National Computing Education Accreditation Council
NCEAC

COURSE DESCRIPTION FORM

INSTITUTION FAST School of Computing, National University of Computer and Emerging Sciences, Islamabad

PROGRAM(S) TO BE EVALUATED **BS-CS FALL 2025**

Course Description

<table>
<tr><td><b>Course Code</b></td><td>CS-1002</td></tr>
<tr><td><b>Course Title</b></td><td>Programming Fundamentals</td></tr>
<tr><td><b>Credit Hours</b></td><td>3+1</td></tr>
<tr><td><b>Prerequisites by Course(s) and Topics</b></td><td>N/A</td></tr>
<tr><td><b>Grading Policy</b></td><td>Absolute grading</td></tr>
<tr><td><b>Policy about missed assessment items in the course</b></td><td>Retake of missed assessment items (other than Sessionals / final exam) will not be held. For a missed Sessionals/ final exam, an exam retake/ pretake application along with necessary evidence are required to be submitted to the department secretary. The examination assessment and retake committee decides the exam retake/ pretake cases.</td></tr>
<tr><td><b>Policy about late submission of assessment item</b></td><td>Penalties for late submissions of assignment/project:
1. Up to 30 mins late, loss of 40% of the mark awarded.
2. After 30 mins, assignment/project will not be accepted for marking.</td></tr>
<tr><td><b>Course Plagiarism Policy</b></td><td>Plagiarism in project or Sessionals or final exam may result in F grade in the course.
Plagiarism in any assessment item will result in zero marks in the whole assessment category for both students.</td></tr>
<tr><td><b>Assessment Instruments with Weights</b> (homework, quizzes, midterms, final, programming assignments, lab work, etc.)</td><td>Assessment items of Theory Part
<table>
<tr><th>Assessment Item</th><th>Number</th><th>Weight (%)</th></tr>
<tr><td>Assignments</td><td>3</td><td>8</td></tr>
<tr><td>Sessional - I</td><td>1</td><td>10</td></tr>
<tr><td>Sessional - II</td><td>1</td><td>15</td></tr>
<tr><td>Quizzes</td><td>>= 5</td><td>12</td></tr>
<tr><td>Project</td><td>1</td><td>15</td></tr>
<tr><td>Final Exam</td><td>1</td><td>40</td></tr>
</table></td></tr>
<tr><td><b>Course Instructors</b></td><td>Dr. Faisal Cheema, Mrs. Nirmal Tariq, Mr. Shehreyar Rashid</td></tr>
<tr><td><b>Lab Instructors (if any)</b></td><td></td></tr>
<tr><td><b>Course Coordinator</b></td><td>Dr. Faisal Cheema</td></tr>
<tr><td><b>URL (if any)</b></td><td><b>Class Link:</b> https://classroom.google.com/c/Nzc0MzAxNzM1NTY4?cjc=sjlkogg5</td></tr>
</table>

	Class code: sjlkogg5
Current Catalog Description	The course aims to equip students with the basic computing concepts and to provide them the ability to analyze the given requirements for solving problems in different domains while implementing the solutions on a computer system. It emphasizes on developing an algorithm and applying the basic programming constructs like control structures, arrays, functions, pointers, dynamic memory allocation, etc. for its development. The students will learn the syntax of the C++ programming language for the implementation.
Textbook (or **Laboratory Manual** for Laboratory Courses)	Tony Gaddis "STARTING OUT WITH C++" 9th Edition
Reference Material	Paul Deitel, Harvey Deitel "C++ How to Program" 10th Edition Walter Savitch "Problem Solving with C++" 10th Edition

Course Learning Outcomes

A. Course Learning Outcomes (CLOs)

At the end of the course the students will be able to:

1. Demonstrate the basic concepts of programming. (3) (2)
2. Apply algorithmic solutions related to the degree program to recent related problems (3) (3)
3. Develop projects as per given specifications and requirements. (6) (4)

B. Program Learning Outcomes

For each attribute below, indicate whether this attribute is covered in this course or not. Leave the cell blank if the enablement is little or non-existent.

