COURSE DESCRIPTION FORM

INSTITUTION National University of Computers and Emerging Sciences

BS Computer Science

PROGRAM (S) TO BE EVALUATED

A. Course Description

(Fill out the following table for each course in your computer science curriculum. A filled-out form should not be more than 2-3 pages.)

Course Code	CS1002
Course Title	Programming Fundamentals
Credit Hours	3+1
Prerequisites by Course(s) and Topics	None
Assessment Instruments with Weights (homework, quizzes, midterms, final, programming assignments, lab work, etc.)	**Mid-1:15** **Mid-2:15** **Assignment: 10 (Three Assignments)** **Quizzes: 10 (Three Quizzes)** **Final:50**
Course Coordinator	Muhammad Shahzad
URL (if any)	
Current Catalog Description	
Textbook (or **Laboratory Manual** for Laboratory Courses)	Name: C How to Program with an Introduction to C Global Edition - 7th Edition Authors: Paul Deitel, Harvey Deitel Publisher: Pearson Name: Problem Solving and Program Design in C - 7th Edition Authors: Maureen Sprankle , Jim Hubbard Publisher: Prentice Hall
Reference Material	Name: Working with C / Let us C

	Author(s): YashwantKanetkar Publisher: BPB Publications Name: Waite Group's Turbo C - Programming for the PC Authors: Robert Lafore Publisher: SAMS
Course Goals	

A. Course Learning Outcomes (CLOs)	Level
CLO 1: Describe fundamental concepts of structured and procedural programming, use pseudo-codes and simple programs to understand control structures, iterative structures and functions using C language.	**C3, PLO1**
CLO 2: Examine code writing, compiling, debugging and program execution.	**C3, PLO5**
CLO 3: Justify problem solving techniques and analytical thinking by identifying the concepts and properties of algorithms.	**C5, PLO2**
CLO 4: Design basic problems of the real world through small/medium size programs given as course projects.	**C6, PLO5**

B. Program learning outcomes (PLO)			
PLO 1	Computing Knowledge	Apply knowledge of mathematics, natural sciences, computing fundamentals, and a computing specialization to the solution of complex computing problems.	✔
PLO 2	Problem Analysis	Identify, formulate, research literature, and analyse complex computing problems, reaching substantiated conclusions using first principles of mathematics, natural sciences, and computing sciences.	✔
PLO 3	Design/Develop Solutions	Design solutions for complex computing problems and design systems, components, and processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.	
PLO 4	Investigation& Experimentation	Conduct investigation of complex computing problems using research-based knowledge and research-based methods	
PLO 5	Modern Tool Usage	Create, select, and apply appropriate techniques, resources and modern computing tools, including	✔

		prediction and modelling for complex computing problems.	
PLO 6	Society Responsibility	Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal, and cultural issues relevant to context of complex computing problems.	
PLO 7	Environment and Sustainability	Understand and evaluate sustainability and impact of professional computing work in the solution of complex computing problems	
PLO 8	Ethics	Apply ethical principles and commit to professional ethics and responsibilities and norms of computing practice.	
PLO 9	Individual and Team Work	Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.	
PLO 10	Communication	Communicate effectively on complex computing activities with the computing community and with society at large.	
PLO 11	Project Management and Finance	Demonstrate knowledge and understanding of management principles and economic decision making and apply these to one's own work as a member or a team.	
PLO 12	Life Long Learning	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological changes.	

