



30-Hours Value Added Course on Logic Building with Python for AI & ML Applications

(CAV-26-02)
(Instructor-led Offline/Online Classes)
Session 2026-27

For
BCA/ MCA Students

Organized By
Department of Computer Application in Association with Integral
University Center for AI Research & Education, Lucknow

Content

Introduction to Logic Building & Python Basics

- Importance of logic in programming and AI/ML
- Introduction to Python: features and applications
- Setting up Python environment (IDE)
- Variables, data types, and basic input/output
- Operators and expressions

Control Structures & Decision Making

- Conditional statements (if, elif, else)
- Nested conditions and logical operators
- Looping constructs (for, while)
- Break, continue, pass statements
- Problem-solving using control flow

Data Structures for Logical Thinking

- Lists, tuples, sets, and dictionaries
- Indexing, slicing, and operations
- Iterating through data structures
- Use cases in data handling for AI/ML
- Practice problems on data manipulation

Functions & Modular Programming

- Defining and calling functions
- Parameters and return values
- Lambda functions
- Recursion and its applications
- Writing modular and reusable code

Object-Oriented Programming (OOPs) in Python

- Introduction to OOP concepts
- Classes and objects
- Attributes and methods
- Constructor (`__init__`)
- Encapsulation and abstraction
- Inheritance and polymorphism
- Real-world examples (e.g., modeling datasets, entities in AI systems)

Problem-Solving & Algorithmic Thinking

- Step-by-step problem-solving approach
- Flowcharts and pseudocode
- Pattern-based problems
- Searching and basic sorting techniques
- Time complexity (basic understanding)

Introduction to AI & ML Concepts

- Overview of AI and Machine Learning
- Types of Machine Learning (Supervised, Unsupervised)
- Role of logic in model building
- Real-world AI/ML applications
- Introduction to datasets

Logic Building in AI/ML using Python

- Data preprocessing basics (cleaning, filtering)
- Conditional logic in data analysis
- Introduction to libraries: NumPy, Pandas
- Simple case studies (e.g., classification logic, decision rules)
- Mini hands-on exercises

Hands-on Practical Sessions

- Hands-on coding sessions
- Assignments after each module
- Mini Project and Capstone submission
- Certificate of Completion

Capstone Project & Certification

- Problem identification a real-world application
- Logic design and implementation using Python
- Basic data analysis or rule-based system
- Presentation and evaluation of AI & ML based prototype
- Team project report and demonstration
- Assessment and feedback