SQL SCHOOL

Premium Quality Training

Data Science Training

What is Data Science?

Data science is the study of data that helps us derive useful insight for business decision making. Data Science is all about using tools, techniques, and our analyse the hidden trends of data !

What are the elements available in Data Science?

- **Graphs and Charts**: Visuals of bar graphs, line charts, scatter plots, etc..
- **Code snippets:** Python or R code with libraries like pandas, numpy, matplotlib, etc
- **Data clouds or binary code**: Depicting the flow of data.
- **Machine Learning:** Visualizations of neural networks, decision trees, or AI models
- **Big Data:** Images of servers, clouds, and databases
- **Statistics:** Equations or symbols for things like mean, median, variance.

What we do as a Data Scientist?

Data Science processes the raw data and solve business problems and even make prediction about the future trend or requirement. Includes:

- What do customer want?
- How can we improve our services?
- What will the upcoming trend in sales?
- How much stock they need for upcoming festival.

Who can join this course?

Anyone. We start the classes from scratch, right from Basics of Data, Database, Analysis, Machine Learning, Statistics, Maths, AI, Gen AI, Prompt Engineering and then finally Realtime Projects.. !

🔥🔥 Detailed Course Content 🔥🔥

Module 1: SQL Server TSQL (MSSQL)

Ch 1: Database Intro & Job Roles ✓ Database Introduction ✓ Database Types: OLTP, DWH ✓ DBMS & Realtime Use ✓ DBMS Software & Purpose ✓ SQL: Purpose & Use ✓ SQL Server Versions, Editions ✓ Power BI Job Roles	**Ch 2: SQL Server Installations** ✓ SQL Server 2022 Installations ✓ SQL Server 2019 Installations ✓ SSMS Tool Installation ✓ Server Connections, Properties ✓ Instance & Instance Types ✓ Authentication Types ✓ System Databases & Purpose	**Ch 3: SQL Basics V1 (Commands)** ✓ Database, Tables & Columns ✓ SQL Basics: Purpose ✓ DDL Statements ✓ DML Statements ✓ DQL Statements ✓ Verifications @ GUI ✓ Basic SELECT Queries
Ch 4: SQL Basics V2 (Operators) ✓ DDL Variants in MSSQL ✓ DML Variants in MSSQL ✓ INSERT & INSERT INTO	**Ch 5: Excel Data Imports** ✓ Data Imports with Excel ✓ SQL Native Client ✓ Order By: Asc, Desc	**Ch 6: Schemas & Security** ✓ Schemas: Creation, Usage ✓ Schemas & Table Grouping ✓ Using Default Schema

✓ SELECT & SELECT INTO ✓ Basic Operators in SQL ✓ Special Operators in MSSQL ✓ ALTER, TRUNCATE, DROP	✓ Order By with WHERE ✓ TOP & OFFSET ✓ UNION ALL ✓ UNION, Data Appends	✓ Real-world Banking Database ✓ Table Migrations @ Schemas ✓ 2 Part, 3 Part & 4 Part Naming ✓ Verifying Schemas in UI
Ch 7: Constraints & Keys Basics ✓ Need for Constraints, Keys ✓ Null, Not Null Constraints ✓ Unique Key Constraint ✓ Primary Key Constraint ✓ Foreign Key & References ✓ Default Constraint & Usage ✓ DB Diagrams & ER Models	**Ch 8: Indexes Basics, Tuning** ✓ Indexes & Tuning ✓ Clustered Index, Primary Key ✓ Non Clustered Index & Unique ✓ Creating Indexes Manually ✓ Verifying Indexes ✓ Composite Keys, Query Optimizer ✓ Composite Indexes & Usage	**Ch 9: Joins & Audits** ✓ Joins: Table Comaparisons ✓ Inner Joins & Matching Data ✓ Outer Joins: LEFT, RIGHT ✓ Full Outer Joins & Audits ✓ Cross Join & Table Combination ✓ Joining more than 2 tables ✓ Joining Tables with Aliases
Ch 10: Views & RLS ✓ Views: Realtime Usage ✓ Storing SELECT in Views ✓ DML, SELECT with Views ✓ RLS: Row Level Security ✓ WITH CHECK OPTION ✓ Database Audits & Metadata ✓ Important System Views	**Ch 11: Stored Procedures** ✓ Stored Procedures: Realtime Use ✓ Parameters Concept with SPs ✓ Procedures with SELECT ✓ System Stored Procedures ✓ Metadata Access with SPs ✓ SP Recompilations ✓ Stored Procedures, Tuning	**Ch 12: User Defined Functions** ✓ Using Functions in MSSQL ✓ Scalar Value Functions ✓ Inline & Multiline Functions ✓ Parameterized Queries ✓ Date & Time Functions ✓ String Functions & Queries ✓ Aggregated Functions & Usage
Ch 13: Triggers & Automations ✓ Need for Triggers ✓ DDL & DML Triggers ✓ For / After Triggers ✓ Instead Of Triggers ✓ Memory Tables with Triggers ✓ Data Replication, Automation ✓ Disabling DMLs & Triggers	**Ch 14: Transactions & ACID** ✓ Transaction Concepts in OLTP ✓ Transaction Types in Realtime ✓ Auto Commit, Explicit Transaction ✓ COMMIT, ROLLBACK ✓ Checkpoint & Logging ✓ Lock Hints & Query Blocking ✓ READPAST, LOCKHINT	**Ch 15: Cursors & Fetch** ✓ Cursors: Realtime Usage ✓ Cursor Declaration Types ✓ Open Cursor, Close Cursor ✓ Local & Global Cursors ✓ Scroll & Forward Only Cursors ✓ Static & Dynamic Cursors ✓ Fetch, Absolute Cursors
Ch 16: CTEs & Tuning ✓ Common Table Expression ✓ Creating and Using CTEs ✓ CTEs, In-Memory Processing ✓ Using CTEs for DML Operations ✓ Using CTEs for Data Retrieval ✓ Using CTEs for Tuning ✓ CTEs: Duplicate Row Deletion	**Ch 17: Relations, Normal Forms** ✓ Adding PK to Tables ✓ Adding FK to Tables ✓ Cascading Keys ✓ Self Referencing Keys ✓ Database Diagrams ✓ Normal Forms: 1 NF, 2 NF ✓ 3 NF, BCNF and 4 NF	**Ch 18: Self Joins, EXISTS** ✓ Joining same table ✓ Correlated Queries ✓ Joining Tables, Queries ✓ Self Joins with WHERE ✓ Self Joins with UNION ✓ Self Joins with Order By ✓ Self Joins with Views
Ch 19: Remote Joins ✓ Working with Multiple Servers ✓ Multi Server Access from SSMS ✓ Linked Servers Creation, Tests ✓ 4 Part Naming Convention ✓ Remote Data Access ✓ RPC & RPC OUT Remote Joins & Data Analysis	**Ch 20: Sub Queries** ✓ Sub Queries Concept ✓ Sub Queries & Aggregations ✓ Joins with Sub Queries ✓ Sub Queries with Aliases ✓ Sub Queries with OrderBy ✓ Sub Queries with WHERE ✓ Sub Queries, Joins, Where	**Ch21: Group By Queries** ✓ Group By, Distinct Keywords ✓ GROUP BY, HAVING ✓ Cube( ) and Rollup( ) ✓ Sub Totals & Grand Totals ✓ Grouping( ) & Usage ✓ Group By with UNION ✓ Group By with UNION ALL