C. Relation between CLOs and PLOs
(CLO: Course Learning Outcome, PLOs: Program Learning Outcomes)

		PLOs											
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CLOs	1	✔											
	2					✔							
	3		✔										
	4					✔							

Topics Covered in the Course, with Number of Lectures on Each Topic (assume 15-week instruction and one-hour lectures)

Week	Topics	CLO	Assessment
Week 1	Discussion of the course outline, Introduction to problem solving, what is algorithm, how to write pseudo code, programming structures, problem solving with the sequential structures and, Basic Flowchart, IPO and PAC	**1**	
Week 2	Problem solving with decisions and iterative structures, Basic Computer Organization, Intro to IDE (compiled program, text editors, debuggers, etc.), Program structure and Execution, First Program with Input and Output	**1,2**	***Project Announcement***
Week 3	1. Constant, Variables, Keywords, Escape sequence 2. Format Specifiers, Data types, Data manipulation 3. Library, Linking, Compiling & Loading	**2,3**	***Quiz no 1*** ***Assignment 1 Friday Release Week 3***
Week 4	1. Decision Control Structures: If statements and if-else statement 2. Basic switch statements 3. Some working examples	**2,3**	
Week 5	1. Nested if statements & switch statements 2. Logical & Conditional Operators 3. Working examples	**2,3,5**	***Assignment 1 submission Monday Week 5*** ***Quiz no 2***
Week 6	**MID I Examination**		
Week 7	1. Introduction to Loops Design 2. For, while and do-while loops 3. Some working examples	**2,3,5**	***Assignment 2 Friday Release Week 7***
Week 8	1. Nested Loops 2. Break and Continue Statement 3. Working examples	**2,3,4,5**	

Week 9	1. Introduction to 1D Arrays 2. Multiple subscripted arrays 3. Working examples	**2,3,4,5**	***Assignment 2 submission Monday Week 9*** ***Quiz no 3***
Week 10	1. Functions: Declaration, Definition and Calling, passing values to functions, Passing arrays to functions 2. Standard library string functions 3. 2D array of characters	**2,3,4,5**	
Week 11	**MID II Examination**		
Week 12	1. Recursion 2. Introduction to Structures and Structure array 3. Working examples	**3,4,5**	***Assignment 3 Friday Release Week 12***
Week 13	1. Nested structures, Passing structure function 2. Filing in C 3. Introduction to pointers	**3,4,5,6**	
Week 14	1. Pointers and Arrays 2. Dynamic memory allocation 3. Void pointers 4. Examples	**2,3,4,5, 6**	***Assignment 3 submission Monday Week 14***
Week 15	**Revision**	**3,5**	***Project Submissions in 12th LAB and Finalization of Sessional marks***
Week 16	**Final Exam**		

Week 1	Problem solving with sequential structure using Scratch		
Week 2	Problem solving with the decision and iterative structures using Scratch		

Laboratory Projects/Experiments Done in the Course	**Week 3**	Introduction to IDE and Basic Programming Constructs		***Announce Project***
	Week 4	Introduction of operators and math.h library functions		
	Week 5	Basic Decision Structure (if, if- else and Switch Statements)		
	Week 6	**THEORY MID I Examination**		
	Week 7	Nested Decision Structures		
	Week 8	Iterative Statements in C		
	Week 9	**Lab Mid**		
	Week 10	Nested Iterations, Arrays Multiple Dimension Array (2D,3D) in C		
	Week 11	**THEORY MID II Examination**		
	Week 12	Functions, Strings and Recursion		
	Week 13	Introduction to Structures & Nested Structure		
	Week 14	Introduction to file processing and basic operations on files and Introduction to Pointers		
	Week 15	Accessing Arrays using pointer Dynamic Memory Management		
	Week 16	**Project Submission**		

Programming Assignments Done in the Course	Assignment related to Functions, Arrays, Pointers, Structures, Dynamic Memory and File Processing will be done			
Class Time Spent on (in credit hours)	**Theory**	**Problem Analysis**	**Solution Design**	**Social**
	15%	50%	30%	5%
Oral and Written Communications	Every student is required to submit at least _1_ written reports of typically _2_ pages and to make _1_ oral presentations of typically _10_ minute's duration. Include only material that is graded for grammar, spelling, style, and so forth, as well as for technical content, completeness, and accuracy.			

Instructor Name _ ____

Instructor Signature _____

Date _____