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Python and AI-ML

Part 1: Basics

Introduction to Programming in Python

- Python basics
- Data Types
- Control Statements
- Functions, Collections
- Exception Handling
- File Operations using Python
- Modules & Packages

Object Oriented Programming

- Class, Objects, Methods, Variables
- Inheritance, Polymorphism, Encapsulation
- Abstraction and Abstract Classes

Database Management Systems

- Basics of RDBMS - Keys, Normalization, Indexes, ACID, Constraints
- Basics of SQL Queries (DDL, DML, DQL)
- Using MySQL with the help of Python,

Web Development Framework

- Flask Introduction
- Components of Flask
- Session Management
- Error Handling
- Basics of SQL Alchemy as ORM
- HTML, CSS

Part 2: Advanced

Data science (AI-ML):

- NumPy, Pandas, Visualization, EDA
- Supervised Learning - Linear Models, Decision trees, Ensemble Models
- Introduction to Deep Learning, Neural Networks
- Introduction to NLP(Natural language Processing)

Data Engineering

- Structured and Unstructured Data
- Databases to Store and Querying Unstructured Data (MongoDB, Cassandra and GraphDB)
- Data – Discovery, Catalogue, Lineage, Governance and Quality
- Dimensionality Reduction (LDA and PCA)
- Synthetic Data (SDV) and Data Versioning (DVC)

Designing Intelligent Systems

- Requirements, Architecture and Design Patterns
- Model Quality, Data Quality, System Quality
- Software Engineering Architecture and Design, Microservices
- AIOps, DataOps, MLOps

Qualities in Intelligent Systems

- NFR Qualities in context to Data Science Applications - Modularity, Reproductiability
- Qualities in Intelligent Systems - Completeness, Consistency and Correctness of Data, Explainability, Interpretability, Fairness, Bias
- Secure Software Engineering - Security and Privacy, Cryptosystems, RSA, Web Application Vulnerabilities
- Intelligent User Interfaces