De Anza College

Academic Year

2014 - 2015

Computer Information Systems

Programming/Network Programming

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| CIS Coordinator 408-864-8877 Bldg. F5 Rm. F51i | Business & Computer Systems Division Bldg. L1 Rm. L14 408-864-8797 | Counseling Center Student & Community Services Bldg. 2nd Fl. 408-864-5400 | Career Services Info. Student & Community Services Bldg. 2nd Fl. 408-864-5400 |

Certificate of Achievement Level Requirements

A minimum "C" grade in each major course.
Note: A maximum of six (6) quarter units may be transferred from other academic institutions.

Certificate of Achievement-Advanced Level Requirements

1. A minimum "C" grade in each major course.
2. Demonstrated proficiency in English and mathematics as evidenced by eligibility for EWRT 1A or ESL 5 and eligibility for MATH 114.
   Note: A maximum of 18 quarter units may be transferred from other academic institutions.

A.A./A.S. Degree Requirements

1. Completion of all General Education (GE) requirements (31-42 quarter units) for the A.A./A.S. degree. GE units must be completed with a minimum 2.0 GPA ("C" average).
2. Completion of all major requirements. Each major course must be completed with a minimum "C" grade.
   Major courses can also be used to satisfy GE requirements (except for Liberal Arts degrees).
   Note: A maximum of 22 quarter units from other academic institutions may be applied toward the major.
3. Completion of a minimum of 90 degree-applicable quarter units (GE and major units included). All De Anza courses must be completed with a minimum 2.0 GPA ("C" average). All De Anza courses combined with courses transferred from other academic institutions must be completed with a minimum 2.0 GPA ("C" average).
   Note: A minimum of 24 quarter units must be earned at De Anza College.

Major courses for certificates and degrees must be completed with a letter grade unless a particular course is only offered on a pass/no-pass basis.

Business Programming

Certificate of Achievement-Advanced
A.A. Degree

The Business Programming certificate and degree program creates a programming savvy entrepreneur who can make decisions about finances and technology, and who understands how to run an enterprise from both the technology and business perspectives. This program teaches skills combined from business and programming that enable a more in-depth view into the technology necessary to run a business in the 21st century.

Student Learning Outcomes - upon completion, students will be able to:
- design and develop business applications complete with user interface, algorithms and storage.
- analyze business requirements and create systems that meet the requirements.
- design and implement network topologies using knowledge about modern networks.

Certificate of Achievement-Advanced

1. Meet the requirements for this certificate level.
2. Complete the following.

Complete both CIS 15AG and 15BG, or both CIS 22A and CIS 22B.   9

CIS 15AG	Intro. to Computer Programming Using C (4.5)	
CIS 15BG	Intermediate Problem Solving in C (4.5)	
or		
CIS 22A	Beginning Programming Methodologies in C++ (4.5)	
CIS 22B	Intermediate Programming Methodologies in C++ (4.5)	

Complete one (1) course from: 4.5

CIS 15C	Data Structures (4.5)	
CIS 63	Systems Design (4.5)	
CIS 22C	Data Abstraction and Structures (4.5)	

Complete the following courses:

ACCT 1A	Financial Accounting I	5
BUS 10	Introduction to Business	5
CIS 14A	Visual Basic.NET Programming I	4.5
CIS 64A	Database Management Systems	4.5
CIS 66	Intro. to Data Communication & Networking	5

Complete one (1) course from: 4-5

CIS 3	Business Information Systems (4.5)	
CIS 67A	Local Area Networks (4)	
CIS 86	Computer Accounting Systems (5)	
	Total Units Required 41.5-42.5	

Check with the CIS department about the recommended sequence for completing the above courses.

A.A. Degree

Meet the A.A./A.S. degree requirements.

Major	*Complete the course requirements for the Business Programming Cert. of Achievement-Advanced*	*41.5-42.5 units*
GE	*General Education (31-42 units)*	
Electives	*Elective courses required when major units plus GE units total is less than 90*	
	Total Units Required . . . . 90 units	

Check with the CIS department about the recommended sequence for completing the above courses.

Network Basics
Certificate of Achievement

The Network Basics Certificate of Achievement prepares students for entry-level employment as a computer support or network technician. Students are introduced to programming, networking, and Internet protocols. This certificate program also gives students a foundation for further study in either network administration or programming.

Student Learning Outcomes - upon completion, students will be able to:
- create algorithms to solve introductory-level problems using C programming language through the stages of coding, documenting, debugging, reading and testing with various tools.
- identify networking components and protocols in the context of architectures and technologies for LAN, WAN and Internet networks.

