

COMPUTER INFORMATION SYSTEMS

BEFORE ENROLLING IN DEGREE APPLICABLE COURSES, IT IS RECOMMENDED THAT YOU COMPLETE ENGL 001A AND READ 053.

COMPUTER INFORMATION SYSTEMS (CIS)

DIVISION: Technology
DEPARTMENT: Computer Information Systems
DEPT CHAIR: Saroj Sabherwal
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The Computer Information System (CIS) program is designed to provide students with the knowledge and skills required to gain entry level employment as computer programmers, and/or software/system administration technicians. The program offers students the choice of pursuing an Associate of Science (A.S.) Degree in Computer Science, or certificate(s) with general and C/C++/Unix programming and emphasis. The Computer Information Systems department also offers a transfer program. The courses offered in the transfer program will transfer to California State University/ University of California systems, and other four year colleges. In addition, the program provides courses to update skills in areas such as programming in C/C++/Unix Systems Administration and networking.

Student Learning Outcomes:

After taking the appropriate level of CIS classes, students should have gained knowledge and skills necessary to successfully work in their chosen area of expertise needed in the high technology environment of Silicon Valley. They may also learn critical thinking skills to enhance their ability to analyze and solve practical problems.

Career Options:

Salary ranges from \$6-\$18.50/hr. or more depending on skill and experience.

- Entry Level Programmer
- Software Technician
- Systems Administration Technician
- Unix System Administration

Some career options require more than two years of college study.

A.S. Degree:

- Computer Information Systems

Certificate:

- Computer Information Systems
- C/C++/UNIX Programming (Levels 1 and 2)
- UNIX Programming Systems Administration (Levels 1 and 2)
- PC Systems Administration (Level 1)

Schedule Matrix:

COURSE	FALL	SPRING	SUMMER	WEEKEND
CIS 002	D,E	D,E		
CIS 014	E	E		
CIS 037A	D,E	D,E	D,E	X
CIS 037B	D,E	D,E		
CIS 040	E	E	E	X
CIS 043	D,E	D,E		X
CIS 044	D,E	D,E		X
CIS 044A	E	E		
CIS 045A	E	E		X
CIS 045B	E	E	E	X
CIS 046A	E	E		X
CIS 046B	E	E		X
CIS 047A	E	E		X
CIS 048	E	E		X
CIS 049	E	E		X
CIS 049A	E	E		X
CIS 051	E	E		X
CIS 052	E	E		X
CIS 053	E	E		X
CIS 054A	E	E		
CIS 054B	E	E		
CIS 081	E	E		X
CIS 081B	E	E		X
CIS 170A	D,E	D,E		
CIS 172A	D,E	D,E	D,E	X
CIS 172B	E	E		
CIS 172C	E	E		
CIS 178	E	E	E	X
CIS 180	D,E	D,E		
CIS 181A	E	E		X
CIS 181B	E	E		X
CIS 183	E	E		X
CIS 184	D,E	D,E		X
CIS 184A	E	E		X

D= Day classes; E= Evening classes; X= Weekend

Computer Information Systems - A.S. Degree

Core Curriculum Courses (Required)	Units	
CIS 037A	"C" Programming	3.0
CIS 172A	Computer Lab: "C"	1.0
CIS 037B	Advanced "C" Programming	3.0
CIS 172B	Computer Lab: Advanced "C"	1.0
CIS 040	Software Development with Visual C++	3.0
CIS 178	Open Computer Lab: C++	1.0
CIS 043	JAVA Programming	3.0
CIS 183	Computer Lab: JAVA	1.0
CIS 044	Introduction To Data Structures Using Java	3.0
CIS 184	Computer Lab: Data Structures Using Java	1.0
CIS 054B	Advanced MS Operating System	1.0
MATH 003A	Analytic Geometry and Calculus	5.0
MATH 003B	Analytic Geometry and Calculus	5.0
MATH 004A	Intermediate Calculus	4.0

OR

MATH 019	Discrete Mathematics	4.0
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Total Core Degree Requirements: 35.0

Plus two or more additional courses

from the following electives (at least 6 units):

	Units	
CIS 002	Intro. to Computer Systems with Visual Basic	3.0
CIS 180	Computer Lab: Visual Basic.NET (VB.NET)	1.0
CIS 014	Data Structures and Algorithms	3.0
CIS 172C	Computer Lab: Data Structures with "C"	1.0
CIS 031A	Fundamentals of MicroSoft Visual Basic .NET	3.0
CIS 170A	Computer Lab: Intro to Visual Basic.NET	1.0
CIS 044A	Introduction to Perl Programming	3.0
CIS 184A	Computer Lab: Perl Programming Language	3.0
CIS 045B	UNIX/LINUX Operating System	3.0
CIS 181	Computer Lab: UNIX	1.0
CIS 046A	UNIX Shell Programming	3.0
CIS 181A	Computer Lab: UNIX Shell Programming	1.0
CIS/CET 081	Introduction to Computer Networking	3.0
CIS 049A	Client -Side Web Programming	1.0
Total Program A.S. Degree Requirements:	41.0	

Computer Information Systems - Certificate

Only courses completed with a grade of C or better may be used to satisfy requirements for a certificate.

