

Data Science Course Syllabus

<u>Introduction to Data Science</u>	<u>Python Programming</u>
<ul style="list-style-type: none"> • What is Data Science & AI • Difference: Data Science vs AI vs Machine Learning • Data Science Lifecycle • Applications (Healthcare, Finance, E-commerce, etc.) • Roles: Data Analyst, Data Scientist, ML Engineer • Tools Overview (Python, SQL, Excel, Power BI) 	<ul style="list-style-type: none"> • Basics: Variables, Data Types, Operators • Control Flow: if-else, loops • Functions & Lambda Functions • Data Structures: List, Tuple, Set, Dictionary • File Handling • Exception Handling • OOP Basics (Class, Object, Inheritance)
<u>SQL for Data Science</u>	<u>Python for Data Science</u>
<ul style="list-style-type: none"> • Database Fundamentals • SQL Queries (SELECT, WHERE, ORDER BY) • Joins (Inner, Left, Right) • Aggregate Functions • Subqueries & Views • Real-world dataset practice 	<ul style="list-style-type: none"> • NumPy (Arrays, Operations) • Pandas: <ul style="list-style-type: none"> • DataFrames & Series • Data Cleaning • Handling Missing Values • GroupBy & Aggregation • Data Wrangling • Working with CSV, Excel, JSON
<u>Data Visualization</u>	<u>Deep Learning</u>
<ul style="list-style-type: none"> • Matplotlib (Basic Charts) • Seaborn (Advanced Visualization) • Charts: <ul style="list-style-type: none"> • Line, Bar, Pie, Histogram • Heatmaps, Pairplots • Data Storytelling • Dashboard Basics 	<ul style="list-style-type: none"> • Neural Networks (ANN) • Activation Functions • Forward & Backpropagation • TensorFlow / Keras Basics • Building Simple Models • Convolutional Neural Network (CNN) • Recurrent Neural Network (RNN)
<u>Statistics for Data Science</u>	<u>Data Cleaning & Preprocessing</u>
<ul style="list-style-type: none"> • Descriptive Statistics (Mean, Median, Variance) • Probability Distributions (Normal, Binomial, Poisson) • Sampling Techniques 	<ul style="list-style-type: none"> • Handling missing values • Removing duplicates • Data transformation • Outlier detection • Normalization

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Computer Institute

<ul style="list-style-type: none"> • Hypothesis Testing (Z-test, T-test, Chi-square) • Correlation & Covariance, Chi-square) • Correlation & Covariance 	
Artificial Intelligence (Core Concepts)	Machine Learning (Core Concepts)
<ul style="list-style-type: none"> • Introduction to AI • Search Algorithms (BFS, DFS – basic) • Rule-based Systems • AI Applications • Ethics in AI 	<ul style="list-style-type: none"> • What is Machine Learning • Types: Supervised, Unsupervised • Train/Test Split • Model Evaluation: • Accuracy, Precision, Recall, F1 Score • Overfitting & Underfitting • Cross Validation
Real-World Projects	Tools & Platforms
<ul style="list-style-type: none"> • Data Cleaning Project • EDA Project • Machine Learning Model Project • AI-based Project (NLP / CV) • Dashboard Project • Final Capstone Project 	<ul style="list-style-type: none"> • Jupyter Notebook • Google Colab • Git & GitHub • Excel (Advanced) • Power BI / Tableau • Visual Studio Code (VS Code)
Interview Preparation	
<ul style="list-style-type: none"> • Excel practical questions • SQL queries practice • Case studies • Resume building • Portfolio (GitHub projects) • HR Questions 	

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