Ch 22: Joins with Group By	Ch 23: Data Types & Conversions	Ch 24: Window Functions, CASE
✓ Joins with Group By ✓ 3 Table, 4 Table Joins ✓ Join Queries with Aliases ✓ Join Queries & WHERE ✓ Join Queries & Group By ✓ Joins with Sub Queries ✓ Query Execution Order	✓ Integer Data Types ✓ Character, MAX Data Types ✓ Decimal & Money Data Types ✓ Boolean & Binary Data Types ✓ Date and Time Data Types ✓ Table, SQL_Variant Types ✓ Cast( ) and Convert( ) Functions	✓ IIF Function and Usage ✓ IIF with Tables, Joins ✓ CASE Statement Usage ✓ Window Functions (Rank) ✓ Row_Number( ) ✓ Rank( ), DenseRank( ) ✓ Partition By & Order By

Mini Project (Can be used in Resume)

Module 2: Power BI

Ch 1: Power BI Intro, Installation	Ch 2: Report Design Concepts	Ch 3: Visual Interactions, PBIT
✓ Power BI Eco System ✓ Report Types & Usage ✓ Power BI Tools, Cloud ✓ Power BI Components ✓ Power Query (M), DAX ✓ Power BI: Co-Pilot & AI ✓ Power BI Installations	✓ Basic Report Design (PBIX) ✓ Get Data, Canvas (Design) ✓ Data View, Data Models ✓ Data Points, Aggregations ✓ Focus Mode, Spotlight ✓ PDF Exports From Power BI ✓ ToolTip, PBIX Reports	✓ Data View Concepts ✓ Visual Interactions & Edits ✓ Limitations with Visual Edits ✓ Creating Power BI Templates ✓ CSV Exports & PBIT Imports ✓ Optimizing Power BI : Caching ✓ PBIX Versus PBIT
Ch 4: Grouping, Hierarchies	**Ch 5: Slicer & Visual Sync**	**Ch 6: Hierarchies & Drill-Down**
✓ Power BI : Field Values ✓ Field Value Groups ✓ Creating Groups : Lists ✓ Creating Groups: Bins ✓ List Items & Group Edits ✓ Bin Size & Bin Count	✓ Slicer Visual in Power BI ✓ Slicer: Format Options ✓ Single Select, Multi Select ✓ Slicer: Select All On / Off ✓ Integer, Character Slicers ✓ Visual Sync with Slicers	✓ Hierarchies: Creation, Use ✓ Hierarchies: Advantages ✓ Drill Up, Drill Down ✓ Conditional Drill Down ✓ Filtered Drill Down ✓ Table View of Data Points
Ch 7: Filters & Drill Thru	**Ch 8: Bookmarks, Buttons**	**Ch 9: SQL DB Access & Big Data**
✓ Power BI Filters ✓ Basic, Top & Advanced ✓ Visual Filters, Page Filters ✓ Report Level Filters ✓ Clear Filter Options, Resets ✓ Drill Thru Filters & Usage	✓ Power BI Bookmarks ✓ Bookmarks Creation, Use ✓ Images: Actions, Bookmarks ✓ Buttons: Actions, Bookmarks ✓ Page to Page Navigations ✓ Score Cards, Master Pages	✓ SQL DB Access , Queries ✓ Storage Modes: Direct Query ✓ Formatting & Date Time ✓ Storage Modes in Power BI ✓ Storage Modes & Formatting ✓ Azure (Big Data) Access
Ch 10: Power BI Visualizations	**Ch 11: Power Query Introduction**	**Ch 12: Power Query : Table Tfns**
✓ Charts, Bars, Lines, Area ✓ TreeMaps & HeatMaps	✓ Power Query (Mashup) ✓ ETL Transformations in PBI	✓ Table Duplicate, Reference ✓ Group By Transformation

✓ Funnel, Card, Multrow Card ✓ PieCharts & Waterfall ✓ Scatter Chart, Play Axis ✓ Infographics, Classifications	✓ Power Query Expressions ✓ Table Combine Options ✓ Merge, Union All Options ✓ Close, Apply & Visualize	✓ Aggregate, Pivot Operation ✓ First Row as Header ✓ Reverse Rows, Count Rows ✓ Advanced Power Query Mode
Ch 13: Power Query: Column Tfn ✓ Any Column Transformations ✓ Change Data Type ✓ Detect Data Type ✓ Rename, Replace, Move ✓ Fill Up, Fil Down ✓ Step Edits & Rollbacks	**Ch 14: Power Query: Text, Date** ✓ String / Text Transformations ✓ Split, Merge, Extract, Format ✓ Numeric and Date Time ✓ Add Column & Expressions ✓ Expressions and New Columns ✓ Column From Examples	**Ch 15: Power Query: Parameters** ✓ Parameters in Power Query ✓ Static Parameters, Defaults ✓ Dynamic Dropdowns, Lists ✓ Linking with Table Queries ✓ Column From Examples ✓ Step Edits, Type Conversions
Ch 16: Power BI Cloud: Publish ✓ Power BI Cloud Concepts ✓ Workspace Creation, Usage ✓ Workspace Items ✓ Report Publish Cloud ✓ Report Edits in Cloud ✓ Semantic Models & Usage	**Ch 17: Power BI Cloud Dashboards** ✓ Power BI Dashboards ✓ Dashboard Creation, Usage ✓ Pin Visuals ✓ Pin LIVE Pages ✓ Add Image, Video Tiles ✓ Q&A & Pin Tiles	**Ch 18: Power BI Cloud** ✓ Report Shares, Alerts ✓ Subscriptions, Exploration ✓ Downloads & Edits ✓ Cloning in Cloud ✓ QR Codes, Web Publish ✓ Lineage & Metrics
Ch 19: Power BI Cloud Gateways ✓ Data Gateways, Data Refresh ✓ Install, Configure Gateways ✓ Data Sources Configurations ✓ Dataset Configurations ✓ Data Refresh & Scheduling ✓ Gateway Optimizations	**Ch 20: Power BI Cloud Apps** ✓ Power BI Apps: Creation ✓ App Sections & Content ✓ Audience Options ✓ App Security & Sharing ✓ App Updates, Favorites ✓ App URL, End User Access	**Ch 21: Power BI Report Server** ✓ Power BI Report Server ✓ Report Server Vs Cloud ✓ Installation, Configuration ✓ RS Config Tool Options ✓ Report Database, TempDB ✓ Web Service & Server URL
Ch 22: Paginated Reports ✓ Report Builder Tool ✓ Paginated Report (RDL) ✓ SQL Database Access ✓ SQL Queries For RDL ✓ Tablix, Chart Wizards ✓ Fields & Drill-Down ✓ RDL Report Publish	**Ch 23: DAX Concepts (Basics)** ✓ DAX Concepts (Introduction) ✓ DAX : Realtime Use ✓ DAX Columns: Creation, Use ✓ DAX Measures: Creation, Use ✓ DAX Functions: IIF, ISBLANK ✓ SUM, CALCULATE Functions ✓ DAX Cheat Sheet	**Ch 24: DAX Quick Measures** ✓ Quick Measures in Power BI ✓ Average & Filters ✓ Running Totals ✓ Star Rating Calculations ✓ DAX Measures in Data View ✓ DAX in Visuals ✓ DAX in Cloud Reports
Ch 25: Data Modelling, DAX ✓ Dimensions Tables ✓ Fact Tables & DAX Measures ✓ Data Models & Relations ✓ DAX Expressions ✓ Star & Snowflake Schemas ✓ DAX Joins & Expressions	**Ch 26: DAX Joins, Variables** ✓ CALCULATEX & Variables ✓ COUNT, COUNTA, etc.. ✓ SUM, SUMX, etc.. ✓ SELECTED MEMEBER ✓ Filter Context, RETRUN ✓ Dynamic Report with DAX	**Ch 27: DAX Time Intelligence** ✓ Need for Time Intelligence ✓ Date Table Generation ✓ Time Intelligence with DAX ✓ PARALLELPERIOD, DATE ✓ CALENDAR, Total Functions ✓ YTD, QTD, MTD with DAX

Ch 28: DAX - Row Level Security	Ch 29: Analytical Reports	Ch 30: Introduction to CoPilot
✓ RLS: Row Level Security ✓ Data Modelling & Roles ✓ Verify Roles (Testing) ✓ Add Cloud Users to Roles ✓ Dynamic Row Level Security ✓ Testing RLS in Power BI	✓ Analytical Report Concepts ✓ Excel Data Analytics ✓ Excel with Power BI Cloud ✓ SQL, AVRO, JSON Sources ✓ Analyze in Excel (Cloud) ✓ Excel Reports to Cloud	✓ AI Components in Power BI ✓ Need for CoPilot ✓ CoPilot Practical Uses ✓ CoPilot with Desktop ✓ CoPilot with Cloud ✓ Need for AI Analytics (Fabric)
Ch 31: Realtime Project – Phase 1	**Ch 32: Realtime Project – Phase 2**	**Ch 33: PL 300 Exam Guidance**
✓ Customer Requirement ✓ Requirement Analysis ✓ Project Planning ✓ Creating Data Sheets ✓ Creating Data Models ✓ Scope of the Project ✓ Data Sheets, Project Planning	✓ Report Design & Modelling ✓ Power Query Implementation ✓ DAX & Data Analytics ✓ Power BI Cloud (Service) ✓ Power BI Report Server ✓ End User Take Aways ✓ Implementation Phases	✓ PL 300 Exam Benefits ✓ Data Analyst Exam Pattern ✓ Type of Questions ✓ Sample Questions, Answers ✓ Mock Certification ✓ Resume Guidance ✓ Mock Interviews

Module 3: Python Analytics

Ch 1: Python Introduction	Ch 2: Python Basics, Architecture	Ch 3: Data Types & Variables
✓ Need for Data Analytics ✓ Python in Data Analysis ✓ History of Python ✓ Python Versions ✓ Python Implementations ✓ Python Installations ✓ Python IDE & Usage ✓ Jupyter Notebooks	✓ Python Scripting Options ✓ Basic Operations in Python ✓ Python Scripts, Print() ✓ Single, Multiline Statements ✓ Adding Cells, Saving Notebook ✓ Single, Multi Line Comments ✓ Python: Internal Architecture ✓ Compiler Versus Interpreter	✓ Integer / Int Data Types ✓ Float & String Data Types ✓ Boolean, Binary Types ✓ Sequence Types: List, Tuple ✓ Range, Complex & memview ✓ Retrieving Data Type: type() ✓ Multi Assignments & Casting ✓ Unpack Collection, Outputs
Ch 4: Python Operators	**Ch 5: Python Loops, Iterations**	**Ch 6: Python Collections**
✓ Arithmetic, Assignment Ops ✓ Comparison Operators ✓ Logical, Identity Operators ✓ Member, Bitwise Operators ✓ Operator Precedence ✓ If ... Else Statement, Pass ✓ Short Hand If, OR, AND ✓ ELIF and ELSE IF Statements ✓ Expressions, Ternary OPs	✓ Python Loop & Realtime Use ✓ Python While Loop Statement ✓ Break and Continue Statement ✓ Using Print with While() ✓ Iterations & Conditions ✓ Exit Conditions & For Loops ✓ Break, Continue & Range ✓ __iter__() and __next__() ✓ iter() and Looping Options	✓ Python Collections (Arrays) ✓ list() Constructor, print() ✓ Python Tuples, Tuple Items ✓ tuple() Constructor, Usage ✓ Python Sets : Syntax Rules ✓ Duplicates, Types, Ordered ✓ Python Dictionaries: Usage ✓ Changeable, Ordered Data ✓ Dictionary Construct, type()

Ch 7: Python Functions ✓ Python Functions & Usage ✓ Function Parameters ✓ Arguments, **kwargs ✓ Default & List Parameters ✓ Python Lambda Functions ✓ Anonymous Functions ✓ Recursive Functions, Usage ✓ Return & Print @ Lamdba	**Ch 8: Python Classes & Arrays** ✓ Python Classes & Objects ✓ __init__() Function ✓ __str__() Function ✓ Self Parameters & Objects ✓ Python Inheritance & Classes ✓ Parent & Child Classes ✓ __init__() & super() Function ✓ Polymorphism in Python	**Ch 9: Python Modules** ✓ import Python Modules ✓ Variables in Modules ✓ Built In Modules & dir ✓ datetime module in Python ✓ Date Objections Creation ✓ strftime Method & Usage ✓ imports & datetime.now() ✓ Using Python Constructors
Ch 10: Python JSON & RegEx ✓ JSON Concepts, Usage ✓ Dictionary & import json ✓ Python Objects into JSON ✓ Formatting & Ordering ✓ json.dumps, print options ✓ Python Regular Expressions ✓ RegEx Module & Functions ✓ search() & span() , Strings ✓ Using RegEx with JSON	**Ch 11: Python User Inputs & TRY** ✓ Try Except, Exception Handling ✓ NameError Resolution ✓ Python Finally Block, Usage ✓ Raise an exception method ✓ TypeError, Scripting in Python ✓ Python User Inputs ✓ Python Index Numbers ✓ Named Indexes, Usage ✓ input() & raw_input()	**Ch 12: Python File Handling** ✓ File Handling, Activities ✓ r, a, w, x modes ✓ t, b Operations ✓ Read Only Parts ✓ Loop, Write, Close Files ✓ Appending, Overwriting ✓ import os, path.exists ✓ f.open, f.write ✓ f.read, f.close
Ch 13: Data Analytics - Pandas ✓ Python Modules & Pandas ✓ Pandas Codebase & Usage ✓ Installation of Pandas ✓ import pandas.DataFrame ✓ Checking Pandas Version ✓ Pandas Series, arrays ✓ Labels : Creation, Use ✓ series(), print()	**Ch 14: Data Analytics - DataFrames** ✓ Indexes & Named Options ✓ Locate Row and Load Rows ✓ Row Index & Index Lists ✓ Load Files Into a DataFrame ✓ pd.read_csv() Function ✓ pd.options.display.max_rows ✓ df.to_string() Function ✓ tail() & null() Function	**Ch 15: Data Analytics - Pandas** ✓ Pandas - Cleaning Data ✓ Replace, Transform Columns ✓ Data Discovery & Column Fill ✓ Identify & Remove Duplicates ✓ dropna(), fillna() Functions ✓ Pandas - Data Correlations ✓ Good & Bad Correlation ✓ Data Plotting & matlib Lib
Ch 16: SQL DB & Python - 1 ✓ SQL & Databases ✓ Azure Data Studio Tool ✓ sp_execute_external_script ✓ Input Data & Result Sets ✓ DDL & DML with Python ✓ SQL_out, SQL_in ✓ Variables & Parameters ✓ Versions, Package List ✓ WITH RESULT SETS Options	**Ch 17: SQL & Python - 2** ✓ pandas.Series with SQL DBs ✓ Indexing Methods in Realtime ✓ Convert series to data frame ✓ Output values into data.frame ✓ pymssql package in SQL Server ✓ pip list & Package Manager ✓ Python runtime, Py Package ✓ pymssql.connect & Usage ✓ Cursor Variables & Usage	**Ch 18: Realtime Case Study**

