C++ Programming & Virtual Robotics

Learn programming, logic building, object-oriented concepts, and virtual robotics through hands-on projects, Arduino simulations, and real-world automation systems.

■ **Coding Fundamentals** Learn C++ step-by-step	■ **Robotics Projects** Arduino & TinkerCAD simulations
■ **Logic Building** Games, loops & problem solving	■ **Final Showcase** Build complete robotics systems

Curriculum Roadmap

1. C++ Fundamentals

- Hello World
- Variables & Data Types
- Input/Output
- Profile Generator

2. Operators & Logic

- Arithmetic operators
- Logical expressions
- Console calculator

3. Decision Making

- If-Else
- Nested conditions
- Eligibility checker

4. Advanced Logic

- Ternary operator
- Random numbers
- Simple games

5. Loops & Patterns

- For & While loops
- Nested loops
- Palindrome checker

6. Functions

- Function creation
- Parameters
- Calculator project

7. Advanced Functions

- Function overloading
- Recursion basics

8. Arrays & Data Handling

- Arrays
- Searching
- Marks analyzer

9. Memory Concepts	• Pointers • References • Efficient data handling
10. Object-Oriented Programming	• Classes & Objects • Constructors • Student system
11. Advanced OOP	• Inheritance • Polymorphism • Smart system simulation
12. Virtual Robotics	• TinkerCAD basics • Arduino + C++ • LED control
13. Digital Systems	• Output control • Traffic light system
14. Sensors & Automation	• Light & temperature sensors • Night lamp
15. Intelligent Systems	• millis() • Event-based logic • Security systems
16. Actuators & Control	• PWM control • Servo motors • Smart control
17. Robotics Logic Systems	• Distance sensing • Obstacle logic

18. Advanced Robotics Simulation	• Queue systems • Elevator simulator
19. Capstone Projects	• Smart automation systems • Combine sensors & logic
20. Final Showcase	• Complete robotics system • Testing & presentation

Learning Outcomes

- Build strong C++ programming foundations
- Develop logical thinking and problem-solving skills
- Learn object-oriented programming concepts
- Create robotics simulations using Arduino and TinkerCAD
- Build automation and intelligent robotics systems

Code • Build • Simulate • Innovate