

A job-focused program covering Python Programming, Data Handling, APIs, LLMs, Prompt Engineering, RAG, AI Agents, and real-time GenAI projects.

This course should take you from Python basics to building real-world Generative AI applications, focusing on hands-on coding, automation, AI integrations, and industry projects.

Couse Outline

- **Module 1: Python Concepts & Programming**
- **Module 2: Python For AI & Data**
- **Module 3: Gen AI Development**
- **Module 4: AI Agents Deployment**
- **Module 5: Realtime Projects**

- ✓ **Duration: 3 Months**
- ✓ **Type: LIVE Online, Interactive.**
- ✓ **100% Practical, Step by Step.**

Students completing the course can build a portfolio relevant to these entry-level or junior roles:

- ✓ **Python Automation Developer**
- ✓ **AI Application Developer**
- ✓ **Generative AI Application Developer**
- ✓ **AI Developer**

DETAILED COURSE CONTENT

Module 1: Python Concepts & Programming

Ch 1: Python Introduction

- ✓ Python Introduction. Python Versions
- ✓ Python Job Roles. Python with AI

Ch 2: Python Architecture

- ✓ Python Architecture. PVM: Python Virtual Machine
- ✓ Compiler, Byte Code. Execution Process
- ✓ Python Implementations

Ch 3: Python Installations

- ✓ Python Installations. Anaconda Installation
- ✓ Python IDE & Usage. Jupyter & PyCharm

Ch 4: Python Print Statement

- ✓ print(), display(). Single Line print()
- ✓ Multi Line print(). Print with Separators

Ch 5: Python Variables

- ✓ Python Variables. Assigning values
- ✓ Purpose & Rules. Variable Value Reads
- ✓ Multiple Variables & Print()

Ch 6: Python Operators

- ✓ Athematic Operators. Python String Literals
- ✓ Single, Double Quotes. Format Strings (f string)
- ✓ Comparison, Indexing Operators

Ch 7: Python Data Types

- ✓ Python Data Types. Integer, Float, String Data Types
- ✓ Type Casting. Type Identification
- ✓ Multi Value Assignments

Ch 8: Python Lists

- ✓ Creating Python Lists. Printing List Items
- ✓ Print List Slices. Length & Type
- ✓ Empty Lists, Append. Loops, List Updates

Ch 9: Python Dictionaries

- ✓ Python Dictionary. Indexing Dictionaries
- ✓ Edit Key Values. Lists inside Dictionaries
- ✓ Delete & Clear

Ch 10: Python Tuples

- ✓ Python Tuples. Length(), Type()
- ✓ Mixed Values in Tuples. Overwriting Tuples

Ch 11: Python IF..ELSE Condition

- ✓ If..Else conditions. if..elif..else & Shorthand if
- ✓ Indent, pass statement. in & negation operators
- ✓ range conditions

Ch 12: Python Loops

- ✓ For Loop @ Range. For Loop @ Sequence Values
- ✓ While Loop, Exit Conditions. Nested Loops. Break, Continue, Paas

Ch 13: Python File Handling

- ✓ File Handling, Activities. Loop, Write, Close Files
- ✓ Appending, Overwriting. import os, path.exists
- ✓ f.open, f.write, f.read, f.close

Ch 14: Python Dataframes

- ✓ Dataframes: Creation. Pandas Dataframes
- ✓ Dataframes From Single List. Dataframes @ Dict, Lists

Ch 15: Python SQL DB Access

- ✓ SQL DB Access with Python. import pandas.DataFrame
- ✓ pyodbc module, sql functions. SQL DB Cursor Connections
- ✓ SQL Query Executions: DDL, DML

Ch 16: Dataframe Transformations - 1

- ✓ Dataframe Transformations. Concat & Append
- ✓ Merge Function. Join with Multiple Dataframes
- ✓ Loops with Dataframes

Ch 17: Dataframe Transformations - 2

- ✓ Pandas - Cleaning Data. Replace, Transform Columns
- ✓ Data Discovery & Column Fill. Identify & Remove Duplicates
- ✓ dropna(), fillna() Functions