Certificate Requirement courses:

	Units	
CIS 037A	"C" Programming	3.0
CIS 172A	Computer Lab: "C"	1.0
CIS 037B	Advanced "C" Programming	3.0
CIS 172B	Computer Lab: Advanced "C"	1.0
CIS 040	Software Development with Visual C++	3.0
CIS 178	Open Computer Lab: C++	1.0
CIS 043	JAVA Programming	3.0
CIS 183	Computer Lab: JAVA	1.0
CIS 044	Introduction To Data Structures Using Java	3.0
CIS 184	Computer Lab: Data Structures Using Java	1.0
CIS 054B	Advanced MS Operating System	1.0
Total Core Certificate Requirements:	21.0	

Plus two or more additional courses from the following electives

(at least 10 units):

	Units	
CIS 002	Intro. to Computer Systems with Visual Basic	3.0
CIS 180	Computer Lab: Visual Basic.NET (VB.NET)	1.0
CIS 014	Data Structures and Algorithms	3.0
CIS 172C	Computer Lab: Data Structures with "C"	1.0
CIS 031A	Fundamentals of Microsoft Visual Basic .NET	3.0
CIS 170A	Computer Lab: Intro to Visual Basic.NET	1.0
CIS 044A	Introduction to Perl Programming	3.0
CIS 184A	Computer Lab: Perl Programming Language	3.0
CIS 045B	UNIX/LINUX Operating System	3.0
CIS 181	Computer Lab: UNIX	1.0
CIS 046A	UNIX Shell Programming	3.0
CIS 181A	Computer Lab: UNIX Shell Programming	1.0
CIS/CET 081	Introduction to Computer Networking	3.0

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CIS 049A..... Client –Side Web Programming.....	1.0
Total Program Certificate Requirements:	31.0

C/C++/Unix Programming (Level I) - Certificate

Only courses completed with a grade of C or better may be used to satisfy requirements for a certificate.

Certificate Requirement courses:	Units
CIS 037A..... "C" Programming.....	3.0
CIS 172A..... Computer Lab "C".....	1.0
CIS 040..... Object Oriented Programming with C++.....	3.0
CIS 178..... Computer Lab: C++.....	1.0
CIS 045B..... UNIX/LINUX Operating System.....	3.0
CIS 181..... Computer Lab: UNIX.....	1.0
CIS 046A..... UNIX Shell Programming.....	3.0
CIS 181A..... Computer Lab: UNIX Shell.....	1.0
CIS 054B..... Advanced to the MS Operating System.....	1.0
Total Program Certificate Requirements:	17.0

C/C++/Unix Programming (Level II) - Certificate

Only courses completed with a grade of C or better may be used to satisfy requirements for a certificate.

Certificate Requirement courses:	Units
CIS 037B..... Advanced "C" Programming.....	3.0
CIS 172B..... Computer Lab: Advanced "C".....	1.0
CIS 047A..... Introduction to UNIX System Administration.....	3.0

Plus two or more additional courses and labs from the following electives (at least 7-8 units):

CIS 014..... Data Structures and Algorithms.....	3.0
CIS 172C..... Computer Lab: Data Structures with "C".....	1.0
CIS 039..... Microcomputer Assembler Programming.....	3.0
CIS 179..... Computer Lab: Assembler.....	1.0
CIS 043..... Introduction to Java Programming Language.....	3.0
CIS 183..... Computer Lab: Java.....	1.0
CIS/CET 081..... Introduction to Computer Networking.....	3.0
Total Program Certificate Requirements:	15.0 - 16.0

UNIX PROGRAMMING SYSTEMS ADMINISTRATION

In the Bay area's competitive job market, job seekers who have state-of-the-art certification offer hiring managers concrete proof of their skills and competency. To help our students gain this competitive edge, Mission College, in collaboration with Sun Microsystems, has created two computer networking certificates: (1) UNIX Systems Administration- Level I and Level II.

Students earning these certificates will be prepared for a career in the rapidly growing information technology field. The Level I UNIX Systems Administration certificate will prepare graduates for entry-level systems administration positions requiring general knowledge of the UNIX language and familiarity with basic system administration commands. Students completing the Level II UNIX Systems Administration certificate will expand their knowledge of the UNIX language to include network protocols and exposure to programming languages as well as introducing business communication skills.

