Acquiescent
Consultancy Services India Pvt. Ltd.

Data Science

Course Pattern:

- Understanding the Business Goal and analyzing

Python

- Core Python
- Basics (Installation and Usage)
- Data & Primitive Data Types (Integer, Float, String, Bool, Complex)
- Variables & Operators with data
- Input & Output
- Type Casting
- Conditions While If – elif – else
- Data Structures Strings as Data Structure, List, Tuple, Dictionary, Set Properties of Data

Structure, Indexing & Slicing Data Structure Methods.

- Loops For , while List Comprehensions Break, Continue, Pass
- Functions User defined functions, Built-in Functions Generators & Decorators Lambda Map , Filter, Reduce

Python Assignments on, Conditions, Loops, Functions Exams & Mock Interviews

- Advanced Python
- OOP Object & Class
- Inheritance, Polymorphism, Encapsulation, Abstraction Class Methods & Static Methods
- Modules & Libraries Modules Parsing Arguments Libraries for Data Science
- Exception Handling
- File Handling
- Multi-Threading & Multi-Processing

Data collection for Features

- Primary
  - Manual Data Collection

- Secondary
  - Open Sources: Kaggle, UCI machine learning repository, Google Data Search
  - Databases: SQL (Import and export)
  - Web scraping: Extracting data from potential websites

Data Validation & Normalization

- Validating Collected Column/Features data
- Removing Extra Spaces or characters in column data if necessary

Data Insights (Stats & Visual)

- EDA (Uni-Variate, Bi-Variate, & Multi-Variate)
- Statistical Analysis
- Variables
- Variable Data Types Study
- Descriptive Stats
  - Measure of Central Tendency(Mean, Median, Mode)
  - Measure of Dispersion/Spread (Range, Standard Deviation, Variance, Quartiles,

IQR)

- Measure of Symmetry (Skewness and Kurtosis)
- Correlation, Co-linearity & Covariance
- Visual Analysis
- Bar plots, Boxplots, Pie charts, Histogram, Distplots
- Scatterplots, Pair plots, Heat maps
- Inferential Stats
  - Population and sample Probability, Distributions & Z scores Confidence Interval Central Limit theorem Hypothesis Testing
  - Z tests, Anova, Chi-Square

Data Preparation for Predictive Modeling

o Missing Values & Outliers Handling

o Input (X) & Output (y) cols selection

o Feature Engineering

- Feature Selection
- Feature Generation

- Feature modification

Data-Preprocessing

o Scaling (Scaling Numeric Data)

o Encoding (Converting Categorical Data to Numerical)

- Ordinal Data Encoding
- Nominal Data One hot Encoding

o Data Leakage

Predictive Modeling (AI)

o Modeling Basics

- Predictive Modeling & AI Introduction

o **Machine Learning (ML)**

- Train-Test Split
- Supervised Learning & Its Algorithms Regression

o **Linear Regression**

- Simple & Multiple
- Polynomial Regression

- Lasso(L1) & Ridge(L2)

o Non-Linear Regression

- Random forest
- Decision Tree Regressor
- Svm Regressor
- etc. Classification

o Class Imbalance

o Logistic Regression

o SVM

o KNN

o Naïve Bayes

o Decision Tree

o Random Forest

o Boosting and Bagging

- Model Evaluation Techniques Regression and Classification Metrics Cross-validation
- Bias-Variance Trade off

▪ Hyper-Parameter Tuning▪ Un- Supervised Learning & It’s algorithms Dimensionality Reduction

o PCA Clustering

o K-means

o H-Clustering

o DBSCAN Clustering

o Deep Learning (DL)

▪ Introduction to Neural Networks

Neurons in Human Brain

What are neural network

o structure of Neural Network

How Neural networks work

o Feed Forward Neural Network

▪ Forward Propagation

Weights

▪ Backward Propagation

Optimization (Gradient Descent)

- Types of Neural Networks

Artificial Neural Network (ANN)

Convolution Neural Network (CNN)

Recurrent Neural Network (RNN)

- ANN for Regression & Classification
- Working with Images Data
- Introduction to CNN

CNN Architectures

- Image Classification using CNN
- Introduction to Object Detection

Object Detection Vs Object Classification

OpenCv Object Detection

- Object detection models

Introduction to R-CNN, Faster R-CNN, YOLO etc....

Introduction to transfer learning

Custom Object Detection using YOLO recent version

- Working with Text data (Natural Language Understanding (NLU))

Collecting Text data according to Analysis

Text validation & Cleaning

o Tokenization

o Stop words

o Stemming/Lemmatization

Text Pre-Processing

o Converting Text to Numeric vectors

- N-grams
- BOW , TF-IDF
- Word2vec Word Embedding’s Language Modeling (Natural Language Generation (NLG))

o Sentiment Analysis/Text Classification Predictive Modeling using ANN/ML

o Introduction to Sequence Models

- RNN

Sequence data (Text/Time series)

Using RNN for Sequence data

- LSTM

o Model Types Based on RNN/LSTM

o Next word prediction/Translations/Q&A

Predictive Modeling using RNN/LSTM

Databases Overview

o Basics(Data Bases, Tables, Data Base Management System (DBMS), SQL)

o Working with Database Management System

- RDBMS (MySQL)

Relational Databases

o SQL, Queries (DDL, DML, Joins, and Aggregations using Group by, Filters...)

- NRDBMS (MongoDB)

Non-relational Databases

o No-SQL, Queries (CRUD)

Reporting Tool (Tableau or PowerBi)

- Introduction

- Tableau
  - Installation
  - Data Sources
  - Visualizations
  - Filters
  - Dashboard
  - Story

Case Study on Data Visualization

For More : https://acquiescent.in