National University

of Computer & Emerging Sciences

Course Outline of BS Electrical Engineering Degree Program

Course Title	Programming Fundamentals	**Course Code**	CS214
Course Pre-requisite(s)	EE116 – Introduction to Computing	**Credit Hrs.**	3+1

Text Book	**Title**	**Object Oriented Programming in C++**
	Author	Robert Lafore
	Publisher	Sams Publishing, 2002, 4th Edition
Reference Book(s)	**Title**	**C++ How to Program**
	Author	Paul Deitel, Harvey Deitel
	Publisher	Pearson Education, 2012, 8th Edition
	Title	**C++ Programming: from problem analysis to Program Design**
	Author	D.S. Malik
	Publisher	Cengage Learning, 7th Edition

Course Objective:	1. Understand the basic problem solving and algorithm development skills and use them to implement basic C++ programs with the fundamental concepts of structured and object oriented computer programming language such as C++. 2. Write program of reasonable difficulty level to implement medium sized complex programs using OOP concepts in C++ programming language.

Course Learning Outcomes:	At the end of this course the student will be able to	Domain	Taxonomy Level	PLO[1]
	1. Prepare logic of a program, sketch an algorithm and make a flow chart to represent the solution of problem.	Cognitive	3	3
	2. Design and Implement the solution of problem using loops, arrays, functions, structures.	Cognitive	5	3
	3. Analyze different programs to compute the output and identify logical and syntax errors in programs including Object Oriented Programming (OOP), Inheritance.	Cognitive	4	2

Lec. Hrs.	Course Contents/Topics	Chapter	CLOs
03	Introduction to course, A quick review of programming basics like syntax, data types and operators, A review of Relational operators, Iterative structures, conditional structures, selective structures	2, 3	1

03	A quick review of programming basics like syntax, data types and operators, A review of Relational operators, Iterative structures, conditional structures, selective structures	2, 3	1
03	A quick review of programming basics like syntax, data types and operators, A review of Relational operators, Iterative structures, conditional structures, selective structures, File input/output, File input/out skeleton, Use of File input/output in C++	2, 3, 12	1
03	C-Type Strings, Arrays, 1D, 2D and multi-dimensional arrays, Addresses and Pointers, The Address-of Operator (&), Pointers and Arrays	7, 10	2
03	Pointers to Pointers, Debugging Pointers, Enumerated data types, Simple Functions, Passing Arguments to Functions	4, 5	2
01	Midterm I Examination (Midterm I)		
05	Overloaded Functions, Recursion, Inline Functions, Default Arguments, Returning by Reference, const Function Arguments, Passing arguments by reference and by value	5	2
03	Passing and returning arrays from functions, memory management, dynamic memory allocation, Structures in C++, Structure declaration, accessing the structure members, array of structure and nested structure in C++	7, 10, 4	2
03	Objects and Classes, A simple class, Object attributes, Methods and Functions, Data hiding in C++, Private, Protected and Public keywords	6	3
05	Constructors, Destructors, Objects as Function Arguments, The Default Copy Constructor, Returning Objects from Functions, Classes, Objects, and Memory, Static Class Data	6	3
01	Midterm II Examination (Midterm II)		
03	Arrays as Class Member Data, Arrays of Objects, The Standard C++ string Class and its built-in functions	7	3
03	Operator Overloading, Overloading Unary and Binary Operators, Concept of Nameless Object	8	3
03	Data conversion, UML class diagram and interrelation of classes	8	3
03	Inheritance, Derived Class and Base Class, Overriding Member Functions, Function Reuse, Class Hierarchies	9	3
03	Public and Private Inheritance, Levels of Inheritance, Multiple Inheritance, Diamond Problem	9	3

Assessment Tools (AT)

AT	Description	CLO	Weight	AT	Description	CLO	Weight
1	Assignment I	CLO 1	4	**6**	Quiz III	CLO 2	2
2	Assignment II	CLO 2	4	**7**	Quiz IV	CLO 3	2
3	Assignment III	CLO 3	4	**8**	Midterm I Examination	CLO 1	15
4	Quiz I	CLO 1	2	**9**	Midterm II Examination	CLO 2	15
5	Quiz II	CLO 2	2	**10**	Final Examination	CLO 3	50

[1]RELEVANT PROGRAM LEARNING OUTCOMES (PLOs):

The course is designed so that students will achieve the following PLOs:

1 Engineering Knowledge:	☐	7 Environment and Sustainability:	☐
2 Problem Analysis:	☒	8 Ethics:	☐
3 Design/Development of Solutions:	☒	9 Individual and Team Work:	☐
4 Investigation:	☐	10 Communication:	☐
5 Modern Tool Usage:	☐	11 Project Management:	☐
6 The Engineer and Society:	☐	12 Lifelong Learning:	☐

Grade	Interpretation
A+	Outstanding
A, A-	Excellent
B+, B, B-	Good
C+, C	Adequate
C-, D+, D	Pass, the student may repeat the course
F	Fail
FA	Fail due to shortage of attendance
I	Incomplete
W	Withdrawn

Grade	Points	Grade	Points
A+	4.00	C+	2.33
A	4.00	C	2.00
A-	3.67	C-	1.67
B+	3.33	D+	1.33
B	3.00	D	1.00
B-	2.67	F	0.00