Unix Systems Administration (Level 1) - Certificate

Only courses completed with a grade of C or better may be used to satisfy requirements for a certificate.

Certificate Requirement courses:	Units
CIS 045B..... UNIX/LINUX Operating System.....	3.0
CIS 181..... Computer Lab: UNIX.....	1.0
CIS 046A..... UNIX Shell Programming.....	3.0
CIS 181A..... Computer Lab: UNIX Shell.....	1.0
CIS 047A..... Introduction to the UNIX System Administration.....	3.0
MGMT 019..... Dealing with Difficult People.....	0.5
MGMT 023..... Personal Effectiveness.....	0.5
CIS 081..... Introduction to Computer Networking.....	3.0
CIS 049..... Web Development on UNIX Programming Language.....	2.0
Total Program Certificate Requirements:	17.0

Unix Systems Administration (Level 2) - Certificate

Only courses completed with a grade of C or better may be used to satisfy requirements for a certificate.

Certificate Requirement courses:	Units
CIS 047B..... Advanced UNIX Systems Administration.....	3.0
CIS 048..... Intro to UNIX Networking/Security.....	3.0
CIS 081B..... TCP/IP.....	3.0
<u>Plus two or more additional courses and labs from the following electives (at least 6-8 units):</u>	
CIS 043..... Introduction to Java Programming Language.....	3.0
CIS 183..... Computer Lab: Java Programming Language.....	1.0
Cis 044A..... Introduction to Perl Programming.....	3.0
Cis 184A..... Computer Lab: Perl Programming Language.....	1.0
WRKEX 301..... Work Experience (recommended).....	3.0
Total Program Certificate Requirements:	17.0 - 19.0

PC Systems Administration (Level 1) - Certificate

Only courses completed with a grade of C or better may be used to satisfy requirements for a certificate.

Certificate Requirement courses:	Units
CET 067..... Computer Diagnostics, Repair and Upgrade.....	3.0
CIS 054C..... Introduction to Windows NT.....	1.0
CIS 056..... Supporting MS Windows.....	3.0
CIS 056A..... Supporting MS Windows NT.....	3.0
CIS 056B..... Supporting MS Windows NT Server.....	3.0
CIS 081..... Introduction to Computer Networking.....	3.0
Total Program Certificate Requirements:	16.0

Java Programming - Certificate

Only courses completed with a grade of C or better may be used to satisfy requirements for a certificate.

Certificate Requirement courses:	Units
CIS 045B..... UNIX/LINUX Operating System.....	3.0
CIS 181..... Computer Lab: UNIX.....	1.0
CIS 043..... Software Development with Java Programming.....	3.0
CIS 183..... Computer Lab: JAVA.....	1.0
CIS 049..... Web Design/Programming (Unix).....	3.0
CIS 051..... Networking Programming Using Java.....	3.0
CIS 053..... Distributed programming With Java.....	3.0
Total Program Certificate Requirements:	17.0

COMPUTER INFORMATION SYSTEMS (CIS)

NOTE: Maximum credit that can be transferred to UC is a total of six CIS courses.

002 • INTRODUCTION TO COMPUTER PROGRAMMING USING VISUAL BASIC.NET (VB.NET)

3.0 units

Total Lecture 54.4 hours

Advisory: MATH 903

Corequisite: CIS 180

Acceptable for credit: University of California, California State University

This course is an Introduction to Programming using Visual Basic.NET (VB.NET). This course will cover fundamentals of digital computers, hardware, software, and introduce concepts of algorithms, flowcharting, and program design aids. Students will design, code, and execute programs on microcomputers in GUI environment using programming language VB.NET. The course will include VB.Net Controls, Events, Strings, Input Output (I/O) Techniques, Subprograms/ Functions, Decision Making and Looping Techniques, Arrays, Sequential Files, and Relational Database and SQL. Concurrent enrollment in CIS 180 is required. (UC credit may be limited; see a counselor) Pass/No Pass Option.