Module 4: Python Programming

Ch 19: Python Dictionary ✓ Dictionary Creation, Use ✓ Hashing, Copy, Update ✓ Deletion, Sorting ✓ Len(), Inbuilt Functions ✓ Variable Types - python List ✓ Cmp() List Method ✓ Python Dictionary Str(dict) ✓ Programming Concepts ✓ Loops and Sets ✓ Realtime Usage	**Ch 20: Python Packages** ✓ Package in Python ✓ Creating a package ✓ Package Imports, Modules ✓ Sub Packages Creation ✓ Sub Package Imports ✓ Popular Packages in Python ✓ NumPy & SciPy ✓ Libraries in Python ✓ Python Seaborn ✓ Python framework	**Ch 21: Exception Handling** ✓ Shell Script Commands ✓ OS operations in Python ✓ File System Shell Methods ✓ os - math - cmd -csv - random ✓ Numpy (numerical python) ✓ Pandas - sys - Matplotlib; ✓ Common RunTime Errors ✓ Python Custom Exception; ✓ Exception Handling ✓ Try…Except…else,Try…finally
Ch 22: Python Class & Objects ✓ Class variables, Instances ✓ Built in Class Attributes ✓ Objects - Constructors ✓ Modifiers - Self Variable ✓ Python Garbage Collections ✓ Hierarchical Inheritance ✓ Multilevel, Multiple, Hybrid ✓ Overloading & OverRiding ✓ Polymorphism - Abstraction	**Ch 23: Regular Expressions** ✓ Regular Expression ✓ Regular Expression Patterns ✓ Literals - Repetition Cases ✓ Groups andGrouping ✓ w+ and ^ , \s Expressions ✓ re.split function ✓ Regular expression methods ✓ re.match() in Regular Expr ✓ re.search(), re.findall for Text	**Ch 24: Multi-Threading** ✓ Python Multi-Threading ✓ Thread Synchronization ✓ Multiprocessing ✓ Python Gil & Programming ✓ Thread Control Block (TCB) ✓ Stack Pointers & App Usage ✓ Program Counters in Realtime ✓ Thread State Concept ✓ Python Exception Handling
Ch 25: Python TKinter ✓ Tkinter GUI Program ✓ Components & Events ✓ Adding Controls inTkinter ✓ Entry, Text Widgets ✓ Radio & Check Buttons ✓ Tkinter Forms in Realtime ✓ List Boxes, Menu, ComboBox ✓ Mainloop () & Functions	**Ch 26: Python Web & IoT Intro** ✓ Python Web Frameworks ✓ Django : Advantages ✓ Web Framework ✓ MVC and MVT - Django ✓ Web Pages using python ✓ HTML5, CSS3 usage ✓ PYTHON Bottle & Pyramid ✓ Falcon ; smart_open in python	**Ch 27:** **Real-time Project**

Module 5: Python with AI - ML

Ch 28: Machine Learning Basics ✓ Machine Learning Funda ✓ Python ML in Realtime ✓ Pandas Extension in ML ✓ Machine Learning Ops ✓ Business to Data Conversions ✓ ML Algorithms in Realtime	**Ch 29: Python ML Concepts** ✓ Machine Learning (ML) Intro ✓ Supervised, Unsupervised ✓ Scikit-Learn Library ✓ Python Libraries for ML ✓ sklearn : Advantages & Uses ✓ sklearn : Functions, Use	**Ch 30: Python Data Handling** ✓ Data structures ✓ Lists, Tuples, Sets ✓ Dictionaries, ✓ Pandas Data Operations ✓ Data Visualizations ✓ Matplotlib & Seaborn

Ch 31: AI With Python Intro ✓ Artificial Intelligence ✓ Applications of AI ✓ AI Applicative Uses ✓ AI Usage with Python ✓ AI - Python Environment ✓ Python Libraries ✓ AI with Python in Realtime	**Ch 32: Supervised Learning** ✓ Linear & Logistic Regression ✓ Decision Trees ✓ Random Forests ✓ Support Vector Machines ✓ Neural Networks Basics ✓ Linear Regression Steps ✓ Linear Regression in AI-ML	**Ch 33: Unsupervised Learning - 1** ✓ Clustering & K-means ✓ DBSCAN & Realtime Usage ✓ Dimensionality Reduction ✓ K clustering hierarchical ✓ DBScan: Realtime Uses ✓ KMeans clustering Vs DBSCAN ✓ PCA Vs t-SNE
Ch 34: Unsupervised Learning 2 ✓ Unsupervised Learning ✓ Concepts and Scope ✓ Realtime Usage ✓ Dimensionality Reduction ✓ Component Analysis (PCA) ✓ PCA: Concept & Usage	**Ch 35: Generalized Models** ✓ GLM Concept in Python ✓ GLM in Regression ✓ Considerations for GLM ✓ Problem Solving Skills ✓ Python Libraries ✓ Python Extensions: GLM	**Ch 36: Python Tree Models** ✓ Decision Tree Models ✓ Decision Tree Working ✓ Model Works, Algorithms ✓ Random Forest Concept ✓ Random Forest Tree ✓ Random Forest Vs Knn
Ch 37: Big Data and ML ✓ Spark and Big Data ✓ Big Data with Python ✓ Spark with Python ✓ Spark with Big Data ✓ Spark Algorithms ✓ AI ML Libraries	**Ch 38: Natural Lang" Processing** ✓ NLP : Purpose, Usage ✓ NLP Applicative Uses ✓ NLP Vs Machine Learning ✓ NLP in Machine Learning ✓ Using NLP in AI - ML ✓ NLP code in Python?	**Ch 39: AI in Real-World** ✓ AI in Chatbots ✓ AI in Virtual Assistants ✓ AI Ethical Considerations ✓ AI Deployments (Flask) ✓ AI with FastAPI ✓ AI with Streamlit
Ch 40: Python AI – ML Realtime Project with Resume, Job Assistance		

All sessions are practical, step by step. Kindly ensure on-time practice for best results.

Module 6: Advanced Statistics

Ch 1: Introduction to Statistics

- ✓ **Importance of Statistics in DS & AI**
- ✓ **What is Statistics?**
- ✓ **Population and Sample**
- ✓ **Parameter and Statistic**
- ✓ **Data Types**

Ch 2: Basic Operations

- ✓ **What is Data, Its type and Data Measures.**
- ✓ **What is Univariate and BI Variate Analysis?**

- ✓ **Measures of Central Tendencies - Mean, Median, & Mode**
- ✓ **Measures of Dispersion - Variance, Standard Deviations, Range, & Interquartile Range**
- ✓ **Covariance and Correlation**
- ✓ **Box Plots and Outliers detection**
- ✓ **Skewness and Kurtosis**

Ch 3: Probability

- ✓ **Probability And Limitations**
- ✓ **Axioms Of Probability**
- ✓ **Conditional Probability**
- ✓ **Random Variable**
- ✓ **Discrete Probability Distributions - Probability Mass Functions**
- ✓ **Bernoulli, Binomial Distribution, Poisson Distribution**
- ✓ **Continuous Probability Distributions - Probability Density Functions**
- ✓ **Normal Distribution, Standard Normal Distribution**