Ch 18: Dataframe Transformations - 3

- ✓ Python Functions for date, time. Now() Function in Python
- ✓ date, time Functions. Calendar Data Generation

Ch 19: Python Functions & Lambda

- ✓ Python Functions & Usage. Default & List Parameters
- ✓ Python Lambda Functions. Recursive Functions, Usage
- ✓ Return & Print @ Lamdba

Ch 20: Python Modules

- ✓ Import Python Modules, Built In Modules & dir
- ✓ datetime module in Python. Date Objections Creation
- ✓ strftime Method & Usage. imports & datetime.now()

Ch 21: Python User Inputs & TRY

- ✓ Try Except, Exception Handling. Raise an exception method
- ✓ TypeError, Scripting in Python. User Inputs, Index Numbers
- ✓ input() & raw_input()

Ch 22: Python Dictionary

- ✓ Dictionary Creation, Use, Hashing, Copy, Update
- ✓ Deletion, Sorting. Len(), Inbuilt Functions
- ✓ Variable Types - python List, Cmp() List Method
- ✓ Python Dictionary Str(dict)

Ch 23: Python Packages

- ✓ Creating a package, Package Imports, Modules
- ✓ Sub Packages & Imports Popular Packages in Python
- ✓ NumPy & SciPy. Python Seaborn, Python framework

Ch 24: Exception Handling

- ✓ Shell Script Commands, OS operations in Python
- ✓ os - math - cmd -csv – random, Numpy (numerical python)
- ✓ Pandas - sys – Matplotlib, Common RunTime Errors
- ✓ Exception Handling, Try…Except…else, Try…finally

Ch 25: Python Class & Objects

- ✓ Class variables, Instances. Built in Class Attributes
- ✓ Objects – Constructors, Modifiers - Self Variable
- ✓ Python Garbage Collections, Multilevel, Multiple, Hybrid
- ✓ Overloading & OverRiding, Polymorphism– Abstraction

Ch 26: Regular Expressions

- ✓ Regular Expression, Regular Expression Patterns
- ✓ Literals - Repetition Cases, w+ and ^ , \s Expressions
- ✓ re.split function, Regular expression methods

Ch 27: Multi-Threading

- ✓ Python Multi-Threading, Thread Synchronization
- ✓ Python Gil & Programming, Thread Control Block (TCB)
- ✓ Stack Pointers & App Usage, Program Counters in Realtime
- ✓ Python Exception Handling

Ch 28: Python TKinter

- ✓ Tkinter GUI Program, Components & Events, Adding Controls in Tkinter
- ✓ Radio & Check Buttons, Tkinter Forms in Realtime, List Boxes, Menu, ComboBox
- ✓ Mainloop () & Functions

Ch 29: Python Web & IoT Intro

- ✓ Python Web Frameworks. Django, Web Framework
- ✓ MVC and MVT – Django. Web Pages. HTML5, CSS3. PYTHON Bottle & Pyramid
- ✓ Falcon; smart_open in python

Module 2: Python for AI & Data

Ch 1: Introduction to Python for AI & Data Analytics

- ✓ Role of Python in Artificial Intelligence, Data Analytics & Automation
- ✓ Setting Up Python, Jupyter Notebook, VS Code & Google Colab
- ✓ Working with Python Libraries, Packages & Virtual Environments
- ✓ Reading and Processing Structured & Unstructured Data
- ✓ Introduction to Python-Based Data Processing Workflows

Ch 2: NumPy – Arrays, Operations & Numerical Computing

- ✓ Introduction to NumPy and Multidimensional Arrays
- ✓ Creating, Indexing, Slicing & Reshaping NumPy Arrays
- ✓ Mathematical, Statistical & Aggregate Operations
- ✓ Broadcasting, Vectorization & Array Manipulation
- ✓ Practical Numerical Data Processing for AI Applications

