



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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| <ul style="list-style-type: none">• To gain an understanding of the basic concepts used in Programming. |
| <ul style="list-style-type: none">• Learn to program with one of the most powerful programming languages that exists today, C++. |
| <ul style="list-style-type: none">• Obtain the key concepts of programming that will also apply to other programming languages. |
| <ul style="list-style-type: none">• 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: <ul style="list-style-type: none">◦ The Types int and double◦ Other Number Types◦ The Type Char	Chapter#02	14.57%
	Lec: 08	2.3 Data Types and Expressions: <ul style="list-style-type: none">◦ The Type bool◦ Introduction to Class String◦ Type Compatibilities	Chapter#02	16.65%
	Lec: 09	2.3 Data Types and Expressions: <ul style="list-style-type: none">◦ Arithmetic Operators and expressions	Chapter#02	18.73%
Week No: 04	Lec: 10	2.4 Simple Flow of Controls <ul style="list-style-type: none">◦ A Simple Branching Mechanism◦ Compound Statements◦ Simple Loop Mechanisms	Chapter#02	20.81%
	Lec: 11	2.4 Simple Flow of Controls: <ul style="list-style-type: none">◦ Increment and decrement operators 2.5 Program Style: <ul style="list-style-type: none">◦ Indenting◦ Comments◦ Naming Constants	Chapter#02	22.89%
	Lec: 12	3.1 Using Boolean Expressions: <ul style="list-style-type: none">◦ Evaluating Boolean Expressions◦ Enumeration Type	Chapter#03	24.97%
Week No:05	Lec: 13	3.2 Multiway Branches: <ul style="list-style-type: none">◦ Nested Statements	Chapter#03	27.05%



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Week No:06	Lec: 14,15	3.2 Multiway Branches: <ul style="list-style-type: none">○ Multiway if-else Statements○ The switch Statement	Chapter#03	31.21%
	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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Week No: 09	Lec: 24	<ul style="list-style-type: none">○ Function Definition Syntax Summary <p>4.5 Scope and Local Variables:</p> <ul style="list-style-type: none">○ The Small Program Analogy○ Global Constants and Global Variables	Chapter#04	49.91%
	Lec: 25	<ul style="list-style-type: none">○ Block Scope○ Call by Value formal Parameters○ Factorial Function	Chapter#04	52.00%
	Lec: 26	<p>5.1 VOID Functions</p> <p>5.2 Call by Reference Parameters</p> <p>5.3 Using Procedural Abstraction</p> <ul style="list-style-type: none">○ Functions calling Function	Chapter#05	54.09%
	Lec: 29	<p>7.1 Introduction to Arrays:</p> <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	<p>7.2 Arrays in Functions:</p> <ul style="list-style-type: none">○ Indexed Variables as Function Arguments○ Functions that return an Array	Chapter#07	60.36%
	Lec: 32	<p>7.3 Programming with Arrays:</p> <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/>