1. Meet the requirements for this certificate level.
2. Complete the following.

Complete one (1) course from: 4.5

CIS 15AG	Intro. to Computer Programming Using C (4.5)	
CIS 22A	Beginning Programming Methodologies in C++ (4.5)	

Complete the following:

CIS 66	Intro. to Data Communication & Networking	5
CIS 67A	Local Area Networks	4
CIS 75A	Internet Concepts and TCP/IP Protocols	5
	Total Units Required	18.5

Network Programming
Certificate of Achievement-Advanced
A.A. Degree

This certificate of achievement-advanced and degree program gives students a foundation for either employment or further study in the field of network programming. The curriculum offers students an introduction to computer programming, networking, and Internet protocols. Advanced topics include data structures, advanced computer programming, Internet programming with TCP/IP, and UNIX/LINUX utilities and shell features for file manipulation and communication.

Student Learning Outcomes - upon completion, students will be able to:
- design solutions for advanced network problems creating distributed programs using Transmission Control Protocol and Internet Protocol.
- create algorithms and code, document, debug and test advanced-level C programs using multiple source and header files.
- use UNIX/LINUX utilities and shell features for file manipulation and communication.

Certificate of Achievement-Advanced
1. Meet the requirements for this certificate level.
2. Complete the following.

Complete both CIS 15AG and 15BG, or both
CIS 22A and CIS 22B.   9

CIS 15AG	Intro. to Computer Programming Using C (4.5)	
CIS 15BG	Intermediate Problem Solving in C (4.5)	
or		
CIS 22A	Beginning Programming Methodologies in C++ (4.5)	
CIS 22B	Intermediate Programming Methodologies in C++ (4.5)	

Complete one (1) course from: 4.5

CIS 15C	Data Structures (4.5)	
CIS 22C	Data Abstraction and Structures (4.5)	

Complete the following courses:

CIS 18A	Introduction to UNIX/LINUX	4.5
CIS 26B	Advanced C Programming	4.5
CIS 66	Introduction to Data Communication and Networking	5
CIS 75A	Internet Concepts and TCP/IP Protocols	5
CIS 75B	Internet Programming with TCP/IP	4.5

Complete one (1) course from the following: 4-5

CIS 18B	Advanced UNIX/LINUX (4.5)	
CIS 21JA	Introduction to 8086 IA32 Processor Assembly Language (4.5)	
CIS 31	Operating System Concepts (5)	
CIS 33A	Programming in PERL (4.5)	
CIS 67A	Local Area Networks (4)	
CIS 67B	Introduction to Wide Area Networking (4)	
	Total Units Required	41-42

Check with the CIS department about the recommended sequence for completing the above courses.

A.A. Degree
Meet the A.A./A.S. degree requirements.

Major	*Complete the course requirements for the Network Programming Cert. of Achievement-Advanced*	*41-42 units*
GE	*General Education (31-42 units)*	
Electives	*Elective courses required when major units plus GE units total is less than 90*	
	Total Units Required	90 units

Check with the CIS department about the recommended sequence for completing the above courses.

Programming in C/C++
Certificate of Achievement

The C/C++ Certificate of Achievement program prepares students for entry-level employment in computer programming, software testing and integration, software analysis or algorithm design. The curriculum offers students an introduction to programming in C, intermediate problem solving in C, and advanced C/C++ programming and design. The Certificate of Achievement program also provides a solid foundation and skill set for those interested in pursuing further study towards a Certificate of Achievement-Advanced or AA Degree in Systems Programming or Business Programming.

Student Learning Outcomes - upon completion, students will be able to:
- read, analyze and explain advanced C/C++ programs
- design solutions for advanced problems using appropriate design methodology incorporating advanced programming constructs.
- create algorithms and code, document, debug and test advanced level C/C++ programs using multiple source and header files.