Ch 3: Pandas – DataFrames, Data Cleaning & Transformation

- ✓ Introduction to Pandas Series and DataFrames
- ✓ Importing Data from CSV, Excel, JSON & SQL Databases
- ✓ Data Filtering, Sorting, Grouping & Aggregations
- ✓ Handling Missing Values, Duplicates & Data Type Conversions
- ✓ Data Merging, Joining, Transformation & Exporting

Ch 4: Data Visualization with Matplotlib & Seaborn

- ✓ Introduction to Data Visualization Using Python
- ✓ Creating Line, Bar, Pie, Histogram & Scatter Charts
- ✓ Customizing Graphs, Labels, Legends & Subplots
- ✓ Statistical Visualization Using Seaborn
- ✓ Exploratory Data Analysis (EDA) with Practical Datasets

Ch 5: Python with SQL, REST APIs & JSON Data

- ✓ Connecting Python with SQL Server and Other Databases
- ✓ Executing SQL Queries and Performing CRUD Operations
- ✓ Introduction to REST APIs and HTTP Methods
- ✓ Consuming REST APIs Using Python Requests
- ✓ Reading, Parsing, Processing & Generating JSON Data
- ✓ Building Automated API-to-Database Data Pipelines

Ch 6: AI Fundamentals – ML, NLP, Transformers & LLM Basics

- ✓ Introduction to Artificial Intelligence, Machine Learning & Generative AI
- ✓ Understanding Supervised, Unsupervised & Deep Learning
- ✓ Natural Language Processing (NLP) Concepts and Applications
- ✓ Introduction to Neural Networks and Transformer Architecture
- ✓ Understanding Large Language Models (LLMs), Tokens & Context Windows
- ✓ Introduction to Embeddings and Semantic Similarity

Module 3: Generative AI Development

Ch 1: Introduction to Generative AI & Large Language Models (LLMs)

- ✓ Introduction to Generative AI and Its Real-World Applications
- ✓ Differences Between Traditional AI, Machine Learning & Generative AI
- ✓ Understanding Large Language Models and Transformer-Based Architecture
- ✓ Overview of GPT, Llama, Gemini & Other LLM Families
- ✓ Understanding Tokens, Context Windows, Temperature & Model Parameters
- ✓ Introduction to LLM Limitations, Hallucinations & Responsible AI

Ch 2: Prompt Engineering – Techniques, Templates & Best Practices

- ✓ Introduction to Prompt Engineering and Prompt Structure
- ✓ Zero-Shot, One-Shot & Few-Shot Prompting Techniques
- ✓ Role-Based Instructions, Context Setting & Prompt Templates
- ✓ Structured Output Generation Using JSON and Schemas

- ✓ Prompt Evaluation, Optimization & Reusable Prompt Design
- ✓ Handling Prompt Injection, Hallucinations & Unsafe Outputs

Ch 3: OpenAI API Integration with Python

- ✓ Introduction to OpenAI APIs, Models & API Authentication
- ✓ Setting Up the OpenAI Python SDK and Managing API Keys
- ✓ Generating Text and Conversations Using the Responses API
- ✓ Implementing Structured Outputs and Function Calling
- ✓ Processing AI Responses, Exceptions, Token Usage & API Costs
- ✓ Building a Python-Based AI Chatbot Using OpenAI APIs

Ch 4: Hugging Face Models, Transformers & Embeddings

- ✓ Introduction to Hugging Face Hub and Open-Source AI Models
- ✓ Exploring Pretrained Models, Tokenizers & Transformers
- ✓ Loading and Using Hugging Face Models with Python
- ✓ Understanding Text Embeddings and Vector Representations
- ✓ Implementing Semantic Similarity and Text Classification
- ✓ Comparing Hosted LLM APIs with Locally Executed Models

Ch 5: LangChain Framework – Chains, Prompts & Tools

- ✓ Introduction to LangChain Architecture and Core Components
- ✓ Configuring Language Models and Prompt Templates
- ✓ Working with Chat Models, Message Objects & Structured Outputs
- ✓ Building Reusable LLM Pipelines and Processing Workflows
- ✓ Integrating External APIs, Python Functions & Tools
- ✓ Building a LangChain-Based AI Assistant

