, AD DS sites and replication, users and groups, Group Policy Objects (GPOs), Active Directory Certificate Services (AD CS), Active Directory Rights Management Services (AD RMS), Active Directory Federation Services (AD FS), and Microsoft Azure services. Preparation for the Microsoft MCSA Windows Server certification exam. Total of 54 hours lecture and 54 hours laboratory.
Grade Mode: *Letter Grade*

CIS 151 VCP-DCV: VMWARE VSPHERE ADMINISTRATION
3 unit
Prerequisite(s): *CIS 011 or valid CompTIA A+ certification or equivalent*

Installation, configuration and management of VMware vSphere which includes VMware ESXi hosts and VMware vCenter server. Topics include cloud computing architecture, vSphere virtual infrastructure, vCenter Server architecture, virtual machines, virtual networks, virtual storage, resource management and monitoring, high availability, fault tolerance, distributed resource scheduler, and update manager. Preparation for the VMware Certified Professional - Data Center Virtualization (VCP-DCV) certification exam. Total of 36 hours lecture and 54 hours laboratory.
Grade Mode: *Letter Grade*

CIS 163 CCNA R&S: SCALING NETWORKS
3 unit
Prerequisite(s): *CIS 042*

Installation, configuration and management of scaling networks. Topics include: VLAN Trunking Protocol (VTP), Extended VLANs, Dynamic Trunking Protocol (DTP), Spanning Tree Protocols (STP), Link Aggregation, Hot Standby Router Protocol (HSRP), Enhanced Interior Gateway Routing Protocol (EIGRP), and Multi-area Open Shortest Path First (OSPF). Preparation for the CCNA Routing & Switching certification exam. Total of 36 hours lecture and 54 hours laboratory.
Grade Mode: *Letter Grade*

CIS 164 CCNA: ENTERPRISE NETWORKING, SECURITY, AND AUTOMATION
3 unit
Prerequisite(s): *CIS 042*

Configuring and troubleshooting enterprise networks. Topics include: Point-to-Point Protocol (PPP), PPP over Ethernet (PPPoE), Virtual Private Networks (VPNs), Generic Routing Encapsulation (GRE), advanced Open Shortest Path First (OSPF) configurations, advanced Access Control Lists (ACLs) configurations, advanced Network Address Translation (NAT) configurations, network security, network management, network design, network troubleshooting, network virtualization, and network automation. Preparation for the Cisco CCNA certification exam. Total of 36 hours lecture and 54 hours laboratory.
Grade Mode: *Letter Grade*

CIS 165 CCNP R&S ROUTE: IMPLEMENTING IP ROUTING
4 unit
Prerequisite(s): *CIS 164 or valid CCNA RS certification or equivalent*

Authorized Cisco Networking Academy CCNP R&S ROUTE course with lecture and hands-on lab. Advanced topics in Cisco routing including how to design, configure, maintain and scale routed networks that are growing in size and complexity, using Cisco routers connected in LANs and WANs typically found at medium to large network sites. Emphasis toward preparing for the Cisco Certified Network Professional (CCNP R&S ROUTE) examination. Total of 54 hours lecture and 72 hours laboratory.
Grade Mode: *Letter Grade*

CIS 167 CCNP R&S SWITCH: IMPLEMENTING CISCO IP SWITCHED NETWORKS
4 unit
Prerequisite(s): *CIS 165*

Build and manage enterprise networks using multilayer switching technologies. Covers enterprise network design, VLANs, Spanning-Tree Protocol (STP), inter-VLAN routing, Multilayer Switching (MLS), Cisco Express Forwarding (CEF), and Hot Standby Router Protocol (HSRP). Securing the switched network model, including setting passwords, local and remote login, modifying default privilege levels, and applying Layer 3 traffic management techniques to the enterprise network. Very detailed information regarding the role of switches in multicasting. Emphasis toward preparing for the Cisco Certified Network Professional (CCNP R&S SWITCH) examination. Total of 54 hours lecture and 72 hours laboratory.
Grade Mode: *Letter Grade*

CIS 168 CCNP R&S TSHOOT: TROUBLESHOOTING AND MAINTAINING IP NETWORKS
4 unit
Prerequisite(s): *CIS 167*