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005A • APPLICATIONS PROGRAM DEVELOPMENT (COBOL)

3.0 units

Total Lecture 54.4 hours
Advisory: MATH 903
Corequisite: CIS 174
Acceptable for credit: California State University

This is a beginning computer problem solving and programming course using COBOL. Structured COBOL syntax will be studied in detail. Emphasis will be placed on taking a number of business applications from the initial job definition phase through programming and testing. Programs will be compiled and executed on computer. *Pass/No Pass Option.*

014 • DATA STRUCTURES AND ALGORITHMS

3.0 units

Total Lecture 54.4 hours
Advisory: MATH 003A
Prerequisite: CIS 037B
Corequisite: CIS 172C
Acceptable for credit: University of California, California State University

This is an advanced course in the Computer Science option. The course reviews basic data structures such as stacks, lists, trees, and the algorithms of their implementation. New topics introduced are the definition and terminology of graphs, internal and external sorting/merging/searching, dynamic storage allocation and the algorithms for implementing each topic. *Pass/No Pass Option.*

032 • FORTRAN PROGRAMMING

3.0 units

Total Lecture 54.4 hours
Advisory: MATH 003A, CIS 054A and CIS 002
Corequisite: CIS 173
Acceptable for credit: University of California, California State University

This is a computer problem solving and programming course using FORTRAN. Structured FORTRAN syntax will be studied in detail. Emphasis will be placed on taking a number of scientific applications from the initial job definition phase through programming and testing. Good programming style will be emphasized and substantial applications of FORTRAN will be compiled and executed on the computer. *Pass/No Pass Option.*

037A • "C" PROGRAMMING

3.0 units

Total Lecture 54.4 hours
Advisory: MATH 903 and CIS 031A or CIS 002
Corequisite: CIS 172A
Acceptable for credit: University of California, California State University.

An introduction to the concepts and methods of computer programming using a problem solving approach—"C" is a powerful, low-level, general purpose programming language, commonly used on UNIX based computer systems. *Pass/No Pass Option.*

037B • ADVANCED "C" PROGRAMMING

3.0 units

Total Lecture 54.4 hours
Advisory: MATH 903
Prerequisite: CIS 037A
Corequisite: CIS 172B
Acceptable for credit: University of California, California State University

This is an advanced course in the "C" programming language. The course will include more complex/advanced topics in the "C" programming language, such as run-time libraries, "C" - UNIX interface, "C" - Assembly interface, and basic data structures with stacks, queues, lists and trees. Students will design, code and execute complex programs with an emphasis on efficient algorithms, structured programming techniques, and good documentation. *Pass/No Pass Option.*

040 • OBJECT - ORIENTED PROGRAMMING

3.0 units

Total Lecture 54.4 hours
Advisory: MATH 903, CIS 037A and CIS 054B
Corequisite: CIS 178
Acceptable for credit: University of California, California State University

This is an introductory course in object-oriented programming using C++ and software application development using industry standard tools. Students will develop and design applications to solve problems in different fields such as engineering and business. Applications will be constructed so that the software has a window based GUI (Graphical User Interface) composed of dialog boxes, menu bars and pull-down menus. Students will use libraries and classes which are packaged with Microsoft Visual C++, such as MFC (Microsoft Foundation Classes). *Pass/No Pass Option.*

043 • SOFTWARE DEVELOPMENT WITH JAVA PROGRAMMING

3.0 units

Total Lecture 54.4 hours
Advisory: CIS 037A and CIS 054B
Corequisite: CIS 183
Acceptable for credit: University of California, California State University

This course is an introduction to the concepts and methods of computer programming with an emphasis on OOP, (Object-Oriented Programming). Fundamentals of Java programming language are taught in the Internet environment. Java programming language concepts include introduction to objects and classes, designing classes, data types, iterations, loops, testing and debugging techniques. The course includes OOP concepts such as interfaces, polymorphism and inheritance. This course also includes applets, GUI (graphical user interface), arrays lists, arrays, streams and exception handling. *Pass/No Pass Option.*

044 • INTRODUCTION TO DATA STRUCTURES USING JAVA

3.0 units

Total Lecture 54.4 hours
Advisory: MATH 003A
Prerequisite: CIS 043 and CIS 183
Corequisite: CIS 184
Acceptable for credit: University of California, California State University

This course is an advanced course in Java Programming Language. It covers basic data structures such as stacks, lists, dynamic arrays, trees, and the algorithms of their implementation. Other topics introduced are the definition and terminology of graphs, internal and external sorting, merging, searching, Hashing, Big-O notation, and Standard collection of Classes. Concurrent enrollment in CIS 184 is required. *Pass/No Pass Option.*

044A • INTRODUCTION TO PERL PROGRAMMING

3.0 units

Total Lecture 54.4 hours
Advisory: CIS 047A and MATH 000C
Corequisite: CIS 184A
Acceptable for credit: University of California, California State University

This is an introductory course in Perl programming. This course includes instruction on the basic features of perl scripting/programming. It also includes regular expressions, arrays and array functions and different perl operators and perl functions, file handlers, interfacing with the system and exception handling. Introduction to network addressing client/server programs in perl, Common Gateway Interface (CGI) and Object Oriented Concepts in perl are emphasized. NOTE: Students must be familiar with UNIX operating system. *Pass/No Pass Option.*