1. Meet the requirements for this certificate level.
2. Complete the following.

Complete both CIS 15AG and 15BG, or both
CIS 22A and CIS 22B.   9

CIS 15AG	Intro. to Computer Programming Using C (4.5)	
CIS 15BG	Intermediate Problem Solving in C (4.5)	
or		

| CIS 22A | Beginning Programming Methodologies in C++ (4.5) | |
| CIS 22B | Intermediate Programming Methodologies in C++ (4.5) | |

Complete one (1) course from: 4.5
| CIS 15C | Data Structures (4.5) | |
| CIS 22C | Data Abstraction and Structures (4.5) | |

Complete one (1) course from: 4.5
CIS 26B	Advanced C Programming (4.5)	
CIS 27	Programming in C++ for C/Java Programmers (4.5)	
	Total Units Required 18	

Programming in JAVA
Certificate of Achievement

This program gives students the knowledge and skills necessary to develop client/server, web and mobile environments. Organizations running networks on private and public clouds pass information among Desktop, Servers, and Mobile Devices, and count on Java as a general-purpose, object oriented solution to fulfill the development requirement of applications. The flexible nature of the language is driving the demand for trained Java programmers.

Student Learning Outcomes - upon completion, students will be able to:
- read, analyze and debug code using CoreJava
- design solutions using object-oriented programming constructs and advanced concepts in the Java Development Kit.
- design web applications using a three-tier architecture and applying advanced concepts for Java Enterprise Edition.
- design Java programs for the Android platform.
- create, design and debug advanced-level programs with Java language.

1. Meet the requirements for this certificate level.
2. Complete the following.

Complete both CIS 15AG and 15BG, or both
CIS 22A and CIS 22B. 9
CIS 15AG	Intro. to Computer Programming Using C (4.5)	
CIS 15BG	Intermediate Problem Solving in C (4.5)	
or		
CIS 22A	Beginning Programming Methodologies in C++ (4.5)	
CIS 22B	Intermediate Programming Methodologies in C++ (4.5)	

Complete the following:
CIS 35A	Java Programming as a Second Language	4.5
CIS 35B	Advanced Java Programming	4.5
CIS 53	Java for Mobile Development	4.5
	Total Units Required 22.5	

Programming in PERL
Certificate of Achievement

The Programming in PERL Certificate of Achievement certifies that the student can create Perl programs. Perl is a continuously developing language, designed for practical management of important server systems. Perl programming is a key skill used in server processing, web host processing, and integrating multiple subsystems. Students develop basic knowledge of Perl which enables them to match interfaces of web protocol subsystems, the operating system, and database subsystems.

Student Learning Outcomes - upon completion, students will be able to:
- read, analyze and explain intermediate level C programs.
- design solutions for intermediate-level problems using appropriate design methodology incorporating intermediate programming constructs.
- create algorithms and code, document, debug, and test intermediate level C programs.
- use the UNIX/LINUX Operating System utilities and shell features for basic file manipulation, networking, and communication.
- design, code, document, analyze, debug, and test advanced-level Perl programs that include object-oriented Perl modules and access to database, TCP/IP, and system processes.

1. Meet the requirements for this certificate level.
2. Complete the following.

Complete both CIS 15AG and 15BG, or both
CIS 22A and CIS 22B. 9
CIS 15AG	Intro. to Computer Programming Using C (4.5)	
CIS 15BG	Intermediate Problem Solving in C (4.5)	
or		
CIS 22A	Beginning Programming Methodologies in C++ (4.5)	
CIS 22B	Intermediate Programming Methodologies in C++ (4.5)	

Complete the following:
CIS 18A	Introduction to UNIX/LINUX	4.5
CIS 33A	Programming in PERL	4.5
CIS 33B	Advanced PERL Programming	4.5
	Total Units Required 22.5	

Systems Programming
Certificate of Achievement-Advanced
A.A. Degree

Students pursuing the Systems Programming Certificate of Achievement-Advanced or AA degree learn computer programming fundamentals of both low-level and high-level languages and gain computing experience on both Windows and Linux platforms.

Student Learning Outcomes - upon completion, students will be able to:
- create a design, implement and debug solutions for computing systems of different levels of complexity using C and C++.
- create, design, implement, and debug solutions for embedded systems such as 8086/ IA32 processor using Assembly Language.
- use UNIX/LINUX utilities and shell features for file manipulation and communication.

Certificate of Achievement-Advanced
1. Meet the requirements for this certificate level.
2. Complete the following.