Diagnose, isolate, and correct network failures and performance problems. Identify troubleshooting targets and use appropriate troubleshooting tools to manage network. Emphasis toward preparing for the Cisco Certified Network Professional, Troubleshooting (CCNP R&S TSHOOT) examination. Total of 54 hours lecture and 54 hours laboratory.
Grade Mode: *Letter Grade*

CIS 169A CCNA SECURITY
4 unit
Prerequisite(s): *CIS 164 or valid CCNA RS certification or equivalent*

Installation, configuration, troubleshooting and monitoring of Cisco network devices to maintain integrity, confidentiality, and availability of data and devices. Topics include security concepts, secure network infrastructure, managing secure access, AAA, VPN encryption, firewalls, intrusion prevention, web and email content security, and endpoint security. Preparation for the CCNA Security certification exam. Total of 54 hours lecture and 54 hours laboratory.
Grade Mode: *Letter Grade*

CIS 169B CCNP SECURITY: IMPLEMENTING CISCO EDGE NETWORK SECURITY SOLUTIONS
4 unit
Prerequisite(s): *CIS 169A*

Focuses on the overall security process in a network including security policy design and management, security technologies, products, and solutions. Firewall and secure router design, installation, configuration, and maintenance along with intrusion prevention system implementation using routers and firewall will be covered. VPN implementation using routers and firewalls will be covered. A part of Cisco Networking Academy Program preparing students for CCSP (Cisco Certified Security Professional) certificate. Total of 72 hours of lecture and 54 hours of laboratory.
Grade Mode: *Letter Grade*

CIS 170 CISCO IP TELEPHONY ADMINISTRATION
4 unit
Prerequisite(s): *CIS 164 or valid CCNA RS certification or equivalent*

Install, configure, and troubleshoot Cisco Unified Communications (UC) solutions. Administration of end-user interfaces, telephony and mobility features, dial plan, Cisco IOS gateways, and Cisco UC solutions maintenance. Preparation for the Cisco CCNA Collaboration exam. Total of 54 hours lecture and 54 hours laboratory.
Grade Mode: *Letter Grade*

CIS 192 INTRODUCTION TO WEB DEVELOPMENT
3 unit
Recommended Preparation: *CIS 012*

The essentials of HTML5, CSS3, and JavaScript including their functionalities, syntax, and advanced techniques to create web content and designs that can be adapt to various device form factors. Coverage includes HTML5 elements and APIs, CSS3 syntax and advanced techniques, code validation, form creation, mobile design for browsers and apps, and JavaScript and its application. Preparation for the CIW Advanced HTML5 and CSS3 Specialist certification. Total of 36 hours lecture and 54 hours laboratory. No credit if taken after GRFX 192.
Grade Mode: *Letter Grade*

CIS 193 CLIENT-SIDE WEB DEVELOPMENT USING JAVASCRIPT
3 unit
Prerequisite(s): *CIS 012 and CIS 192*

Client-side web application programming using JavaScript. Topics include JavaScript basics, control structures, arrays, object-oriented programming, functions, methods, expressions, Document Object Model (DOM), forms, debugging, event handling, cookie creation, security, web API (Application Programming Interface), libraries and frameworks, and AJAX. Preparation for the CIW JavaScript Specialist Certification. Total of 36 hours lecture and 54 hours laboratory.
Grade Mode: *Letter Grade*

CIS 194 CLIENT-SIDE WEB DEVELOPMENT USING JAVASCRIPT FRAMEWORKS
3 unit
Prerequisite(s): *CIS 193*

Client-side web application programming using JavaScript libraries. Focuses on React's declarative user interfaces, testing Redux, React router, React Redux, JSX, data flow, usage with React, async actions, async flow, and React middleware to create effective client-side web applications on the latest web stacks and techniques. Total of 36 hours lecture and 54 hours laboratory.
Grade Mode: *Letter Grade*

CIS 197 SERVER-SIDE WEB DEVELOPMENT
3 unit
Prerequisite(s): *CIS 031 and CIS 194*

Server-side web application programming using various server-side technologies. Coverage of Server-side web development principles and techniques. Utilization of PHP and Node.js to building database-driven web sites that incorporate lightweight, efficient, and secure web services and applications. Preparation for the Zend Certified PHP Engineer and OpenJS Node.js Application Developer exams. Total of 36 hours lecture and 54 hours laboratory.
Grade Mode: *Letter Grade*