Ch 6: Retrieval-Augmented Generation (RAG) & Vector Databases

- ✓ Introduction to RAG Architecture and Knowledge-Based AI Applications
- ✓ Loading Documents from PDF, TXT, CSV & Web Sources
- ✓ Document Chunking, Embedding Generation & Indexing
- ✓ Introduction to Vector Databases – FAISS & Chroma
- ✓ Implementing Semantic Search, Retrievers & Context Grounding
- ✓ Building a Document Question-Answering Chatbot Using RAG

Module 4: AI Agents & Deployment

Ch 1: Introduction to AI Agents & Agentic AI

- ✓ Introduction to AI Agents and Agentic AI Concepts
- ✓ Differences Between AI Chatbots, AI Assistants & AI Agents
- ✓ Understanding Agent Components – LLM, Tools, State & Memory
- ✓ Agent Workflows, Planning, Reasoning & Decision-Making
- ✓ Single-Agent vs Multi-Agent Architecture
- ✓ Real-World Applications of AI Agents in Business Automation

Ch 2: Building AI Agents with Python, LangChain & LangGraph

- ✓ Introduction to LangChain Agents and LangGraph
- ✓ Creating AI Agents Using Python and LLM APIs
- ✓ Building Stateful Agent Workflows with LangGraph
- ✓ Understanding Nodes, Edges, State & Conditional Routing
- ✓ Implementing Agent Execution, Persistence & Human Approval
- ✓ Developing a Practical AI Research or Data Assistant

Ch 3: AI Tool Calling, Workflow Automation & Memory

- ✓ Introduction to Function Calling and Tool Integration
- ✓ Connecting AI Agents with REST APIs and Python Functions
- ✓ Integrating AI Agents with SQL Databases and External Systems
- ✓ Implementing Conversation History and Persistent Memory
- ✓ Building Automated Multi-Step AI Workflows
- ✓ Handling Tool Errors, Access Permissions & Human-in-the-Loop Approvals

Ch 4: Building Gen AI Applications with Streamlit & FastAPI

- ✓ Introduction to AI Application Architecture and Web Interfaces
- ✓ Creating Interactive AI Applications Using Streamlit
- ✓ Building REST APIs Using FastAPI
- ✓ Integrating LLMs, RAG Pipelines & Agents with Web Applications
- ✓ Managing User Sessions, File Uploads & Chat History
- ✓ Building an End-to-End AI Chatbot Web Application

Ch 5: AI Application Deployment, Monitoring & Security

- ✓ Introduction to AI Application Deployment and Hosting Options
- ✓ Managing Python Dependencies, Environments & Docker Containers
- ✓ Deploying Streamlit and FastAPI Applications
- ✓ Secure API Key Management, Authentication & Access Control
- ✓ Monitoring API Usage, Logs, Latency, Errors & Costs
- ✓ Implementing AI Guardrails, Evaluation, Testing & Production Best Practices

Module 5: Real-Time AI Projects, Testing & Interview Preparation



Project 1: Python Data Automation

Extract data from APIs and CSV files, clean it with Pandas, load it into SQL Server and generate automated reports.

Tools: Python, Pandas, SQL Server, REST API



Project 2: Generative AI Knowledge Assistant

Build a chatbot that answers questions from course PDFs, documents and a knowledge base using RAG.

Tools: Python, OpenAI API, LangChain, Chroma, Streamlit



Project 3: AI-Powered SQL & Analytics Assistant

Ask questions in natural language, generate validated read-only SQL queries and visualize business results.

Tools: Python, SQL Server, LLM APIs, LangGraph, FastAPI

Training Highlights

Python Programming • Data Analytics • Generative AI • LLMs • Prompt Engineering • RAG • Vector Databases • AI Agents • API Integration • 4 Real-Time Projects

- ✓ End-to-End AI Application Integration, Testing & Debugging
- ✓ GitHub Portfolio Development, Documentation & Project Deployment
- ✓ Python, Generative AI, RAG & AI Agent Interview Preparation

Learn Python. Build GenAI Apps. Create AI Agents. Become AI-Ready.



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www.sqlschool.com