Complete both CIS 15AG and 15BG, or both
CIS 22A and CIS 22B. 9
CIS 15AG	Intro. to Computer Programming Using C (4.5)	
CIS 15BG	Intermediate Problem Solving in C (4.5)	
or		
CIS 22A	Beginning Programming Methodologies in C++ (4.5)	
CIS 22B	Intermediate Programming Methodologies in C++ (4.5)	

Complete one (1) course from: 4.5
CIS 15C   Data Structures (4.5)
CIS 22C   Data Abstraction and Structures (4.5)

Complete the following:
CIS 18A   Introduction to UNIX/LINUX   4.5
CIS 21JA   Introduction to 8086 IA32 Processor
               Assembly Language   4.5
CIS 26B   Advanced C Programming   4.5
CIS 27   Programming in C++ for C/Java
               Programmers   4.5
CIS 31   Operating System Concepts   5

Complete one (1) course from: 4.5-5
CIS 18B   Advanced UNIX/LINUX (4.5)
CIS 28   Object Oriented Analysis and Design (4.5)
CIS 35A   Java Programming as a Second
               Language (4.5)
CIS 66   Intro. to Data Communication
               and Networking (5)
               Total Units Required 41-41.5

Check with the CIS department about the recommended sequence for completing the above courses.

A.A. Degree
Meet the A.A./A.S. degree requirements.

Major	*Complete the course requirements for the Systems Programming Cert. of Achievement-Advanced*	*41-41.5 units*
GE	*General Education (31-42 units)*	
Electives	*Elective courses required when major units plus GE units total is less than 90 Total Units Required . . . . 90 units*	

Check with the CIS department about the recommended sequence for completing the above courses.

UNIX/LINUX Operating System
Certificate of Achievement
Students pursuing the UNIX/LINUX Operating System Certificate of Achievement learn the fundamentals of the UNIX/LINUX OS, ranging from text file manipulation, job control, and communication to implementation of shell scripts to automate tasks.

Student Learning Outcomes - upon completion, students will be able to:
• use UNIX/LINUX utilities and shell features for file manipulation, job control, and communication.
• create algorithms and code, document, debug, and test shell scripts that interact with the UNIX/LINUX Operating System.

1. Meet the requirements for this certificate level.
2. Complete the following.

Complete both CIS 15AG and 15BG, or both
CIS 22A and CIS 22B.   9
CIS 15AG   Intro. to Computer Programming Using C (4.5)
CIS 15BG   Intermediate Problem Solving in C (4.5)
or
CIS 22A   Beginning Programming Methodologies
               in C++ (4.5)
CIS 22B   Intermediate Programming Methodologies
               in C++ (4.5)

Complete the following:
CIS 18A   Introduction to UNIX/LINUX   4.5
CIS 18B   Advanced UNIX/LINUX   4.5
CIS 18C   Shell Programming   4.5
               Total Units Required 22.5

Visual Basic Programming
Certificate of Achievement
The Visual Basic Certificate of Achievement program prepares students for entry-level positions such as: Visual Basic Developer, .NET Developer, and Web Database Developer. Additionally, students will enhance their skills in working with spreadsheets and databases and these skills can be applied to degrees in MIS, Web Development, or any associated area.

Student Learning Outcomes - upon completion, students will be able to:
• develop and present a plan for improving a business using the business decision making model utilizing hardware and software applications such as word processing, spreadsheets, and/or databases.
• design, create and debug an application incorporating class modules, bas modules, multiple forms, and database updating.
• design, create, and debug a Web application using ASP.NET 3.5

1. Meet the requirements for this certificate level.
2. Complete the following.

CIS 3   Business Information Systems   4.5
CIS 14A   Visual Basic.NET Programming I   4.5
CIS 14B   Visual Basic.NET Programming II   4.5
CIS 86   Computer Accounting Systems   5
               Total Units Required 18.5

Web Development
Certificate of Achievement
The Certificate of Achievement in Web Development certifies that the student can create web pages and client side programming for web pages.

Student Learning Outcomes - upon completion, students will be able to:
• create algorithms and code, document, debug, and test introductory-level programs in a high-level programming language.
• create web pages using Extensible Hypertext Markup Language (XHTML), Cascading Style Sheets (CSS), JavaScript, and the Document Object Model (DOM), and demonstrate how they interact together within a web document.

1. Meet the requirements for this certificate level.
2. Complete the following.

Complete one (1) course from: 4.5
CIS 15AG   Intro. to Computer Programming Using C (4.5)
CIS 14A   Visual Basic Programming I (4.5)
CIS 22A   Beginning Programming Methodologies
               in C++ (4.5)

Complete four (4) courses from the following: 16.5-18

CIS 18A   Introduction to UNIX/LINUX (4.5)
CIS 55   iOS Development (4.5)
CIS 89A   World Wide Web Page Development (3)
CIS 89C   Client Side Programming with JavaScript (4.5)
CIS 89D   Rich Internet Application Development (4.5) CIS 98
Digital Image Editing Software
               (Photoshop) (4.5)
               Total Units Required 21-22.5