

GANPAT UNIVERSITY										
FACULTY OF ENGINEERING & TECHNOLOGY										
Programme	Bachelor of Technology				Branch/Spec.		Computer Science and Engineering			
Semester	I				Version		1.0.0.0			
Effective from Academic Year	2026-27				Effective from the batch admitted in		July 2026			
Course Code	2ESC1121				Course Name		Computer Programming with C++			
Course Category	Engineering Science Course (ESC)									
Teaching & Learning Scheme							Examination scheme (Marks)			
	L	TU	P	Total	SL	TSL		CE	SEE	Total
Credit	3	0	1	4	30	90	Theory	50	50	100
Hours (per week)	3	0	2	5			Practical	25	25	50
L: Lecture, TU: Tutorial, P: Practical/Lab., SL: Minimum Self-Learning or Term Work Hours per Semester, TSL: Minimum Total Teaching & Self-Learning Hours per Semester, CE: Continuous Evaluation, SEE: Semester End Examination.										
Pre-requisites:										
Basic knowledge of Computer										
Course Outcomes										
COs	Description									
CO1	Explain the fundamentals of C programming and object-oriented programming concepts.									
CO2	Develop C++ programs using classes, objects, and object-oriented programming principles.									
CO3	Apply file handling, exception handling, and dynamic memory management techniques in C++.									
CO4	Develop generic and reusable programs using templates and the Standard Template Library.									
Theory Syllabus										
Unit	Content									Hours
1	Introduction of Programming: History of programming languages, Types of programming, Flow chart and Algorithms									3
2	Introduction to Object-Oriented Programming: Evolution of OOP, POP vs OOP, features of OOP, tokens, identifiers, keywords, data types, variables, constants, input/output statements, C++ compiler and program structure, operators, arrays and strings, decision-making statements, control structures									10
3	Advanced Object-Oriented Concepts: Classes and objects, encapsulation, data hiding, abstraction, inheritance and its types, polymorphism (function overloading and operator overloading), constructors and destructors, this pointer, access modifiers									10
4	File Handling and Exception Handling: Functions, file handling operations, file streams, exception handling mechanism (try-throw-catch blocks)									9
5	Memory Management: Static and dynamic memory allocation, new and delete operators, memory leaks, dangling pointers, smart memory usage, dynamic objects and arrays.									7
6	Generic Programming: Function templates, class templates, template specialization, generic programming concepts, introduction to STL containers, iterators, and algorithms.									6
Practical and Self Learning Content										

Practical, assignments, quiz, industrial visit, field survey and tutorials are based on the above syllabus.

Text Books

1	Object Oriented Programming with C++ by E. Balagurusamy
2	The C++ Programming Language by Bjarne Stroustrup
3	Programming Principles and Practice Using C++ by Bjarne Stroustrup

Reference Books

1	Object-Oriented Programming in C++ – Robert Lafore
2	C++ Primer (5th Edition) – Stanley B. Lippman, Josée Lajoie, Barbara E. Moo
3	Effective C++ – Scott Meyers
4	Data Structures Using C++ – D.S. Malik
5	Programming with C++ – Ravichandran D.

ICT/MOOCs Reference

1	NPTEL – Programming in C++ by IIT Kharagpur
2	NPTEL – Programming, Data Structures and Algorithms using C++
3	SWAYAM – Object-Oriented Programming using C++
4	Microsoft Learn – Introduction to C++
5	LearnCpp (www.learncpp.com)

Mapping of COs, POs, and PSOs

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PSO 1	PSO 2	PSO 3
CO1	3	2	0	0	1	0	0	0	0	0	0	3	1	0
CO2	3	3	2	0	2	0	0	0	0	0	0	3	3	1
CO3	2	3	3	2	3	0	0	0	0	0	0	2	3	2
CO4	2	2	3	1	3	0	0	0	0	0	0	2	3	3

Bloom's Taxonomy Level

Unit	Unit Title	Aligned COs	Learning Hours	BTL Level
1	Introduction of Programming	CO1	7	R, U
2	Introduction to Object-Oriented Programming	CO1, CO2	8	U, A
3	Advanced Object-Oriented Concepts	CO2	9	A, N
4	File Handling and Exception Handling	CO3	8	A, N
5	Memory Management	CO3	7	A, N
6	Generic Programming	CO4	6	N, E, C

Note:

- Version 1.0.0.0 (First Digit= New syllabus/Revision in Full Syllabus, Second Digit=Revision in Teaching Scheme, Third Digit=Revision in Exam Scheme, Forth Digit= Content Revision)
- 1 Hour Lecture = 1 Credit, 1 Hour Tutorial = 1 Credit, 2 Hours Practical = 1 Credit, 2 Hours Internship/Project/Seminar = 1 Credit
- As per NCeF/NEP 2020, Minimum Self-Learning or Term Work Hours per Semester should be calculated in such a way that 1 Credit should have minimum 30 Hours of Teaching and Self Learning Engagement per semester
- Bloom's Taxonomy Level (BTL) : R: Remember, U: Understand, A: Apply, N: Analyze, E: Evaluate, and C: Create