Sarhad University of Science & Information Technology, Peshawar

Department of Computer Science and IT
Landi Akhun Ahmad, Adjacent Attock Petroleum, Ring Road (Kohat Road-Hayatabad Link), Peshawar
Tel: +92-91-523-0931, 32, & 33 Fax: +92-91-523-0930

Course Code & Title: CS-116T, Programming Fundamentals- (Th)

Credit Hours: 3-0

Course Duration: One Semester

Credit Units: 3

Level: 1st Semester, 1st Year

Prerequisites: None

Course Objectives:

The course is designed to familiarize students with the basic structured programming skills. It emphasizes upon problem analysis, algorithm designing, and program development. The objective of this course is to provide the student with the fundamental knowledge and skills to become a proficient C/C++programmer. After this course, students would be able to;

- Divide a problem into its logical set of components.
- Create a program using programming tools.
- Understand the concept of functions and their usage
- Understand the use of arrays to store lists and tables of values.
- Use pointers and Strings.
- Understand the close relationships among pointers, arrays and strings.

Text Book:

1. The C Programming Language, 2nd Edition by Brian W. Kernighan, Dennis M.Ritchie
2. Object-Oriented Programming using C++ by Tasleem Mustafa

Reference Books:

1. Object-Oriented Programming in C++by Robert Lafore,3rdEdition
2. C++ How to Program by Deitel &Deitel ,5th Edition
3. C How to Program, 7th Edition by Paul Deitel & Harvey Deitel
4. Problem Solving and Program Design in C++, 7th Edition by Jeri R.Hanly & Elliot B.Koffman

Grading Criteria: Mid Term Exam: 30 %

Final Term Exam: 70 %

Course Learning Outcomes:

CLOs	Level of Learning (Bloom's Taxonomy)	GAs
CLO-01 **State** the fundamental concepts of structured programming along with problem solving techniques and analytical thinking.	C1	2
CLO-02 **Demonstrate** an ability to write, debug and execute programs in C++	C3	2
CLO-03 **Apply** loops, conditional statements, arrays, pointers, functions for evaluating and solving computing problems.	C3	4

Course Week Wise Plan with CLOs Mapping

WEEK #	Topics	Assignments / Quizzes	CLO
1	**Problem Solving.** Example problems, Phases of problem solving, Analysis of problem, Identification of Data, Inputs, Process, Output. Ven-Neumann Architecture **Introduction to Programming Languages** High level / Low-level Languages, Introduction to C++,		CLO-01
2	**Solution Design:** Flow Charts, Algorithms, Pseudo Code Development of flowcharts for simple problems. Development of Algorithms/Pseudo Code for simple problems. Solution Verification/ Dry Run Program Development, Compilation. Simple C++ program. Program errors: Syntax / Runtime / Logic errors	Assignment #01	CLO-01
3	**C++ Basics** Keywords, A sample C++ program explained. Basic I/O.(cout, cin) Displaying a message, Formatting a Message, Variables, Integer Data type. Assignment Operator. Arithmetic Operators,	Quiz #01	CLO-02
4	**Solution Program** Conversion of mathematical formula to C++ formula. Operator precedence., Constants, Data Types, Float data. Arithmetic operations in Float. Type casting. Character Data types. Operation on character Datatype	Assignment #02	CLO-02
5	**Control Structures I (Selection)** Increment and Decrement Operator, Relational Operators, Logical Operators and Logical Expressions,		

	Selection: if statement,		CLO-03
6	**Control Structures II (Selection) Cont…** else-if statement, if-else statement, Conditional Operator,		CLO-03
7	**Repetition I** While loop, Syntax, Flow Chart, Examples, Dry Run of code. While with Multiple conditions.do-while loops,		CLO-03
8	**Repetition II** For loop, Syntax, Flow Chart, Examples, Dry Run of code. Variations in For Loop.		CLO-03
9	**Mid-Semester Examination**		
10	**Repetition III** Nested loop, Switch statement Break and Continue Statement		CLO-03
11	**Functions I** Definition, Role of functions, Call and Return. Library functions (Math) User defined functions. Defining a function, Prototype, Calling a function, Passing arguments to functions, Returning values from functions,	Quiz #02	CLO-03
12	**Functions II** Scope rules (local variables, global variables and static variables) Call by value, Call by reference		CLO-03
13	**Arrays Declaration, Initialization,** Accessing and processing one-Dimensional Arrays	Assignment #03	CLO-03
14	**Examples of array.** Stack Implementation. Passing arrays to functions,		CLO-03
15	**Two dimensional Arrays, Strings** Fundamentals of character arrays, array of strings, string manipulation functions	Quiz #03	CLO-03
16	**Structures** Declaring Structures and their variables, Accessing structure members,		CLO-03
17	**Pointers** Fundamentals of pointers Pointer expressions and arithmetic Pointers and Arrays Pointers and Functions		CLO-03
18	**Final Semester Examination**		

Course outlines Theory work:

1. Algorithms

a. Definition

b. Properties

2. Flow charts

a. Types

b. Advantages and disadvantages

3. Pseudo code
a. Rules
b. Designing Algorithm with Pseudo code
c. Advantages and disadvantages of Pseudo code
5. Operators
a. Assignment operators
b. Arithmetic operators
c. Conditional Operators
d. Relational operators
e. Logical Operators
f. Basic Program constructions
6. Control statements
a. Conditional statements
b. Iteration statements
c. Jump statements
7. Arrays
a. Array accessing and declaration
b. One and multi-dimensional arrays
c. Passing values to the Array, with reference and value
d. Character arrays
8. Functions
a. Declaration, calling and definition
b. Passing values to function
9. Library Functions
a. System Defined functions
b. Trigonometric functions
c. Arithmetic functions
d. String functions
e. Conversion functions
10. Structures
a. Declaring Structures and their variables,
b. Accessing structure members,
11. Pointers
a. Data type renaming
b. Declaring pointers
c. Calling a function by reference

Teaching & Learning Activities (TLAs):

Course learning outcomes will be achieved through a combination of the following teaching strategies.

- PowerPoint presentations
- Use of internet & email
- Assignments and Quizzes
- Mid-term major examination
- Presentations

- Final examination

Assessment Tasks, Activities and CLO mapping:

Course learning outcomes will be achieved by using the following assessment tasks and activities.

Mid-term major examination = 30 %
Final comprehensive examination = 70 %

Assessment Tasks & Activities	CLO1	CLO2	CLO3
Mid-term major examination	X	X	X
Final comprehensive examination	X	X	X
Quizzes and homework assignments	X	X	X

Mapping of CLOs with GAs

CLOs / GAs	CLO1	CLO2	CLO3
GA 01 (Academic Education)			
GA 2 (Knowledge for Solving Computing Problems)	X	X	
GA 3 (Problem Analysis)			
GA 4 (Design/ Development of Solutions)			X
GA 5 (Modern Tool Usage)			
GA 6 (Individual and Team Work)			
GA 7			

(Communication)			
GA 8 (Computing Professionalism and Society)			
GA 9 (Ethics)			
GA 10 (Life-long Learning)			