

MATH & CODING BOOTCAMP

Goal: Use Python programming to strengthen mathematical thinking, logic, problem-solving, and computational skills.

Module 1: Introduction to Coding & Computational Thinking

- What is programming?
- Algorithms and step-by-step thinking
- Flowcharts and pseudocode
- Variables and data types
- Writing the first Python program
- Using Python as a mathematical calculator

Activity: Create a simple mathematical calculator.

Module 2: Python Fundamentals

- Numbers and strings
- Variables
- Input and output
- Arithmetic operators
- Comparison and logical operators
- Type conversion

Activity: Build a student marks/percentage calculator.

Module 3: Mathematical Operations with Python

- Addition, subtraction, multiplication and division
- Powers and roots
- Remainders
- Order of operations
- Average, percentage and ratio
- Area and perimeter calculations

Project: Geometry Calculator.

Module 4: Conditions & Logical Thinking

- if, elif and else
- Boolean logic
- Comparing numbers
- Even/odd numbers
- Positive/negative numbers
- Decision-making programs

Project: Number Classification Program.

Module 5: Loops & Patterns

- for loops
- while loops
- Counting
- Repeated calculations
- Number sequences
- Multiplication tables
- Pattern generation

Project: Multiplication Table & Number Pattern Generator.

Module 6: Lists & Data

- Introduction to lists
- Adding/removing elements
- Finding maximum and minimum
- Sorting data
- Calculating totals and averages

Project: Student Marks Analyzer.

Module 7: Mathematical Problem Solving

- Prime numbers
- Factors and multiples
- Fibonacci sequence
- Greatest common divisor
- Simple mathematical puzzles
- Algorithmic problem solving

Activity: Build a Mathematical Challenge Game.

Module 8: Functions

- What is a function?
- Creating functions
- Parameters and arguments
- Return values
- Reusing code

Project: Multi-function Math Toolkit.

Module 9: Python & Real-World Mathematics

- Simple interest
- Compound interest
- Distance, speed and time
- Unit conversions
- Probability basics
- Data-based calculations

Project: Personal Finance/Travel Calculator.

Module 10: Capstone Project - Students choose and build one:

- Math Quiz Game
- Geometry Calculator
- Student Performance Analyzer
- Number Puzzle Game
- Budget Calculator

Final Outcome: Students learn to translate mathematical problems into algorithms and working Python programs.