Ch: 4 Data Sampling

- ✓ **Data Collection Techniques**
- ✓ **Sampling Techniques:**
- ✓ **Convenience Sampling, Simple Random Sampling**
- ✓ **Stratified Sampling, Systematic Sampling and Cluster Sampling**

Ch 5: Inferential Statistics

- ✓ **Sampling variability and Central Limit Theorem**
- ✓ **Confidence Intervals**
- ✓ **Hypothesis Testing, A/B testing**
- ✓ **parametric vs non-parametric tests**
- ✓ **test for normality**
- ✓ **Z -test, t-test**
- ✓ **Chi – Square Test**
- ✓ **F -Test and ANOVA**

Ch 6: EDA

- ✓ **What is EDA?**
- ✓ **Uni - Variate Analysis**
- ✓ **Bi - Variate Analysis**
- ✓ **Usage of Seaborn for Pair plots, Heat Maps, Count Plot**
- ✓ **Introduction to Web Scrapping**

Ch 7: Advanced Regex for Unstructured Data

- ✓ **Structured Data and Unstructured Data**
- ✓ **Literals and Meta Characters**
- ✓ **How to Regular Expressions using Pandas?**
- ✓ **Inbuilt Methods**
- ✓ **Pattern Matching**
- ✓ **flags**

Module 7: Machine Learning

Ch 1: Introduction

- ✓ What is Machine Learning?
- ✓ Types of learning
- ✓ Approaches of machine learning algorithms
- ✓ Decision boundaries
- ✓ data pre-processing
- ✓ Under fit, optimal fit, over fit
- ✓ sklearn pipeline + model building

Ch 2: Validation Methods

- ✓ Cross-Validation
- ✓ The Validation Set Approach Leave-One-Out Cross-Validation
- ✓ k -Fold Cross-Validation
- ✓ Bias-Variance Trade-Off for k-Fold Cross-Validation

Ch 3: Naïve Bayes

- ✓ Principle of Naive Bayes Classifier
- ✓ Bayes Theorem
- ✓ Terminology in Naive Bayes
- ✓ Posterior probability
- ✓ Prior probability of class
- ✓ Likelihood
- ✓ Types of Naive Bayes Classifier
- ✓ Multinomial Naive Bayes
- ✓ Bernoulli Naive Bayes and Gaussian Naive Bayes
- ✓ Categorical naive bayes

Ch 4: Linear Algebra

- ✓ Introduction to Matrices
- ✓ Vector spaces
- ✓ Eigenvalues and Eigenvectors

Ch 5: K Nearest Neighbours

- ✓ K-Nearest Neighbour Algorithm
- ✓ Eager Vs Lazy learners
- ✓ How does the KNN algorithm work?
- ✓ How do you decide the number of neighbours in KNN?
- ✓ Weighted knn, ball tree, kd tree, lsh forest, cosine hashing
- ✓ Curse of Dimensionality
- ✓ Pros and Cons of KNN
- ✓ How to improve KNN performance
- ✓ Hyper parameters of knn

Ch 6: Decision Trees

- ✓ Basic Terminology in Decision Tree
- ✓ Root Node and Terminal Node
- ✓ Classification Tree
- ✓ Regression tree
- ✓ Trees Versus Linear Models
- ✓ Advantages and Disadvantages of Trees
- ✓ Gini Index
- ✓ Overfitting and Pruning
- ✓ Stopping Criteria
- ✓ Accuracy Estimation using Decision Trees
- ✓ Hyper parameter tuning using random search, grid search, kfold cv

Ch 7: Linear Regression

- ✓ Simple Linear Regression:
- ✓ Estimating the Coefficients
- ✓ Assessing the Coefficient Estimates

Ch 8: Multiple Linear Regression

- ✓ Estimating the Regression Coefficients
- ✓ OLS Assumptions
- ✓ Multicollinearity
- ✓ Feature Selection
- ✓ Gradient Discent

Ch 9: Evaluation metrics for Regression

- ✓ Homoscedasticity and Heteroscedasticity of error terms
- ✓ Residual Analysis
- ✓ Q-Q Plot
- ✓ Identifying the line of best fit
- ✓ R Squared and Adjusted R Squared
- ✓ M SE and RMSE

Ch 10: Polynomial Regression

- ✓ Why Polynomial Regression
- ✓ Creating polynomial linear regression
- ✓ Evaluating the metrics

Ch 11: Regularization Techniques

- ✓ Lasso Regularization
- ✓ Ridge Regularization
- ✓ ElasticNet Regularization

Ch 12: Logistic Regression

- ✓ An Overview of Classification
- ✓ Difference Between Regression and classification Models.

- ✓ Why Not Linear Regression?
- ✓ Logistic Regression:
- ✓ The Logistic Model
- ✓ Estimating the Regression Coefficients and Making Predictions
- ✓ Logit and Sigmoid functions
- ✓ Setting the threshold and understanding decision boundary
- ✓ Logistic Regression for >2 Response Classes
- ✓ Evaluation metrics for classification models

Ch 13: Support Vector machine

- ✓ The Maximal Margin Classifier
- ✓ HyperPlane
- ✓ Support Vector Classifiers and Support Vector Machines
- ✓ Hard and Soft Margin Classification
- ✓ Classification with Non-linear Decision Boundaries
- ✓ Kernel Trick
- ✓ Polynomial and Radial
- ✓ Tuning Hyper parameters for SVM
- ✓ Gamma, Cost and Epsilon
- ✓ SVMs with More than Two Classes

Ch 14: Ensemble Methods in Tree Based Models

- ✓ What is Ensemble Learning?
- ✓ What is Bootstrap Aggregation Classifiers and how does it work?
- ✓ Series vs parallel ensemblers

Ch 15: Random Forest Algorithm

- ✓ What is it and how does it work?
- ✓ Variable selection using Random Forest

Ch 16: Boosting

- ✓ Introduction to adaboost, Gradient Boosting, XG Boosting
- ✓ Working with the alogorithms
- ✓ Pros and Cons

Ch 17: ML for Data Analysis

- ✓ Missing Value imputation using Machine Learning Algorithms
- ✓ Outlier and Anomalies detection using Machine Learning Algorithms

Ch 18: Un-Supervised Learning

- ✓ Why Unsupervised Learning
- ✓ How it Different from Supervised Learning
- ✓ The Challenges of Unsupervised Learning

Ch 19: Dimensionality Reduction

- ✓ Introduction to Dimensionality Reduction and it's necessity
- ✓ What Are Principal Components?

