

PYTHON + AI DEVELOPER PROGRAM SYLLABUS

Module 1: Python Programming Fundamentals

- Introduction to Python
- Installing Python and development environment
- Variables and data types
- Operators
- Input and output
- Conditional statements
- Loops
- Functions
- Practical programming exercises

Module 2: Python Data Structures

- Strings
- Lists
- Tuples
- Sets
- Dictionaries
- List and dictionary operations
- Comprehensions
- Working with structured data
- Practical exercises

Module 3: Functions, Modules & Exception Handling

- Advanced functions
- Arguments and return values
- Lambda functions
- Modules and packages
- Importing libraries
- Exception handling

- File handling
- Debugging Python programs

Module 4: Object-Oriented Python

- Classes and objects
- Constructors
- Instance and class methods
- Encapsulation
- Inheritance
- Polymorphism
- Abstraction
- Building reusable Python components

Module 5: Python with Databases

- Database fundamentals
- SQL basics
- SQLite
- MySQL connectivity
- CRUD operations
- Database-driven applications
- Data validation
- Practical database project

Module 6: Python Web Development & APIs

- Introduction to web applications
- HTTP and REST APIs
- JSON
- API requests
- Working with external APIs
- Introduction to Flask/FastAPI concepts
- Building simple API-based applications

Module 7: Git, GitHub & Developer Workflow

- Git fundamentals
- Creating repositories
- Commits and branches
- GitHub
- README files
- Project version control
- Managing Python projects
- Building a professional GitHub portfolio

Module 8: Introduction to Artificial Intelligence

- What is AI?
- Machine Learning vs AI vs Generative AI
- How modern AI systems work
- AI APIs
- AI use cases
- AI limitations
- Responsible AI usage
- Working with AI services

Module 9: Prompt Engineering & AI-Assisted Coding

- Prompt engineering fundamentals
- Role-based prompting
- Context and instructions
- Structured prompts
- AI-assisted programming
- Code generation
- Debugging with AI
- Code explanation and optimization
- Developer productivity with AI

Module 10: Building AI-Powered Python Applications

- Connecting Python with AI APIs
- Text generation
- Summarization
- Classification
- AI chat applications
- AI-powered content generation
- Working with structured AI responses
- Building practical AI features

Module 11: Real-World Python + AI Projects

- AI chatbot
- AI content generator
- Student result/management system
- API-based application
- AI-powered productivity application

Module 12: Deployment, Portfolio & Career

- Project deployment fundamentals
- Environment variables
- Production basics
- GitHub portfolio
- Project documentation
- Resume/project presentation
- Freelancing opportunities
- Interview preparation
- Career roadmap