BS(Artificial Intelligence)
Fall-2023
Programming Fundamentals

Course Title: Programming Fundamentals
Course Code: CSC-101
Credit Hours: (3+1)
Course Instructor: Abdul Haseeb Shaikh
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Description:

This is an introductory course to the programming language which is intended for those with little or no programming background. This course provides a conceptual and practical introduction to programming. The focus is on programming rather than the particular choice of programming language, with general principles being brought out through the study of 'C++'. This course will equip students with tools and techniques to implement a given problem programmatically.

Aims and Objectives:

- To gain an understanding of the basic concepts used in Programming.
- Learn to program with one of the most powerful programming languages that exists today, C++.
- Obtain the key concepts of programming that will also apply to other programming languages.
- Learn C++ features from basic to more advanced such as inheritance and polymorphic functions.

Assessment:

S. No	Assessment Activities	Percentage	Total Activities
1.	Sessional: Quizzes/ Assignments (Quizzes & Assignments)	30%	10
2.	Mid Term Exam	30%	1
3.	Final Exam	40%	1

Course Learning Outcomes (CLOs):

No.	Course Learning Outcome	Domain	Level	Assessment Tool
C1	**Understand** the basic problem-solvingsteps and logic constructs	C	2	Class Participation, Quizzes, Mid Exams., Assignments
C2	**Demonstrate** basic programmingconcepts	C	3	Class Activity, Quiz,Assignments
C3	Design and implement algorithms to **solve** real world problems.	C	3	Worksheets, Project

Domains:
C=Cognitive, A=Affective, P=Psychomotor
Levels:
Cognitive = {1: Remembering, 2: Understanding, 3: Applying, 4: Analyzing, 5: Evaluating,
5: Creating}
Affective = {1: Receiving, 2: Responding, 3: Valuing, 4: Organizing, 5: Characterizing}
Psychomotor= {1: Imitation, 2: Manipulation, 3: Precision, 4: Articulation, 5: Naturalization}

Course Outlines:

Weeks	LEC#	SUBTOPICS .	REFERENCE	Course % Covered
Week No: 01	**Lec: 01**	**1.1 Computer System:** ○ Hardware ○ Software ○ Low Level vs High Level Languages ○ Language Translators	**Chapter#01**	**2.08%**
	Lec: 02	**1.2 Programming and Problem Solving:** ○ Algorithms ○ Program Design **1.3 Testing and Debugging:** ○ Kinds of Program Errors	**Chapter#01**	**4.16%**
	Lec: 03	**1.4 Introduction to C++:** ○ Brief History of C++ ○ A sample C++ Program ○ Layout of C++ Program ○ Compiling and running a C++ Program	**Chapter#01**	**6.25%**
Week No: 02	**Lec :04**	**2.1 Variables and Assignments:** ○ Variables ○ Names: Identifiers ○ Variable Declarations ○ Assignment Statement	**Chapter#02**	**8.33%**
	Lec: 05	**2.2 Input and Output:** ○ Output using cout ○ Include Directives and Namespaces	**Chapter#02**	**10.41%**
	Lec: 06	**2.2 Input and Output:** ○ Escape Sequences ○ Input using cin	**Chapter#02**	**12.49%**
Wee	**Lec: 07**	**2.3 Data Types and Expressions:** ○The Types int and double	**Chapter#02**	**14.57%**

		◦ Other Number Types ◦ The Type Char		
	Lec: 08	**2.3 Data Types and Expressions:** ○ The Type bool ○ Introduction to Class String ○ Type Compatibilities	Chapter#02	16.65%
	Lec: 09	**2.3 Data Types and Expressions:** ○ Arithmetic Operators and expressions	Chapter#02	18.73%
Week No: 04	Lec: 10	**2.4 Simple Flow of Controls** ○ A Simple Branching Mechanism ○ Compound Statements ○ Simple Loop Mechanisms	Chapter#02	20.81%
	Lec: 11	**2.4 Simple Flow of Controls:** ○ Increment and decrement operators **2.5 Program Style:** ○ Indenting ○ Comments ○ Naming Constants	Chapter#02	22.89%
	Lec: 12	**3.1 Using Boolean Expressions:** ○ Evaluating Boolean Expressions ○ Enumeration Type	Chapter#03	24.97%
Week No:05	Lec: 13	**3.2 Multiway Branches:** Nested Statements	Chapter#03	27.05%