- ✓ Demonstration of 2D PCA and 3D PCA
- ✓ EigenValues, EigenVectors and Orthogonality
- ✓ Transforming Eigen values into a new data set
- ✓ Proportion of variance explained in PCA
- ✓ t-Distributed stochastic neighbor embedding (t-sne)

Ch 20: K-Mean Clustering

- ✓ Centroids and Medoids
- ✓ Deciding optimal value of 'k' using Elbow Method
- ✓ Linkage Methods
- ✓ Clustering metrics - Silhouette score

Ch 21: Hierarchical Clustering

- ✓ Divisive and Agglomerative Clustering
- ✓ Dendrograms and their interpretation
- ✓ Applications of Clustering
- ✓ Practical Issues in Clustering

Ch 22: Other Learning ways in ML

- ✓ Reinforcement Learning
- ✓ Hybrid Learning models
- ✓ Other models

Module 8: Deep Learning

Ch 1: Introduction

- ✓ Introduction to AI , ML AND DL
- ✓ Difference between ML and DL
- ✓ When to use ML and DL
- ✓ History Of Deep Learning
- ✓ Introduction to Biological Neuron

Ch 2: Neural Networks

- ✓ Introducing Google Colab
- ✓ Tensorflow basic syntax
- ✓ Tensorflow Graphs
- ✓ Tensorboard

Ch 3: Forward and Backward Propogation

- ✓ MLP Architecture
- ✓ Defining the Notation for MLP
- ✓ Working of MLP (Forward Propagation
- ✓ How To Train Single Neuron Model
- ✓ Backpropagation -1 (chain rule)
- ✓ Backpropagation -2 (chain rule+ memorization)
- ✓ Hyperparameter In MLP

- ✓ Bias and Variance Trade-off In MLP
- ✓ Why Deep Neural Network Failed
- ✓ Activation Function -1 (Sigmoid)
- ✓ Activation Function -2 (Tanh)
- ✓ Vanishing Gradient Problem
- ✓ Exploding Gradient Problem
- ✓ Activation Function -3 (ReLU and ReLU Variants Linear and Non Linear Variants)
- ✓ Weight Initialization Techniques (pros and cons)
- ✓ Batch Normalization
- ✓ Early Stopping
- ✓ Tensor Board

Ch 4: Optimizers

- ✓ Convex Function And Non Convex Functions ,Saddle Point
- ✓ SGD with Momentum
- ✓ NAG
- ✓ Rmsprop
- ✓ Ada Delta
- ✓ Ada Grad
- ✓ ADAM
- ✓ NADAM

Ch 5: Keras

- ✓ Intro To Tensorflow and Keras
- ✓ Working

Module 9: Computer Vision

Ch 1: Images and image processing with OpenCV

- ✓ Intro To Images
- ✓ How Images are formed and stored in machines
- ✓ Color Spaces
- ✓ Intro To OpenCv
- ✓ read, write, save image
- ✓ Converting to Different Color Spaces
- ✓ Building Histograms for Images
- ✓ Read videos
- ✓ Capturing images with web camera
- ✓ Manipulating videos with opencv
- ✓ Drawing on images and videos
- ✓ Bitwise Operators On Images and Videos
- ✓ Affine and Non-Affine Transformation
- ✓ Object Detection

Ch 2: CNN

- ✓ Intro To CNN

- ✓ Why CNN over MLP
- ✓ How does Convolution works on images
- ✓ Padding, Stride, Pooling
- ✓ LeNet5
- ✓ Alex Net
- ✓ Vgg 16 and Vgg 19
- ✓ Inception Net
- ✓ ResNet
- ✓ Xception
- ✓ Mobile Net
- ✓ Efficient Net
- ✓ Pre trained Model Introduction

Ch 3: Transfer Learning

- ✓ Intro To Transfer Learning
- ✓ Transfer learning Concepts (When and Why)
- ✓ Transfer Learning Coding
- ✓ Hyper Parameter Tuning [Random Search, Hyperband, Bayesian optimization]
- ✓ Ch 4: Object Detection
- ✓ Intro To object Detection
- ✓ R-CNN
- ✓ Fast R-CNN
- ✓ Faster R-CNN # Show why Faster R CNN is faster than R CNN (no Need of Maths)

Ch 5: YOLO

- ✓ Intro to Yolo
- ✓ Yolo Algorithm (How it works) - More Detail on YOLO
- ✓ Implementation of Yolo V7 / V8 using Ultralytics

Moduel 10: Natural Language Processing

Ch 1 Introduction to text processing

- ✓ Intro to NLP
- ✓ Text Preprocessing Steps
- ✓ Tokenization
- ✓ Special Character
- ✓ Stop words
- ✓ Stemming & Lemmatization

Ch2: Vectorization Techniques

- ✓ BOW
- ✓ TF-IDF
- ✓ Coding for BOW and TF-IDF using nltk
- ✓ Word2Vec
- ✓ How Word2Vec algorithm works (Skip-Gram & CBOW)
- ✓ Glove

- ✓ FastText

Ch 3: RNN

- ✓ Intro to RNN
- ✓ Why RNN ?
- ✓ How RNN Works
- ✓ Trainning RNN
- ✓ Types of RNN

Ch 4: LSTM

- ✓ Intro to LSTM
- ✓ Why LSTM
- ✓ LSTM algorthim
- ✓ Grus
- ✓ Bi-Directional RNN
- ✓ Understanding of working of Image captioning

Ch 5: Auto Encoders

- ✓ Encoder Decoder Architecture
- ✓ Introduction to autoencoders
- ✓ Types of autoencoders

