Gen Aspira – Course Brochure

Python Course Syllabus

1.1. Introduction to Python
1.1.1. Python overview
1.1.2. Features of Python
1.1.3. Introduction to the Python IDLE and development environment

1.2. Introduction Library functions
1.2.1. Keywords
1.2.2. Variables
1.2.3. Identifier rules

1.3. Datatypes
1.3.1. Single value datatype
1.3.2. Collections
1.3.3. Slicing
1.3.4. Typecasting
1.3.5. Copy operation

1.4. Operators
1.4.1. Arithmetic
1.4.2. Logical
1.4.3. Bitwise
1.4.4. Relational
1.4.5. Assignment
1.4.6. Membership
1.4.7. Identity

1.5. Input/output statements

1.6. Control statements
1.6.1. Decisional
1.6.2. Looping
1.6.3. Intermediate termination

1.7. Functions
1.7.1. Introduction to functions
1.7.2. Types of functions
1.7.3. Global and local variables
1.7.4. Passing default values
1.7.5. Packing and unpacking
1.7.6. Recursion

1.8. Object-Oriented Programming (OOP)
1.8.1. Classes and objects
1.8.2. Types of states
1.8.3. Constructor method
1.8.4. Types of methods
1.8.5. Inheritance
1.8.6. Encapsulation

1.8.7. Polymorphism
1.8.8. Abstraction

1.9. Comprehensions
1.9.1. List
1.9.2. Set
1.9.3. Encapsulation and abstraction

1.10. Lambda, map, filter

1.12. File Handling
1.12.1. Reading from and writing to files
1.12.2. Working with different file formats (text, CSV)
1.12.3. Parsing techniques

1.13. Error Handling and Exceptions
1.13.1. Try, except, and finally blocks
1.13.2. Custom exceptions
1.13.3. User defined exceptions
1.13.4. Assertion

1.14. Package architecture
1.14.1. Introduction
1.14.2. Inbuilt packages
1.14.3. User defined packages

1.15. Regular expression

1.16. SQL connection

Gen AI Course Syllabus

Week 1: Introduction to AI, ML, DL
- Difference between AI, ML, DL
- What is ML? When to use?
- Bias-Variance Trade off
- Underfitting vs Overfitting
- Evaluation Metrics (Accuracy, Precision, Recall, F1, ROC-AUC, RMSE, MAE)
- Supervised & Unsupervised Learning

Week 2: Deep Learning (DL)
- Neural Networks (Perceptron, MLP)
- Activation Functions: ReLU, Sigmoid, Tanh, Softmax
- Loss Functions: MSE, Cross-Entropy, Hinge Loss
- Optimizers: SGD, Adam, RMSprop
- CNNs, RNNs, LSTMs, GRUs
- Attention Mechanism, Transformers

Week 3: NLP
- Text preprocessing: tokenization, stemming, lemmatization, stopwords, regex
- POS tagging, NER
- Word embeddings: Word2Vec, GloVe, FastText
- N-grams & language models
- BoW, TF-IDF

Week 4 & 5: RAG (Retrieval-Augmented Generation)
- Query → Retrieve → Generate workflow
- Vector Databases (FAISS, Pinecone, Weaviate)
- Chunking & Embedding strategies
- Advanced RAG: multi-hop retrieval, agentic RAG

Week 6 & 7: Agentic AI Core
- Agents: Plan → Decide → Act → Reflect → Learn
- Memory in agents (short-term, long-term, vector memory)
- Tools & function calling
- Planning patterns: ReAct, Plan-and-Execute, ToT, Self-Reflective Agents
- Multi-agent collaboration

Frameworks & Tooling
- LangChain, CrewAI, LlamaIndex, Microsoft AutoGen, MCP

Advanced GenAI + Agents
- Combining RAG with Agents
- Multi-hop reasoning
- Orchestration patterns
- Multimodal Agents

Week 8: Reliability & Safety
- Preventing hallucinations
- Guardrails for agents
- Evaluation & Monitoring

Deployment & Ops
- Packaging with Docker, FastAPI, Flask
- Cloud deployment (Azure, AWS, GCP)

- Monitoring & cost management

Course Schedule

- Python classes start: 8th September
- Timings: Weekdays 8:30 AM – 10:00 AM
- Saturdays: Presentation, mock interviews, guest lecturers, personality development
- Sundays: Holiday

What We Offer

- 1:1 Live mentorship
- Live projects
- Internship + Certificate
- Resume making
- Mock interview preparation
- Placement support
- Guest lecturers
- Communication skills
- Recorded sessions
- Doubt clarification & special sessions
- Hackathons

Mentorship & Support

- Weekly review mails on performance
- Extra sessions for weak areas
- Mock interviews by mentors
- Reach out to HR for any concerns

Mentors

Python: Monish Kumar
Gen AI: Kavin
Guest Lecturers: Weekly changing experts

About Us – Gen Aspira

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