Week No:06	**Lec: 14,15**	**3.2 Multiway Branches:** ○ Multiway if-else Statements ○ The switch Statement	**Chapter#03**	**31.21%**
	Lec: 16	**3.3 More About C++ Loops:** ○ The while statements ○ Increment and Decrement Operators revisited	**Chapter#03**	**33.29%**
	Lec: 17	**3.3 More About C++ Loops:** ○ The for statement ○ What Kind of Loop to Use ○ The break Statement	**Chapter#03**	**35.37%**
	Lec: 18	**3.4 Designing Loops:** ○ Loops for Sums and Product ○ Ending a Loop	**Chapter#03**	**37.45%**
Week No:07	**Lec: 19**	**3.5 Designing Loops:** ○ Break Statement ○ Continue Statement ○ Debugging a Loop	**Chapter#03**	**39.53%**
	Lec: 20,21	**3.5 Designing Loops:** ○ Use of Nested Loops ○ Nested Loops Exercises	**Chapter#03**	**41.61%**
Week No: 08	**Lec: 22**	**4.1 Top Down Design** **4.2 Predefined Functions:** ○ Using Predefined Functions ○ Random Number Generation ○ Type Casting	**Chapter#04**	**44.71%**
	Lec: 23	**4.3 Programmer Defined Functions:** ○ Function Definition ○ Function That return a Boolean value	**Chapter#04**	**46.81%**

	Lec: 24	○ Function Definition Syntax Summary **4.5 Scope and Local Variables**: ○ The Small Program Analogy ○ Global Constants and Global Variables	**Chapter#04**	**49.91%**
Week No: 09	**Lec: 25**	○ Block Scope ○ Call by Value formal Parameters ○ Factorial Function	**Chapter#04**	**52.00%**
	Lec: 26	**5.1 VOID Functions** **5.2 Call by Reference Parameters** **5.3 Using Procedural Abstraction** ○ Functions calling Function	**Chapter#05**	**54.09%**
	Lec: 29	**7.1 Introduction to Arrays:** ○ Declaring and Defining Arrays ○ Arrays in Memory	**Chapter#07**	**56.18%**
Week No: 10	**Lec: 30**	○ Accessing Array Elements using Index Variable ○ Using Loops to Access Arrays	**Chapter#07**	**58.27%**
	Lec: 31	**7.2 Arrays in Functions**: ○ Indexed Variables as Function Arguments ○ Functions that return an Array	**Chapter#07**	**60.36%**
	Lec: 32	**7.3 Programming with Arrays:** ○ Partially Filled Arrays ○ Searching in Arrays	**Chapter#07**	**62.45%**

	Lec: 33	○ ○ Sorting an Array Practice Excercises	**Chapter#07**	**64.54%**
	Lec: 34,35	**7.4 Multidimensional Arrays**: ○ Multidimensional Array Basics ○ Multidimensional Array Parameters	**Chapter#07**	**70.34%**
Week No: 12	**Lec: 36**	**10.1 Structures:** ○ Structure for Diverse Data	**Chapter#10**	**72.42%**
	Lec: 37	○ Structures as Function Arguments	**Chapter#10**	**74.5%**
	Lec: 38	○ Initializing Structures	**Chapter#10**	**76.58%**
Week No:13	**Lec: 39**	**8.1 An Array Type for Strings:** ○ C string ○ Other functions in <cstring> ○ C-string Input and Output	**Chapter 6 & 8**	**78.66%**
	Lec: 40	**8.2 The Standard String Class:** ○ Introduction to Standard Class string ○ I/O with the Class String	**Chapter 6 & 8**	**80.74%**
	Lec: 41	○ String processing with the Class String ○ Converting between string Objects and C string	**Chapter 6 & 8**	**82.82%**

	Lec: 42	**9.1 Pointers:** Pointer Variables	**Chapter 09**	**84.9%**
	Lec: 43	○ Basic Memory Management ○ Static Variable and Automatic Variables	**Chapter 09**	**86.98%**
	Lec: 44	**9.2 Structures:** ○ Defining Structures ○ Using Structures ○ Creating Member Variables	**Chapter 09**	**90%**
Week No:15	**Lec: 45**	○ 3	**Geeksforgeeks.org**	**93%**
	Lec: 46,47	**Filing in practice:** ○ Opening a file ○ Reading from a file ○ Writing Data to a file	**Geeksforgeeks.org**	**100%**
Week No: 16		**REVISION**		

Text Books:

1. Problem Solving with C++ 10$_{th}$ edition by Walter Savitch- Pearson Prentice-Hall
2. Beginning Programming with C++ for Dummies by Stephen R. Davis
3. C++ for Dummies by Stephen R. Davis

Reference Boo

Books:
1. Programming: Principles and Practice using C++ by Bjarne Stroustrup
2. C++ How to Program Deitel & Deitel- Pearson Prentice-Hall

Web Tutorials:
- https://www.cplusplus.com/doc/tutorial/
- https://www.geeksforgeeks.org/c-plus-plus/
- https://www.w3schools.com/CPP/default.asp

Online C++ Compilers:
- https://www.onlinegdb.com/online_c++_compiler
- https://www.programiz.com/cpp-programming/online-compiler/
- https://onecompiler.com/cpp
- http://cpp.sh/