Ch 6: Transformer and attention

- ✓ Intro to Transformers and Attention Models
- ✓ How does Transformers works
- ✓ How does Attention works
- ✓ Coding For Transformers and Attention Models

Ch 7: BERT

- ✓ Intro to BERT
- ✓ How does BERT works
- ✓ Coding For Transformers and Attention Models

Module 11: AI & Gen AI

9. AI, Gen AI & Prompt Engineering

Ch 1: Introduction

- ✓ Introduction to Generative AI
- ✓ Overview of generative AI technologies.
- ✓ Applications and case studies across industries

Ch 2: Introduction to LLM

- ✓ History of NLP
- ✓ Into to large language Models

- ✓ What is Large Language Model
- ✓ Types of Large Language Model

Ch 3: Prompt Engineering

- ✓ Introduction
- ✓ Working with models

Ch 4: Popular Gen-AI application

- ✓ Intro To Open AI and Gemini
- ✓ Utilizing OpenAI APIs
- ✓ Setting up and authenticating API usage
- ✓ How to obtain an API key for Gemini.
- ✓ Overview of the Gemini API and accessing its features.
- ✓ Detailed exploration of different Gemini models.
- ✓ Selecting and initializing the right model for specific tasks

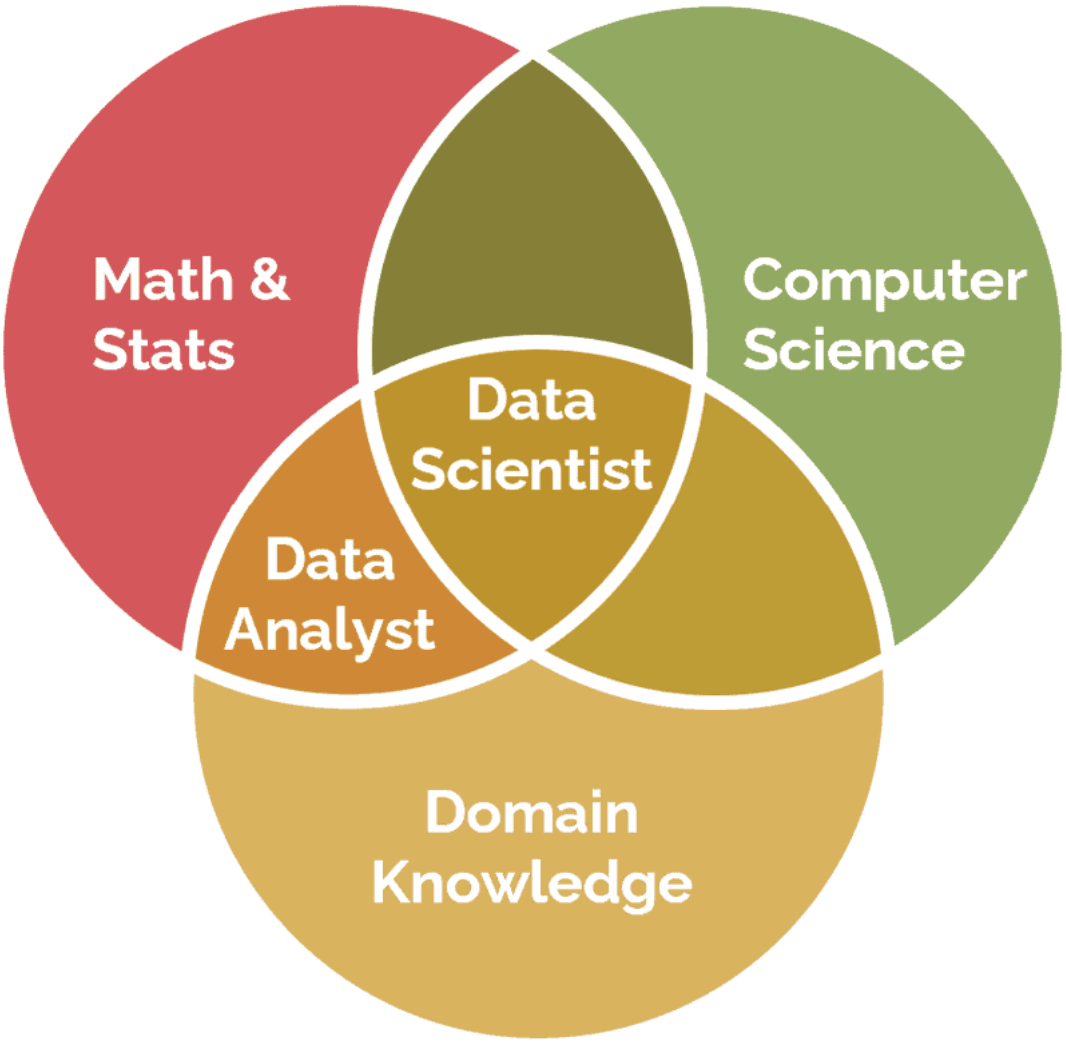
Ch 5: LLaMA

- ✓ Introduction of LLaMA .
- ✓ Comparison with other large language models like GPT-3 and GPT-4.
- ✓ Key features and capabilities of LLaMA
- ✓ Understanding the Model Architecture of LLaMA.
- ✓ Discussion on model sizes and capabilities.
- ✓ Environment setup: Installing necessary libraries and tools
- ✓ Accessing LLaMA models: Overview of the download process and setup on local machines or cloud platforms (Meta LLaMa).
- ✓ Intro to the architecture of LLaMA models
- ✓ Understanding the differences between LLaMA model variants (8B, 13B, 30B, and 70B parameters)
- ✓ Implementing text generation using LLaMA

Ch 6: LangChain

- ✓ Introduction to the LangChain framework
- ✓ Understanding the purpose and core components of LangChain Framework
- ✓ LangChain Setup and necessary dependencies
- ✓ Basic configuration and setup for development
- ✓ Step-by-step guide to creating a simple application using LangChain Framework
- ✓ Detailed walkthroughs of real-world applications built with LangChain

Resume, Mock Interview + Project FAQs and Solutions



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