AI/ML/DS 1 Credit Course

Learning Reference Guide –
Data Warehouse, SQL, NoSQL, Cloud Concept, Python, AI, ML

Version v1.0

Contents

Learning Objective: What do you gain from this program?

- To recall data warehousing and business intelligence fundamentals with examples. State Data Lakehouse and its importance. Compare Data Lakehouse to the traditional SQL data warehouse.
- To write SQL queries to perform complex operations. Learn advanced SQL concept with examples and differentiate NO SQL with RDBMS (which uses SQL) by their advantages and disadvantages.
- To get clear understanding of AWS, Azure, GCP fundamentals. Cloud Computing- Benefits of it. Basic knowledge on few products and services provided by AWS, Azure, GCP.
- Be aware of advanced Python concepts programming with real-life examples.
- To gain insights of fundamental concepts of Artificial Intelligence (AI), Basics of Machine Learning and how to use concepts, Prompt Engineering.

Recommended Week-wise Learning Plan

SESSION 1	SESSION 2	SESSION 3
5hrs (SME Connect)	**5hrs (SME Connect)**	**5hrs (SME Connect)**
Data Warehouse Concepts, SQL, NoSQL [Refresher Learning Provided in this document]	Python, Cloud Fundamentals [Refresher Learning Provided in this document]	AI, ML, Gen AI, Prompt Engineering [Refresher Learning Provided in this document]

Students should complete refresher before SME Connect

Every day 5 hours connect with SME - Subject Matter Expert
Session 1 - Data Warehouse Concepts - 3 hours, SQL, NoSQL - 2 hours
Session 2 - Python - 3 hours, Cloud Fundamentals - 2 hours

Session 3 - AI, ML - 3 hours, Prompt Engineering - 2 hours

Expectation from SME connect sessions.

- SME connect sessions should be an interactive session and expected to add business flavors/ real time project scenarios.
- Recap or doubt clarification session on a particular topic.
- Encourage learner's interaction and idea sharing.
- Identify and share areas of improvement and strength of the learners.
- Knowledge level checks to know the learners understanding.

Session 1 - Data Warehouse Concepts, SQL, NoSQL

Topic: Data Warehouse concepts	
Sub-Topics: Need for BI, Data Warehouse, Key terminologies related to DWH architecture: OLTP vs OLAP, ETL, Data Mart, Metadata, DWH Architecture, **Demo: creating a DWH**	https://www.youtube.com/watch?v=J326LIUrZM8
Topic: Data Lakehouse	
Sub-Topics: Data Lake to Data Swamp, SQL Relational Databases, Transactional Processing, Relational Database Workload Types, Architectural Challenges, Databricks Evolution	https://www.youtube.com/watch?v=Muyq3qtHzzo
Topic: ETL	
Sub-Topics: Extract Data Dump from source, Data format consistency, Data Quality rules, Truncate & Load, Load strategies, Load Approach, Transform, Mapping, Enriching, Joins, filter, Remove Duplicates, Aggregation, Load, Dimension, Facts, EDW Tables, Data Marts	https://www.youtube.com/watch?v=Tw44ml26Mos
Topic: Variety of ETL Tools	
Sub-Topics: Apache Airflow, Datastage,	https://www.datacamp.com/blog/a-list-of-the-16-best-etl-tools-and-

Oracle Data Integrator, SSIS, Talend, Hadoop, AWS Glue, Azure Data Factory, Google Cloud Dataflow, Stitch, SAP, Hevo, Qlik, Airbyte	why-to-choose-them
Topic: Informatica	
Sub-Topics: Informatica Architecture, Informatica PowerCenter & Repository, Informatica PowerCenter Designer, Informatica PowerCenter workflow manager, Informatica PowerCenter workflow monitor, Run Mappings, Workflow creation & Deletion	https://www.youtube.com/watch?v=Q2tX2v7KXhk
Topic: SQL (Beginner)	
Sub-Topics: DQL, DDL, DML, Filtering and sorting Data, Grouping and Aggregating Data, Joins and Subqueries, Window Functions, Optimizing SQL queries, Automation.	https://www.youtube.com/watch?v=oreAsJTNcsA
Topic: SQL (Advanced)	
Sub-Topics: Store Procedure, Trigger, Views, Functions.	https://www.youtube.com/watch?v=M-55BmjOuXY
Topic: NoSQL	
Sub-Topics: NoSQL Fundamentals and Comparison with SQL	https://www.youtube.com/watch?v=xQnIN9bW0og
Topic: Power BI	

