Course Title	Programming Fundamentals Lab	**Course Code**	CL1002
Department	Department of Electrical Engineering (DEE)	**Campus**	Lahore
Knowledge Profile	Mathematics & Computing (WK2)	**Credit Hrs.**	1
Knowledge Area	Computer Science (KA02)	**Grading Scheme**	To be announced by instructor
HEC Knowledge Area	Computing	**Applicable From**	Fall 2023
Pre-requisite(s)	-		

Course Objective	The course is designed as an introductory course on programming, using the imperative core of C++ programming language. The students will learn basic problem solving and algorithm development skills and use them to implement basic C++ programs.

No.	Assigned Program Learning Outcome (PLO)
3	An ability to design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.
4	An ability to investigate complex engineering problems in a methodical way including literature survey, design and conduct of experiments, analysis and interpretation of experimental data, and synthesis of information to derive valid conclusions.
5	An ability to create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modeling, to complex engineering activities, with an understanding of the limitations.
9	An ability to work effectively, as an individual or in a team, on multifaceted and /or multidisciplinary settings

CP = Class Participation, L= Lab, PR = Project Report, PQ = Project Quiz, Q = Quiz, PD = Project Demonstration.

No.	Lab Learning Outcome (LLO) Statements	Assessment Tools	Taxonomy Levels	PLO
1	Display active individual / team work and high ethical standards.	CP1-CP12	A5	9
2	Practice experiments under supervision to acquire the required data/results using modern tools.	L1-L12	P3	5
3	Apply the knowledge of subject in the lab environment.	PR, PQ, Q1	C3	4
4	Build a product or system meeting the requirements.	PD, Q2	P5	3

Text Books	**Title**	C++ Programming: From Problem Analysis to Program Design, 8th Edition
	Author	D.S. Malik
	Publisher	Cengage Learning
Reference Books	**Title**	C++ How to Program, 8th Edition
	Author	Dietel and Dietel
	Publisher	Pearson

Week	Course Contents/Topics	Chapter	LLO
01	Introduction to Visual Studio 2012		1, 2
02	Basic Data Types and Variable Declaration		1, 2
03	Data Types, Variable Declaration and Arithmetic Operators		1, 2
04	I/O and File Streams		1, 2
05	Control Structures: If-else statement & Operators		1, 2
06	Nested – if and switch structure		1, 2
07	Control Structures: Loops (while & for)		1, 2
08	Nested Control Structures		1, 2
09	C++ Functions		1,2
10	Value and Reference parameters in Functions		1, 2
11	Introduction to arrays		1, 2
12	Function and arrays		1, 2
13-14	Project		3, 4

Assessment Tools	Weightage
Class Participation	10%
Lab Work	40%
Quiz	20%
Project (Quiz, Report, Demonstration)	5%+5%+20 %