1.	**Academic Education**	Completion of an accredited program of study designed to prepare graduates as computing professionals
2.	**Knowledge for Solving Computing Problems**	Apply knowledge of computing fundamentals, knowledge of a computing specialization, and mathematics, science, and domain knowledge appropriate for the computing specialization to the abstraction and conceptualization of computing models from defined problems and requirements
3.	**Problem Analysis**	Identify, formulate, research literature, and solve complex computing problems reaching substantiated conclusions using fundamental principles of mathematics, computing sciences, and relevant domain disciplines
4.	**Design/ Development of Solutions**	Design and evaluate solutions for complex computing problems, and design and evaluate systems, components, or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations
5.	**Modern Tool Usage**	Create, select, adapt and apply appropriate techniques, resources, and modern computing tools to complex computing activities, with an understanding of the limitations
6.	**Individual and Team Work**	Function effectively as an individual and as a member or leader in diverse teams and in multi-disciplinary settings
7.	**Communication**	Communicate effectively with the computing community and with society at large about complex computing activities by being able to comprehend and write effective reports, design documentation, make effective presentations, and give and understand clear instructions
8.	**Computing Professionalism and Society**	Understand and assess societal, health, safety, legal, and cultural issues within local and global contexts, and the consequential responsibilities relevant to professional computing practice
9.	**Ethics**	Understand and commit to professional ethics, responsibilities, and norms of professional computing practice
10.	**Life-long Learning**	Recognize the need, and have the ability, to engage in independent learning for continual development as a computing professional

C. Mapping of CLOs on PLOs
(CLO: Course Learning Outcome, PLOs: Program Learning Outcomes)

		GAs									
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
CLOs	1		✓								
	2			✓							
	3				✓						

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

List of Topics	No. of Weeks	Contact Hours	CLOs
- Introduction, Problem-solving, Basic flowchart, block diagram, and programming languages. - Primitive data types, input/output (hello world). - Signed and unsigned data types, constants and variables.	**2**	**3**	**1**
- Arithmetic operators (+, -, *, /, %) and their compound counterparts) with their associativity and precedence. - Bit wise operators	**1.5**	**4.5**	**1**
- Conditional/selection structures. - Comparison and logical operators. - if, if. . .else and if else if structure. - Switch statement, break statement. - Ternary operator.	**1.5**	**4.5**	**1,2**
1st Sessional Examination			
- Repetition structures. - Pre/post increment/decrement operators. - while loop (sentinels + condition). - Loop with *for.* - Loop with *do-while.* - Nesting of *while*, *for* loop and *continue* statement.	**3**	**9**	**1,2**
- Function prototypes, definition, and calling.	**1**	**3**	**1,2**
- Introduction to Arrays. - Array initialization and representation. - Char arrays. - Multi-Dimensional Arrays (MDA). - MDA representation in memory.	**2.33**	**7**	**1,2**
2nd Sessional Examination			
- Aliases, parameters passing by value and by reference (passing arrays). - Function calling order and stack (function within a function). - Recursion	**1.66**	**5**	**2,3**
- Pointers. - const. vs. non-const. pointers, a pointer to const. data vs. a pointer to non-constant data. - Using pointers. - Dynamic memory allocation. - Array of pointers.	**2**	**6**	**2,3**
Total	**15**	**45**	

Laboratory Projects/Experiments Done in the Course	Yes, there are lab tasks with every lab of three hours.			
Programming Assignments Done in the Course	Yes, there are six programming assignments and a project.			
Class Time Spent (in hours)	**Theory**	**Problem Analysis**	**Solution Design**	**Social and Ethical Issues**
	34	5	5	1
Oral and Written Communications	Every student is required to submit at least __1___ written reports of typically ___5__ pages and to make __1___ demonstration of typically ____10___ minutes duration.			