Sub-Topics: Connecting Data Sources and DataBases, Data Modeling, Creating Calculated Fields in Power BI	https://www.youtube.com/watch?v=ootqUuVk_js

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Session 2 – Python, Cloud Fundamentals

Topic: Python (Beginner)	
Sub-Topics: Variables, Operators, functions, Libraries, Methods, Refactoring, Enum, Tuples, Dictionaries, sets, Map, filter, reduce, Class & objects, Exceptions, Overloading	https://www.youtube.com/watch?v=eWRfhZUzrAc
Topic: Python (Advanced)	
Sub-Topics: Iterators, Modules, Packages, Generators, List, Comprehensions, Regular expressions, Serialization, Partial functions, closures, Decorators	https://www.youtube.com/watch?v=Yrtm7d3TJbs
Topic: AWS	
Sub-Topics: Benefits of AWS, AWS Services - Computer, Storage, Database Service, Networking Service, Security Service, Management tool Service, Developer tool Service	https://www.youtube.com/watch?v=qu9rTSI_ZUU
Topic: Azure	
Sub-Topics: Cloud Computing, Services in Azure - Compute, Containers, Databases, Identity, Security, Networking, Storage	https://www.youtube.com/watch?v=3h0ZXIZvra0

Topic: GCP	
Sub-Topics: Cloud Computing, Benefits of GCP, GCP services, AWS vs Azure vs GCP	https://www.youtube.com/watch?v=vACTtmLWiQY
Topic: Python with Deep Learning	
Sub-Topics: Python Data Science Libraries, Numpy, Scipy, Pandas, Matplotlib, Scikit-Learn, Statsmodels, Pandas, Sorting, Concatenate, Preprocessing - Time Series Data, Visualization	https://www.youtube.com/watch?v=Rgz9SRg3DGw
Topic: Python with AI	
Sub-Topics: Introduction, Demand of AI, What is AI, Types of AI, Why python for AI, Python Packages for AI	https://www.youtube.com/watch?v=RpuObKwE43k

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Session 3 – AI, ML, Prompt Engineering

Topic: Artificial Intelligence	
Sub-Topics: Artificial intelligence and its types, AI Roadmap, Machine learning and its types, Linear regression Analysis, Classifications in Machine Learning	https://www.youtube.com/watch?v=faBRsREN1Dg
Topic: Machine Learning	
Sub-Topics: AI vs ML, Classification vs regression, Supervised learning, Unsupervised learning, Training Model, Preparing Data, K-Nearest Neighbors, Naive Bayes, Logistic	https://www.youtube.com/watch?v=i_LwzRVP7bg

Regression, Support Vector Machine, Neural Networks, Tensorflow, K-Means Clustering, Principal Component Analysis, K-Means and PCA Implementations	
Topic: Prompt Engineering	
Sub-Topics: Introduction to AI, Linguistics, Language Models, Prompt Engineering Mindset, Zero shot and few shot prompts, AI hallucinations, Vectors/text embeddings.	https://www.youtube.com/watch?v=_ZvnD73m40o
Topic: Generative AI Fundamentals	
Sub-Topics: Generative AI and its use cases, How do LLMS (Large Language Models) work, LLMs generates output for NLP task, LLM model decision criteria, Proprietary models, Fine tuned models, Mixing LLM flavors in workflow, Data privacy, Data security	https://www.youtube.com/watch?v=1fQ1DDMmiqo

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