



Aror University of Art, Architecture, Design & Heritage Sukkur.

BS (AI, MMG, Cyber Security)

Fall-2025

Programming Fundamentals

Course Title: Programming Fundamentals
Course Code: CSC-121
Credit Hours: (3+1)
Course Instructor: Mir Faraz Ali
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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:

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| • 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. |



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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-solving steps and logic constructs	C	2	Class Participation, Quizzes, Mid Exams., Assignments
C2	Demonstrate basic programming concepts	C	3	Class Activity, Quiz, Assignments
C3	Design and implement algorithms to solve real world problems.	C	3	Worksheets, Project



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Course Outlines:

Weeks	LEC#	SUBTOPICS	REFERENCE	Course% Covered
Week No: 01	Lec: 01	1.1 Computer System: <ul style="list-style-type: none"> ○ Hardware ○ Software ○ Low Level vs High Level Languages ○ Language Translators 	Chapter#01	2.08%
	Lec: 02	1.2 Programming and Problem Solving: <ul style="list-style-type: none"> ○ Algorithms ○ Program Design 1.3 Testing and Debugging: <ul style="list-style-type: none"> ○ Kinds of Program Errors 	Chapter#01	4.16%
	Lec: 03	1.4 Introduction to C++: <ul style="list-style-type: none"> ○ 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: <ul style="list-style-type: none"> ○ Variables ○ Names: Identifiers ○ Variable Declarations ○ Assignment Statement 	Chapter#02	8.33%
	Lec: 05	2.2 Input and Output: <ul style="list-style-type: none"> ○ Output using cout ○ Include Directives and Namespaces 	Chapter#02	10.41%
	Lec: 06	2.2 Input and Output: <ul style="list-style-type: none"> ○ Escape Sequences ○ Input using cin 	Chapter#02	12.49%



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Week No: 03	Lec: 07	2.3 Data Types and Expressions: ◦ The Types int and double ◦ Other Number Types ◦ The Type Char	Chapter#02	14.57%
	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%



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	Lec: 14,15	3.2 Multiway Branches: <ul style="list-style-type: none"> Multiway if-else Statements The switch Statement 	Chapter#03	31.21%
Week No:06	Lec: 16	3.3 More About C++ Loops: <ul style="list-style-type: none"> The while statements Increment and Decrement Operators revisited 	Chapter#03	33.29%
	Lec: 17	3.3 More About C++ Loops: <ul style="list-style-type: none"> The for statement What Kind of Loop to Use The break Statement 	Chapter#03	35.37%
	Lec: 18	3.4 Designing Loops: <ul style="list-style-type: none"> Loops for Sums and Product Ending a Loop 	Chapter#03	37.45%
Week No:07	Lec: 19	3.5 Designing Loops: <ul style="list-style-type: none"> Break Statement Continue Statement Debugging a Loop 	Chapter#03	39.53%
	Lec: 20,21	3.5 Designing Loops: <ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> Using Predefined Functions Random Number Generation Type Casting 	Chapter#04	44.71%
	Lec: 23	4.3 Programmer Defined Functions: <ul style="list-style-type: none"> Function Definition Function That return a Boolean value 	Chapter#04	46.81%



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	Lec: 24	<ul style="list-style-type: none"> Function Definition Syntax Summary 4.5 Scope and Local Variables: <ul style="list-style-type: none"> The Small Program Analogy Global Constants and Global Variables 	Chapter#04	49.91%
Week No: 09	Lec: 25	<ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> Functions calling Function 	Chapter#05	54.09%
	Lec: 29	7.1 Introduction to Arrays: <ul style="list-style-type: none"> Declaring and Defining Arrays Arrays in Memory 	Chapter#07	56.18%
Week No: 10	Lec: 30	<ul style="list-style-type: none"> Accessing Array Elements using Index Variable Using Loops to Access Arrays 	Chapter#07	58.27%
	Lec: 31	7.2 Arrays in Functions: <ul style="list-style-type: none"> Indexed Variables as Function Arguments Functions that return an Array 	Chapter#07	60.36%
	Lec: 32	7.3 Programming with Arrays: <ul style="list-style-type: none"> Partially Filled Arrays Searching in Arrays 	Chapter#07	62.45%



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Week No: 11	Lec: 33	<ul style="list-style-type: none"> ○ Sorting an Array ○ Practice Exercises 	Chapter#07	64.54%
	Lec: 34,35	7.4 Multidimensional Arrays: <ul style="list-style-type: none"> ○ Multidimensional Array Basics ○ Multidimensional Array Parameters 	Chapter#07	70.34%
Week No: 12	Lec: 36	10.1 Structures: <ul style="list-style-type: none"> ○ Structure for Diverse Data 	Chapter#10	72.42%
	Lec: 37	<ul style="list-style-type: none"> ○ Structures as Function Arguments 	Chapter#10	74.5%
	Lec: 38	<ul style="list-style-type: none"> ○ Initializing Structures 	Chapter#10	76.58%
Week No:13	Lec: 39	8.1 An Array Type for Strings: <ul style="list-style-type: none"> ○ C string ○ Other functions in <cstring> ○ C-string Input and Output 	Chapter 6 & 8	78.66%
	Lec: 40	8.2 The Standard String Class: <ul style="list-style-type: none"> ○ Introduction to Standard Class string ○ I/O with the Class String 	Chapter 6 & 8	80.74%
	Lec: 41	<ul style="list-style-type: none"> ○ String processing with the Class String ○ Converting between string Objects and C string 	Chapter 6 & 8	82.82%



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Week No: 14	Lec: 42	9.1 Pointers: <ul style="list-style-type: none"> ○ Pointer Variables 	Chapter 09	84.9%
	Lec: 43	<ul style="list-style-type: none"> ○ Basic Memory Management ○ Static Variable and Automatic Variables 	Chapter 09	86.98%
	Lec: 44	9.2 Structures: <ul style="list-style-type: none"> ○ Defining Structures ○ Using Structures ○ Creating Member Variables 	Chapter 09	90%
Week No:15	Lec: 45	File Handling: <ul style="list-style-type: none"> ○ Different classes for file Handling 	Geeksforgeeks.org	93%
	Lec: 46,47	Filing in practice: <ul style="list-style-type: none"> ○ Opening a file ○ Reading from a file ○ Writing Data to a file 	Geeksforgeeks.org	100%
Week No: 16	REVISION			



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Text Books:

1. Problem Solving with C++ 10th 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 Book

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/>