

PROGRAM CURRICULUM

Advanced Certification in Data Science and AI

Syllabus overview

CORE CURRICULUM

Modules 01–09

MODULE 01 Preparatory Sessions – Python & Linux

- Python: Introduction to Python and IDEs
- Python Basics
- Object Oriented Programming
- Hands-on Sessions And Assignments for Practice
- Linux: Introduction to Linux
- Linux Basics
- Hands-on Sessions And Assignments for Practice

MODULE 02 Data Wrangling with SQL

- SQL Basics
- Advanced SQL
- Deep Dive into User Defined Functions
- SQL Optimization and Performance

MODULE 03 Python With Data Science

- Data Handling with NumPy
- Data Manipulation Using Pandas
- Data Preprocessing
- Data Visualization

MODULE 04 Linear Algebra and Advanced Statistics

- Descriptive Statistics
- Probability
- Inferential Statistics
- Linear Algebra

MODULE 05 Machine Learning

- Introduction to Machine learning
- Regression
- Classification
- Clustering

MODULE 06 Supervised Learning

- Linear Regression
- Logistic Regression
- Decision Tree
- Random Forest
- Support Vector Machine
- K-Nearest Neighbors
- Time Series Forecasting
- Performance Metrics
- Classification reports
- Confusion Matrix
- Evaluation Matrix

MODULE 07 Unsupervised Learning

- K-means
- Dimensionality reduction
- Linear Discriminant Analysis
- Principal Component Analysis

MODULE 08 Deep Learning Using TensorFlow

- Artificial Intelligence Basics
- Neural Networks
- Deep Learning

MODULE 09 Data Science Capstone Project

- Extracting, loading and transforming data into usable format to gather insights
- Data manipulation and handling to pre-process the data
- Feature engineering and scaling the data for various problem statements
- Model selection and model building on various classification, regression

problems using supervised/unsupervised machine learning algorithms • Assessment and monitoring of the model created using the machine learning models	

Program Curriculum

ADVANCED TOPICS & ELECTIVES — Modules 10–15

MODULE 10 Business Case Studies

- Recommendation Engine
- Rating Predictions
- Census
- Housing
- Object Detection
- Stock Market Analysis
- Banking Problem
- AI Chatbot

MODULE 11 Generative AI

- LSTM
- Transformers
- BERT
- GPT
- LLM

MODULE 12 Power BI · Elective

- Power BI Basics
- Data Visualization with Analytics

MODULE 13 Deploying Machine Learning Models With Cloud · Elective

- Introduction to MLOps
- Deploying Machine Learning Models

MODULE 14 GIT · Elective

- Version Control
- GIT

MODULE 15 Data Analysis With MS-Excel · Self-paced course

- Excel Fundamentals
- Excel For Data Analytics
- Data Visualization with Excel
- Excel Power Tools
- Classification Problems using Excel
- Information Measure in Excel
- Regression Problems Using Excel
- Hands-on Exercise

JOB READINESS — Career preparation

- Job Search Strategy
- Resume Building
- LinkedIn Profile Creation

SKILLS TO MASTER — Program outcomes

Python	**Data Science**	**Data Analysis**
Artificial Intelligence	**GIT**	**MLOps**
Data Wrangling	**SQL**	**Story Telling**
Machine Learning	**Prediction Algorithms**	**NLP**
PySpark	**Model**	**Data Visualization**

TOOLS TO MASTER — Technology toolkit

Matplotlib	**Python**	**Jupyter**	**SciPy**
NumPy	**Pandas**	**SQL**	**Excel**
Power BI	**Git**	**Spark SQL**	**PySpark**