Degree Applicable X

Glendale Community College
May1990
Revised January, 2012

COURSE OUTLINE

COMPUTER SCIENCE/INFORMATION SYSTEMS 130
Introduction to Algorithms

I. Catalog Statement

Computer Science/Information Systems 130 is a course in programming, algorithm development and problem-solving using both object-oriented and structured approaches. It includes a study of syntax and data structures with applications in science, engineering, and industry. This course is suitable either for students planning to transfer or those wishing to develop a marketable skill.

Units – 3.0
Lecture/Demonstration Hours – 3.0

~~Recommended Preparation: Computer Science/Information Systems 110 or equivalent.~~

Prerequisites: Computer Science/Information Systems 112

II. Course Entry Expectations

Skills Level Ranges: Reading 6; Writing 5; Listening/Speaking 6; Math 4.

III. Course Exit Standards

Upon successful completion of the required coursework, the student will be able to:

1. write simple programs using basic unstructured data types;
2. use procedures for problem-solving and modularity;
3. use objects for data encapsulation;
4. develop algorithms and select an appropriate combination of algorithm and data structures for various problems;
5. write more complex programs using structured data types, objects, parameters, functions and recursion;
6. understand and perform basic operations with reference variables, linked lists, and binary trees;
7. convert simple documentation into basic programming including looping and decision;
8. refine a program into two or more modules.

IV. Course Content — Total Contact Hours = 48

A. Introduction — 4 hours
   1. Problem definition
   2. Object concepts

B. Basic Concepts — 3 hours
   1. Data types

2. Scalar Data Types

a. Integer types
b. Floating point types
c. Character

C. Elementary Programs — 3 hours
1. Arithmetic expression
2. The Assignment Statement
3. Program examples

D. Control Flow — 3 hours
1. Looping statements
2. Conditional statements
3. Selection statements

E. Running, Debugging, and Testing Programs — 6 hours
1. Debugging
2. Program testing program
3. Documentation and maintenance

F. Algorithm Development — 5 hours

G. Additional Data Types — 6 hours
1. User - defined
2. Arrays
3. Files

H. Functions and Methods — 5 hours
1. Declaring and invoking a function
2. Local and global variables
3. Parameters – by reference and by value
4. Recursion

I. Objects — 8 hours
1. Declaring classes
2. Inheritance
3. Arrays of objects
4. Files of objects

J. References and Linked Lists — 5 hours
1. Reference Variables
2. Stacks and queues
3. Linked lists
4. Binary trees

V. Methods of Presentation

The following instructional methodologies may be used in the course:

1. normal lecture mode;
2. hands-on programming problems using computers with instructor answering individual students' questions in real-time.

VI. Assignments and Methods of Evaluation

1. Graded programs;
2. Unit tests;
3. Final examination (requiring analytical thinking and problem-solving.)

VII. Textbook

~~Gaddis, Starting Out with JAVA 4th edition.~~
~~Boston, Course Technology, 2010.~~
~~12th Grade Textbook Reading Level. ISBN: 0-13608-020-0~~

Gaddis, Starting Out with JAVA 5th edition.
Boston, Course Technology, 2013.
12th Grade Textbook Reading Level. ISBN: 0-13285-583-6

VIII. Student Learning Objectives

Upon successful completion, the student will be able to: