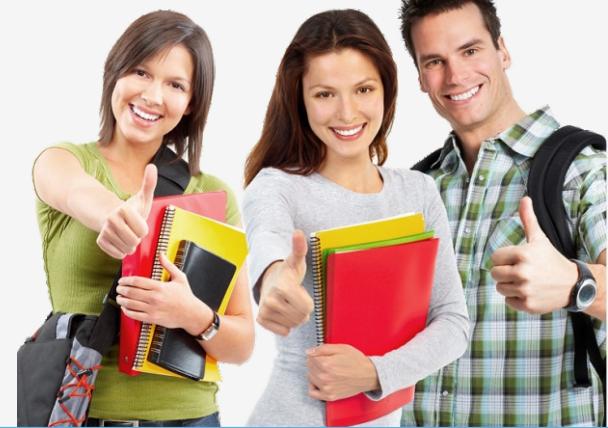# Data Science Professional

Course Highlights

Modules(Total 8)

- Python
- SQL (using MySQL)
- Statistics
- Power BI
- Tableau
- Adv. Excel & VBA
- Machine Learning
- Deep Learning

Projects(Total 7)

1 Project In Python & SQL

1 Report In Power BI

1 Dashboard In Tableau

2 projects In Machine Learning

2 projects In Deep Learning

Duration

Course Duration : 8-10 Months

Python

Introduction To Python

- Why Python
- Application Areas of Python
- Python Implementations
  - Cpython
  - Jython
  - IronPython
  - PyPy
- Python Versions
- Installing Python
- Python Interpreter Architecture
  - Python Byte Code Compiler
  - Python Virtual Machine(PVM)

Writing and Executing First Python Program

- Using Interactive Mode
- Using Script Mode
  - General Text Editor and Command Window
  - IDLE Editor and IDLE Shell
- Understanding print() function
- How to compile python program explicitly

Python Language Fundamentals

- Character Set
- Keywords
- Comments
- Variables
- Literals
- Operators
- Reading input from console
- Type conversion

Python Conditional Statements

- If Statement
- If else Statement
- If elif Statement
- If elif else Statement
- Nested If Statement

Looping Statements

- While Loop
- For Loop
- Nested Loops
- Pass ,Break and Continue keywords

Standard Data Types

- int,float,complex
- bool,NoneType
- str,list,tupledict
- set,frozenset

String Handling

- What is string
- String representations
- Unicode String
- String Functions, Methods
- String Repetition and concatenation
- String Indexing and Slicing
- String Formatting

Python List

- Creating and Accessing Lists
- Indexing and Slicing Lists
- List Methods
- Nested Lists
- List Comprehension

Python Tuple

- Creating Tuple
- Accessing Tuple
- Immutability of tuple

Python Set

- How to create a set
- Iteration Over Sets
- Python Set Methods
- Python Frozenset

Python Dictionary

- Creating a Dictionary
- Dictionary Methods
- Accessing values from Dictionary
- Updating dictionary
- Iterating dictionary
- Dictionary Comprehension

Python Functions

- Defining a Function
- Calling a Function
- Types of Functions
- Function v/s Method
- Function Arguments
    - Positional arguments, Keyword arguments,
    - Default arguments, Non default arguments,
    - Arbitrary arguments, Keyword Arbitrary arguments
- Function Return Statement
- Nested Function
- Function as argument
- Function as return statement
- Decorator function
- Closure
- map(),filter() ,reduce(),any() functions
- Anonymous or lambda Function

Modules & Packages

- Why Modules
- Script v/s Module
- Importing Module
- Standard & Third Party Modules
- Why Packages
- Understanding pip utility

File I/O

- Introduction to File Handling
- File modes
- Functions and methods related to File Handling
- Understanding with block

Regular Expressions(Regex)

- Need of regular Expressions
- re module
- Functions /Methods related to regex
- Meta Characters & Special Sequences

Object Oriented Programming

- Procedural v/s Object Oriented Programming
- OOP Principles

- Defining a Class & Object Creation
- Inheritanc
- Encapsulation
- Polymorphism
- Abstraction
- Garbage Collection Iterator &
- Generator

Exception Handling

- Difference Between Syntax Errors and Exceptions
- Keywords used in Exception Handling
  - try , except , finally , raise , assert
- Types of Except Blocks
- User-defined Exceptions

GUI Programming

- Introduction to Tkinter Programming
- Tkinter Widgets
  - Tk , Label , Entry , TextBox , Buttons
  - Frame , messagebox , filedialogetc
- Layout Managers
- Event handling
- Displaying image

Multi-Threading Programming

- Multi-processing v/s Multi-threading
- Need of threads
- Creating child threads
- Functions /methods related to threads
- Thread synchronization and locking

SQL using MySQL

Introduction to RDBMS

- Understanding data storage options
- Relational Database (RDBMS) Concept
- Installing MySQL Server database
- MySQL editors
- Difference between SQL & MySQL

MySQL Data Types

- Numeric types
- tinyint, smallint, mediumint, int, bigint, float, double, decimal

- Text types
- char, varchar, tinytext, text, mediumtext, longtext
- Date/Time types
- date, time, datetime, timestamp, year

MySQL Operators

- Arithmetic operators (+ ,-, *, /)
- Logical operators (and, or, not)
- Conditional operators (>,<,<>,=,like, between, in, is etc.)

MySQL CRUD operations

- C-creating rows
- R-Retrieving (Selecting) rows
- U-Updating rows
- D-Deleting rows

MySQL Constraints

- Not null, unique key
- Primary key, composite key
- Foreign key
- Default & check

MySQL Union & Joins

- Union,union all,except,intersect
- Inner Join,Natural Join
- Left Join,Right Join
- Full Join,Cross Join
- Self Join

MySQL View

- creating view
- updating view
- fetching data from view

MySQL Built-in Functions

- String functions
- Aggregate functions
- Date & time functions
- Window functions

Working with Subqueries

- Understanding SQL subqueries, their rules
- Statements and operators with which subqueries can be used

- Using the set clause to modify subqueries
- Understanding different types of subqueries, such as where, select, insert, update, delete, etc.
- Methods to create and view subqueries

Stored Procedures & Functions
- Why define user defined functions
- Limitations with functions
- Understanding stored procedures and their key benefits
- Working with stored procedures
- Studying user-defined functions

Event Handling using Triggers
- Understanding triggers
- Procedure versus trigger
- Why define logic inside trigger
- Types of triggers
- Old and New modifiers in trigger

Other Concepts
- Query optimization using index
- Savepoint
- Rollback
- Importing/exporting database

Python Database Connectivity
- Understanding driver/connector
- Creating database connection
- Understanding Cursor
- Executing queries
- Parameterized queries

Statistics & Analysis:

Introduction to Statistics
- Types of statistics
- Use of statistics
- Measures of Central Tendency
- Arithmetc Mean
- Harmonic Mean
- Geometric Mean
- Mode
- Quartile
- Standard Deviation

- Data Distributions
- Normal Distribution
- Uniform Distribution
- Right & Left Skewed Distribution
- Hypothesis Testing
- Normality Test
- Central Limit Theorem
- Mean Test
- T-test
- Z-test
- ANOVA test
- Chi Square Test
- Correlation and Covariance

Numpy Library

- Difference between list and numpy array
- Array and Matrix operations
- Array indexing and slicing

Pandas Library

- Labeled and structured data
- Series and DataFrame Objects
- From excel
- From csv
- From html table
- at & iat
- loc & iloc
- head() & tail()
- Exploratory Data Analysis (EDA)
- Data Manipulation & Cleaning
- Combining data frames
- Adding/removing rows & columns
- Sorting data
- Handling missing values
- Handling duplicate values
- Handling Data Error
- Label Encoding
- One Hot Encoding
- Handling Date and Time

Web Scraping

- Introduction to html & it's tags and attributes
- Requests & beautiful soup libraries
- Understanding methods to parse data
- Static versus dynamic data in web scraping

Data Visualization (matplotlib & seaborn libs)

- Scatter plot,lineplot,bar plot
- Histogram,pie chart
- Jointplot,pairplot,Heatmap
- Outlier detection using boxplot

POWER BI

INTRODUCTION TO POWER BI

- Introduction to Power BI
- Why Power BI
- Power BI Components
- Installation of Power BI Desktop
- Understanding report,data,model & dax query views
- Page layout & Formatting
- Column chart, Pie chart, Donut chart,
- Scatter chart, Funnel chart,KPI,line chart
- Tables & matrix
- Geographical data visualization using Maps
- Use of Hierarchies in drill down analysis
- Drill through
- Page navigations
- Bookmarks
- Selection pane to show/hide visuals
- Combinations charts (dual axis charts)
- Filter pane
- Slicers
- Sync slicers
- Tooltips & custom tooltips
- Conditional formatting on visuals

DAX & DATA MODELING

- Introduction of DAX
- Why DAX is used

- DAX functions
- Calculated columns using DAX
- Measures using DAX
- Calculated tables using DAX
- Learning about table, information, logical, text, iterator,
- Date and time functions
- Introduction of relationships
- Creating relationships
- Cardinality
- Cross filter direction
- Use of inactive relationships

DATA TRANSFORMATION (ETL)

- Shaping data using Power Query Editor
- Formatting data
- Transformation of data
- Understanding of Data types
- Naming conventions & best practices to consider
- Working with Parameters
- Merge Query
- Append Query
- Group by of data (aggregation of data)
- Duplicate & Reference tables
- Fill
- Pivot & Un-pivot of data
- Custom columns
- Conditional columns
- Replace data from the tables
- Split columns values
- Move columns & sorting of data
- Detect data type, count rows & reverse rows
- Promote rows as column headers

POWER BI SERVICE, PUBLISING & SHARING

- Introduction to Power BI Service
- Using 3rd party party visuals
- Introduction of workspaces
- Dashboard

- Creating & Configuring Dashboards
- Dashboard theme
- Reports vs Dashboards
- Sharing reports & dashboards
- Auto refresh
- On-premises data gateway integration

TABLEAU

- Tableau Introduction
- Comparing Tableau with Power bi
- Dimension & Measure
- Tableau Charts
- Tableau Filters
- Tableau Dashboards
- Tableau Story
- Calculated Fields
- Publishing Report to Server

Advanced Excel

Advanced Excel Course - Overview of the Basics of Excel

- Customizing common options in Excel
- Absolute and relative cells
- Protecting and un-protecting worksheets and cells

Working with Functions

- Writing conditional expressions (using IF)
- Using logical functions (AND, OR, NOT)
- Using lookup and reference functions (VLOOKUP, HLOOKUP, MATCH, INDEX)
- VLOOKUP with Exact Match, Approximate Match
- Nested VLOOKUP with Exact Match
- VLOOKUP with Tables, Dynamic Ranges
- Nested VLOOKUP with Exact Match
- Using VLOOKUP to consolidate Data from Multiple Sheets

Advanced Excel Course - Data Validations

- Specifying a valid range of values for a cell
- Specifying a list of valid values for a cell
- Specifying custom validations based on formula for a cell

Advanced Excel Course - Working with Templates

- Designing the structure of a template
- Using templates for standardization of worksheets

Advanced Excel Course - Sorting and Filtering Data

- Sorting tables
- Using multiple-level sorting
- Using custom sorting
- Filtering data for selected view (AutoFilter)
- Using advanced filter options

Advanced Excel Course - Working with Reports

- Creating subtotals
- Multiple-level subtotals
- Creating Pivot tables
- Formatting and customizing Pivot tables
- Using advanced options of Pivot tables
- Pivot charts
- Consolidating data from multiple sheets and files using Pivot tables
- Using external data sources
- Using data consolidation feature to consolidate data
- Show Value As (% of Row, % of Column, Running Total, Compare with Specific Field)
- Viewing Subtotal under Pivot
- Creating Slicers (Version 2010 & Above)

Advanced Excel Course - More Functions

- Date and time functions
- Text functions
- Database functions
- Power Functions (CountIf, CountIFS, SumIF, SumIfS)

Advanced Excel Course - Formatting

- Using auto formatting option for worksheets
- Using conditional formatting option for rows, columns and cells

Advanced Excel Course - Macros

- Relative & Absolute Macros
- Editing Macro's

Advanced Excel Course - WhatIf Analysis

- UGoal Seek
- Data Tables
- Scenario Manage

- Using Bar and Line Chart together
- Using Secondary Axis in Graphs
- Sharing Charts with PowerPoint / MS Word, Dynamically
- (Data Modified in Excel, Chart would automatically get updated)

Advanced Excel Course - New Features Of Excel
- Sparklines, Inline Charts, data Charts
- Overview of all the new features

Advanced Excel Course - Final Assignment
- The Final Assignment would test contains questions to be solved at the end of the Course

VBA (VISUAL BASIC FOR APPLICATION) & MACROS

Create a Macro:
- Swap Values, Run Code from a Module, Macro Recorder, Use Relative References,
- FormulaR1C1, Add a Macro to the Toolbar, Macro Security, Protect Macro.

MsgBox:
- MsgBox Function, Input Box Function.

Workbook and Worksheet Object:
- Path and Full Name, Close and Open, Loop through Books and Sheets, Sales Calculator, Files in a Directory, Import Sheets, Programming Charts.

Range Object:
- Current Region, Dynamic Range, Resize, Entire Rows and Columns, Offset, From Active Cell to Last Entry, Union and Intersect, Test a Selection, Possible Football Matches, Font, Background Colors, Areas Collection, Compare Ranges.

Variables:
- Option Explicit, Variable Scope, Life of Variables.

If Then Statement:
- Logical Operators, Select Case, Tax Rates, Mod Operator, Prime Number Checker, Find Second Highest Value, Sum by Color, Delete Blank Cells.

Loop:
- Loop through Defined Range, Loop through Entire Column, Do Until Loop, Step Keyword, Create a Pattern, Sort Numbers, Randomly Sort Data, Remove Duplicates, Complex Calculations, Knapsack Problem.

Macro Errors:
- Debugging, Error Handling, Err Object, Interrupt a Macro, Macro Comments.

String Manipulation:
- Separate Strings, Reverse Strings, Convert to Proper Case, Count Words.

Date and Time:
- Compare Dates and Times, DateDif Function, Weekdays, Delay a Macro, Year Occurrences, Tasks on Schedule, Sort Birthdays.

Events:
- Before DoubleClick Event, Highlight Active Cell, Create a Footer Before Printing, Bills and Coins, Rolling Average Table

Array:
- Dynamic Array, Array Function, Month Names, Size of an Array.

Function and Sub:
- User Defined Function, Custom Average Function, Volatile Functions, ByRef and ByVal.

Application Object:
- Status Bar, Read Data from Text File, Write Data to Text File.

ActiveX Controls:
- Text Box, List Box, Combo Box, Check Box, Option Buttons, Spin Button, Loan Calculator.

User form:
- User form and Ranges, Currency Converter, Progress Indicator, Multiple List Box Selections,

Machine Learning

Introduction To Machine Learning
- Traditional v/s Machine Learning Programming
- Real life examples based on ML
- Steps of ML Programming
- Data Preprocessing revised
- Terminology related to ML

Supervised Learning
- Classification
- Regression

Unsupervised Learning
- clustering

KNN Classification
- Math behind KNN
- KNN implementation
- Understanding hyper parameters

Performance metrics
- Confusion Matrix
- Accuracy Score

- Recall & Precision
- F-1 Score
- R2 Score

Regression

- Math behind Regression
- Simple Linear Regression
- Multiple Linear Regression
- Polynomial Regression
- Boston Price Prediction
- Cost or Loss Functions
  - Mean absolute error
  - Mean squared error
  - Root mean squared error
  - Least Square Error
- Regularization

Logistic Regression for classification

- Theory of Logistic Regression
- Binary and Multiclass classification
- Implementing titanic dataset
- Implementing iris dataset
- Sigmoid and softmax functions

Support Vector Machines

- Theory of SVM
- SVM Implementation
- kernel,gamma,alpha

Decision Tree Classification

- Theory of Decision Tree
- Node Splitting
- Implementation with iris dataset
- Visualizing Tree

Ensemble Learning

- Random Forest
- Bagging and Boosting
- Voting Classifier

Model Selection Techniques

- Cross Validation
- Grid and Random Search for hyper parameter tuning

Recommendation System
- Content based technique
- Collaborative filtering technique
- Evaluating similarity based on correlation
- Classification-based recommendations

Clustering
- K-means Clustering
- Hierarchical Clustering
- Elbow technique
- Silhouette coefficient

Text Analysis
- Install NLTK
- