COURSE DISCIPLINE :   CS/IS

COURSE NUMBER :   130

COURSE TITLE (FULL) :   Introduction to Algorithms

COURSE TITLE (SHORT) :   Introduction to Algorithms

CATALOG DESCRIPTION

CS/IS 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.

Total Lecture Units: 3.00

Total Laboratory Units: 0.00

Total Course Units: 3.00

Total Lecture Hours: 54.00

Total Laboratory Hours: 0.00

Total Laboratory Hours To Be Arranged: 0.00

Total Contact Hours: 54.00

Total Out-of-Class Hours: 108.00

Prerequisite: CS/IS 112 or equivalent.

ENTRY STANDARDS

	Subject	Number	Title	Description	Include
1	CS/IS	112	Introduction To Programming Using Java	Examine problems, apply logic, and provide solutions/algorithms for the problems;	Yes
2	CS/IS	112	Introduction To Programming Using Java	show the solution/algorithm using flowcharts or pseudocode;	Yes
3	CS/IS	112	Introduction To Programming Using Java	utilize a compiler to write, debug, and test Java programs.	Yes

EXIT STANDARDS

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   describe and perform basic operations with reference variables, linked lists, and binary trees;

7   convert simple documentation into basic programming including looping and decision;

8   demonstrate how to refine a program into two or more modules.

STUDENT LEARNING OUTCOMES

1   analyze problems and provide logical solutions;

2   outline solutions in a systematic fashion;

3   demonstrate ability to code, test, and debug intermediate level Java programs.

COURSE CONTENT WITH INSTRUCTIONAL HOURS

	Description	Lecture	Lab	Total Hours
1	Introduction • Problem definition • Object concepts	4	0	4

2	Basic Concepts • Data types • Scalar data types • Integer types • Floating point types • Character	4	0	4
3	Elementary Programs • Elementary programs • The assignment statement • Program examples	4	0	4
4	Control Flow • Looping statements • Conditional statements • Selection statements	5	0	5
5	Running, Debugging, and Testing Programs • Debugging • Program testing program • Documentation and maintenance	6	0	6
6	Algorithm Development	5	0	5
7	Additional Data Types • User - defined • Arrays • Files	6	0	6
8	Functions and Methods • Declaring and invoking a function • Local and global variables • Parameters – by reference and by value • Recursion	6	0	6
9	Objects • Declaring classes • Inheritance • Arrays of objects • Files of objects	8	0	8
10	References and Linked Lists • Reference variables • Stacks and queues • Linked lists • Binary trees	6	0	6
				54

OUT OF CLASS ASSIGNMENTS

1   programming assignments (e.g. write a simple program incorporating objects, functions and methods).

METHODS OF EVALUATION

1   quizzes;
2   midterm examinations;
3   programming projects;
4   final examination.

METHODS OF INSTRUCTION

☑ Lecture

☐ Laboratory

☐ Studio

☐ Discussion

☐ Multimedia

☐ Tutorial

☐ Independent Study

☐ Collaboratory Learning

☑ Demonstration

☐ Field Activities (Trips)

☐ Guest Speakers

☐ Presentations

TEXTBOOKS

Title	Type	Publisher	Edition	Medium	Author	IBSN	Date
Starting Out with JAVA: From Control Structures through Objects	Required	Upper Saddle River: Prentice Hall,	7	Print	Gaddis, Tony.	9780134802213	2019