045A • INTRODUCTION TO UNIX OPERATING SYSTEM

1.0 unit

Total Lecture 16.0 hours
Advisory: MATH 903 and CIS 054A
Acceptable for credit: California State University

An introduction to the UNIX operating system, its structure and capabilities. UNIX is one of the most recently developed and most popular operating systems. *Pass/No Pass Option.*

045B • UNIX/LINUX OPERATING SYSTEM

3.0 units

Total Lecture 54.4 hours
Advisory: MATH 903 and CIS 054B
Corequisite: CIS 181
Acceptable for credit: University of California, California State University

This is an introductory course in the UNIX operating system. This course includes basic UNIX commands, setup vi environment, using advanced vi features, UNIX file and directory manipulation, processes and standard files, access permission, and UNIZ mail, write and talk. The course also includes an introduction to the Bourne Shell, including the shell command line, setup, customizing the shell environment, the alias mechanism, pipes, filters, I/O redirection and the text manipulation commands troff and nroff. In addition, document formatting packages and an introduction to system administration will be covered. *Pass/No Pass Option.*

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045C • LINUX OPERATING SYSTEM

3.0 units

Total Lecture 44.8 hours, Total Lab 27.2 hours

Corequisite: CIS 045A

Acceptable for credit: University of California, California State University

This is an introductory course in the Linux operating system. This course includes learning basic Linux commands and how to set up a Linux system on PC's. The Linux commands to be addressed are: Linux file and directory manipulation, processes, access permission, and Linux mail, write, and talk. The course also includes an introduction to the Bash Shell, which includes the shell command line, setup, and customizing the shell environment. In addition, students will configure DNS, NIS, and NFS systems and use GNU project utilities, gawk programming, C/C++, Tcl/Tk, and perl programming with Linux. *Pass/No Pass Option.*

046A • UNIX SHELL PROGRAMMING

3.0 units

Total Lecture 54.4 hours

Advisory: MATH 903

Prerequisite: CIS 045B

Corequisite: CIS 181A

Acceptable for credit: University of California, California State University

This is a beginning course in UNIX Shell Programming using different shell programs available with the AT&T UNIX 5.0 operating system. The course will include use of Bourne Shell and C-Shell Programming theory and concepts. These concepts include interpretation of different quote characters, shell variables, decision making commands, and looping mechanism. Students will also learn passing arguments to shell scripts, terminal/file I/O, subshells and using special UNIX commands. Additionally, this course will also include use of restricted shell "rsh" and introduction to Korn shell commands. *Pass/No Pass Option.*

047A • INTRO TO UNIX SYSTEM ADMINISTRATION

3.0 units

Total Lecture 44.8 hours, Total Lab 27.2 hours

Advisory: MATH 903

Prerequisite: CIS 046A

Acceptable for credit: California State University

This is an introductory course in the UNIX system administration series. This course includes review of basic UNIX commands, bringing up/shutting down the system and monitoring processes using administration tools. The course also includes mounting and unmounting the file system. This course utilizes UNIX tools to administer users accounts and groups and administer devices, printers and networking services. This course includes planning, setting up and administering mail services, customizing send mail configuration files, use of shell programming, UNIX tools to administer hardware and troubleshooting file access problems. *Pass/No Pass Option.*

047B • ADVANCED UNIX SYSTEM ADMINISTRATION

3.0 units

Total Lecture 44.8 hours, Total Lab 27.2 hours

Advisory: MATH 903

Prerequisite: CIS 047A

Acceptable for credit: California State University

This is an advanced course in the UNIX system administration series. This course includes setup, configuration, maintenance and performance issues of Domain Name Servers (DNS), Network File System (NFS), Network Information Service (NIS) and Network Information Service Plus (NIS+). DNS, NFS, NIS, NIS+ are configured on a networked UNIX System. The course also includes configuration, setting up and mounting Berkeley Internet Name Domain (BIND) and troubleshooting DNS and BIND. Shell programming with nslookup and C programming with Resolver Library Routines is also included. The course also includes the use of Service Access Facility (SAF), using SAF commands, setting up modems, character terminals and printing services, installing and managing application software. *Pass/No Pass Option.*

048 • UNIX NETWORKING AND SECURITY

3.0 units

Total Lecture 44.8 hours, Total Lab 27.2 hours

Prerequisite: CIS 047A

Advisory: Math 903

Acceptable for credit: California State University

This is an advanced course in the UNIX system administration series. This course includes assembly, setup and configuration of a UNIX Ethernet network. The course is based upon TCP/IP (Transmission Control Protocol/Internet Protocol) and includes host and router configuration, sendmail, firewalls, remote access and execution. This course also includes an introduction to distributing programming using sockets, Ili (Transfer Level Interface), RPC (Remote Procedure Calls) and frequently used diagnostic utilities. *Pass/No Pass Option.*

049 • WEB DESIGN/PROGRAMMING (UNIX)

2.0 units

Total Lecture 27.2 hours, Total Lab 27.2 hours

Prerequisite: CIS 045B

Acceptable for credit: California State University

This is an introductory course in the Web design/programming on a UNIX platform. This course includes web design concepts and HTML commands and setting up and creating websites including e-commerce. This course is specific to the UNIX operating system tools, web servers, search engines, and web design for communication. The course also includes introduction to Java scripts, Common Gateway Interface (CGI), and Java applet integration. Students will create complex web sites, upload commercial web sites, and use corporate web design with Intranet implementation. NOTE: Students should have knowledge of UNIX and windows environment.. *Pass/No Pass Option.*

049A • CLIENT-SIDE WEB PROGRAMMING

3.0 units

Total Lecture 44.8 hours, Total Lab 27.2 hours

Advisory: CA 097A and CIS 031A

Acceptable for credit: California State University

This course enables participants to learn client-side programming for the web pages that require data collection and other user interactions. Students will learn how to write Javascript and embed them into the HTML documents to enhance the dynamics and interactive features of the web, by checking and validating the forms, adding special effects, customizing graphic selections, creating security passwords etc. Participants will use Document Object Model (DOM) to dynamically access and update the content, structure and style of the document. *Pass/No Pass Option.*

051 • NETWORK PROGRAMMING USING JAVA

3.0 units

Total Lecture 44.8 hours, Total Lab 27.2 hours

Prerequisite: CIS 043

Acceptable for credit: California State University

This course reviews basic network concepts and World Wide Web / Internet from the perspective of a programmer and a developer. It explores Java's high-level classes for network access including internet address, URL (Uniform Resource Identifier), and Applet. There will be discussion of Java's low-level sockets classes for network access: socket, serversocket, DatagramPacket, and DatagramSocket. Additional topics include multitasking protocol and content handler, concepts unique to Java that makes it possible to write dynamically extensible programs that automatically understand protocols and new kinds of contents. This course focuses on developing network programs (both applets and applications) using Java, covering networking fundamentals to remote method invocation (RMI). Additional topics include TCP and UDP sockets, multicasting protocol and content handlers, and servlets. *Pass/No Pass Option.*

053 • DISTRIBUTED COMPUTING USING JAVA

3.0 units

Total Lecture 44.8 hours, Total Lab 27.2 hours

Advisory: Eligibility for MATH 001

Prerequisite: CIS 043

Acceptable for credit: California State University

This course is an introduction to designing and writing distributed applications in Java. The course explores Java's Remote Method Invocation (RMI) facility and CORBA protocols to build message-passing systems using Java's security facilities, and writing multithreaded servers. Special emphasis is given to distributed database systems, collaboration, and applications with high bandwidth requirements. The course focuses primarily on how to structure and wire distributed application and, therefore discusses issues like designing protocols, security, working with databases, and dealing with low bandwidth situations. *Pass/No Pass Option.*

081 • INTRODUCTION TO COMPUTER NETWORKING

3.0 units

Total Lecture 44.8 hours, Total Lab 27.2 hours

MATH 903, CIS 037A, CIS 054B and CET 078

Acceptable for credit: California State University

This is a comprehensive course in networking. Local area network (LAN) technology is used to implement broadband/baseland broadcast protocols, and different access methods. The course will also include different topologies, transmission media, access methods, interface techniques, composite systems and discuss different standards. Students will also learn different architectures and hardware/software architectural compatibility. Additionally, this course will include LAN operating systems, gateways/servers, network control and management, and implementation consideration/product review. (Also listed as CET 081). *Pass/No Pass Option.*

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- 081B • INTRODUCTION TO TCP/IP** **3.0 units**
Total Lecture 44.8 hours, Total Lab 27.2 hours
Acceptable for credit: California State University
This is an introductory course in Transmission Control Protocol/Internet Protocol (TCP/IP) networks and its protocols such as TCP, IP and UDP (User Datagram Protocols). Students will design, configure and manage TCP/IP internetworks and use all major TCP/IP applications services including FTP (File Transfer Protocol), TELNET and NFS (Networking File System). Students will employ popular internet/intranet tools such as FTP, Gopher, Netscape, WWW (World Wide Web) and others, troubleshoot TCP/IP networks/Internetworks and a wide range of routing problems using protocol analysis techniques. *Pass/No Pass Option.*
- 085A • DEVELOP PL/SQL PROGRAM UNITS** **3.0 units**
Total Lecture 44.8 hours, Total Lab 27.2 hours
Acceptable for credit: California State University
This course enables participants to learn how to write PL/SQL procedures, function and packages. Working in both the Procedure Builder and the SQL*Plus environments, participants will learn how to create and manage PL/SQL program units and database triggers. Participants will also learn how to use some of the Oracle-supplied packages This course is useful for Database Administrators, Designer/Developers, and Application Developers. *May be repeated 3 times. Pass/No Pass Option.*
- 171A • COMPUTER LAB: INTRODUCTION PROGRAMMING IN PASCAL** **1.0 unit**
Total Lab 54.4 hours
Advisory: MATH 903
Corequisite: CIS 004A
Acceptable for credit: University of California, California State University
This course is designed for students writing programs in PASCAL and using the Mission Computer lab for PASCAL programming. It is required for CIS 4A students using the computer lab. *Pass/No Pass Option.*
- 172A • COMPUTER LAB: INTRO TO "C" PROGRAMMING** **1.0 unit**
Total Lab 54.4 hours
Advisory: MATH 903
Corequisite: CIS 037A
Acceptable for credit: University of California, California State University
This course is designed for students writing programs in "C" and using the Mission Computer lab for "C" programming. It is required for CIS 37A students using the computer lab. *Pass/No Pass Option.*
- 172B • COMPUTER LAB: ADVANCED "C"** **1.0 unit**
Total Lab 54.4 hours
Advisory: MATH 903
Corequisite: CIS 037B
Acceptable for credit: University of California, California State University
This course is designed for students writing programs in "C" and using the Mission Computer lab for "C" programming. It is required for CIS 37B students using the computer lab. *Pass/No Pass Option.*
- 172C • COMPUTER LAB: DATA STRUCTURES AND ALGORITHMS** **1.0 unit**
Total Lab 54.4 hours
Advisory: MATH 903
Corequisite: CIS 014
Acceptable for credit: University of California, California State University
This course is designed for students writing programs in "C" and using the Mission Computer lab for "C" programming. It is required for CIS 14 students using the computer lab. *Pass/No Pass Option.*
- 173 • COMPUTER LAB: FORTRAN** **1.0 unit**
Total Lab 54.4 hours
Advisory: MATH 903
Corequisite: CIS 032
Acceptable for credit: University of California, California State University
This course is designed for students writing programs in FORTRAN and using the Mission Computer lab for FORTRAN programming. It is required for CIS 32 students using the computer lab. *Pass/No Pass Option.*
- 174 • COMPUTER LAB: COBOL** **1.0 unit**
Total Lab 54.4 hours
Advisory: MATH 903
Corequisite: CIS 005A
Acceptable for credit: California State University
This course is designed for students writing programs in COBOL and using the Mission Computer lab for COBOL programming. It is required for CIS 5A students using the computer lab. *May be repeated three times. Pass/No Pass Option*
- 178 • COMPUTER LAB: C++** **1.0 unit**
Total Lab 54.4 hours
Advisory: MATH 903
Corequisite: CIS 040
Acceptable for credit: University of California, California State University
This course is designed for students writing programs in C++ on IBM platforms, preferably using Borland C++ compiler. It is required laboratory course for CIS 40, and the credit is given to the students for hands on experience, for using C++ compiler and writing large programs in C++. Students will write these programs using object-oriented concepts of programming, that will be taught in CIS 40, for which this lab course is a corequisite. *Pass/No Pass Option.*
- 180 • COMPUTER LAB: VISUAL BASIC.NET (VB.NET)** **1.0 unit**
Total Lab 54.4 hours
Advisory: MATH 903
Corequisite: CIS 002
Acceptable for credit: University of California, California State University
This course is designed for students writing programs using Visual Basic.NET programming language used in CIS 002 course at the Mission Computer laboratory. Concurrent enrollment in CIS 002 is required. *May be repeated three times. Pass/No Pass Option.*
- 181 • COMPUTER LAB: UNIX** **1.0 unit**
Total Lab 54.4 hours
Advisory: MATH 903
Corequisite: CIS 045B
Acceptable for credit: University of California, California State University
This course is designed for students writing program in shell and using the Mission Computer lab for shell programming and UNIX. It is a required laboratory course for CIS 45B. *May be repeated three times. Pass/No Pass Option.*
- 181A • COMPUTER LAB: UNIX SHELL PROGRAMMING** **1.0 unit**
Total Lab 54.4 hours
Advisory: MATH 903
Corequisite: CIS 046A
Acceptable for credit: University of California, California State University
This course is designed for students writing program in shell and using the Mission Computer lab for shell programming and UNIX. It is a required laboratory course for CIS 46A. *Pass/No Pass Option.*
- 183 • COMPUTER LAB: JAVA** **1.0 unit**
Total Lab 54.4 hours
Advisory: MATH 903
Corequisite: CIS 043
Acceptable for credit: University of California, California State University
This course is designed for students writing programs in Java preferably on IBM platforms using the Java Interpreter. It is a required laboratory course for CIS 43, and credit is given to students for hands-on experience using Java and writing programs in Java. *Pass/No Pass Option.*
- 184 • COMPUTER LAB: INTRODUCTION TO DATA STRUCTURES USING JAVA** **1.0 unit**
Total Lab 54.4 hours
Advisory: MATH 003A
Prerequisite: CIS 043 and CIS 183
Corequisite: CIS 044
Acceptable for credit: University of California, California State University
This lab course is designed for students writing programs using Java2 SDK and SUN ONE Studio 4 programming language in CIS 044 at the Mission Computer laboratory. Concurrent enrollment in CIS 044 is required. *Pass/No Pass Option.*

COMPUTER INFORMATION SYSTEMS • COMPUTER INFORMATION TECHNOLOGY

BEFORE ENROLLING IN DEGREE APPLICABLE COURSES, IT IS RECOMMENDED THAT YOU COMPLETE ENGL 001A AND READ 053.

184A • COMPUTER LAB: PERL PROGRAMMING

1.0 unit

Total Lab 54.4 hours

Advisory: MATH 000C

Prerequisite: CIS 044A

Acceptable for credit: University of California, California State University

This course is designed for students writing programs in Perl on UNIX platforms using the Perl Interpreter/Compiler. It is a required laboratory course for CIS 44A and provides the students with hands-on experiences using Perl and writing programs in Perl. *Pass/No Pass Option.*

COMPUTER INFORMATION TECHNOLOGY (CIT)

DIVISION: Technology
 DEPARTMENT: Computer Information Technology
 DEPT CHAIR: Wael Abdeljabbar
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 COUNSELING: 408-855-5030

Cisco Certified Network Administration (CCNA) - Certificate

The Cisco Certified Network Associate (CCNA) track is designed as an introduction to the installation, configuration, and design of Networks. The track focuses on Cisco products, but also includes support courses that are not vendor specific and better prepares the student to actually work in the field. Completion of the track prepares students to take and pass the Cisco Certification exams.

Core Curriculum Courses (Required)	Units
CIT 011 Desktop Operating Systems	4.0
CIT 012 Network Hardware & Software.....	4.0
CIT 014 Introduction to Computer Hardware.....	4.0
CIT 021 Cisco Network Fundamentals (Cisco-1)	3.0
CIT 022 Routing Protocols and Concepts (Cisco-2)	3.0
CIT 023 LAN Design & Case Study (Cisco 3)	3.0
CIT 024 Accessing the WAN (Cisco)	3.0
COMM 015 Career Communications	3.0
Total Program Certificate Requirements:.....	27.0

Cisco Certified Network Professional (CCNP) - Certificate

The Cisco Certified Network Professional (CCNP) track is designed to fully prepare students to the install, configure, and design Networks. The track focuses on Cisco products, but also includes support courses that are not vendor specific and better prepares the student to actually work in the field. Completion of the track prepares students to take and pass the Cisco Certification exams. Student must first complete the CCNA certification as a prerequisite to the CCNP certification.

Prerequisite - Completion of the CCNA certification (27 units)

Core Curriculum Courses (Required)	Units
CIT 025 Advanced Routing	3.0
CIT 026 Remote Access Networks	3.0
CIT 027 Multilayer Switching	3.0
CIT 028 Internetwork Troubleshooting	3.0
Total Program Certificate Requirements:.....	12.0

Certified Network Engineer (CNE) - Certificate

The Certified Novell Engineer (CNE) track is designed to fully prepare students to the install, configure, and design Novell networks. The track focuses on Novell products, but also includes support courses that are not vendor specific and better prepares the student to actually work in the field. Completion of the track prepares students to take and pass the Novell Certification exams.

Core Curriculum Courses (Required)	Units
CIT 011 Desktop Operating Systems	4.0
CIT 012 Network Hardware & Software.....	4.0
CIT 014 Introduction to Computer Hardware.....	4.0
CIT 060 Netware Administration	3.0
CIT 062 Netware Advanced Administration	2.0
CIT 063 NDS Design and Implementation.....	3.0
CIT 064 Service and Support	3.0
CIT 067 Integrating NetWare with Windows O.S.....	3.0
CIT 160 Netware Administration Lab.....	1.0
CIT 162 Netware Advanced Administration Lab	1.0
COMM 015 Career Communications	3.0
Total Program Certificate Requirements:.....	31.0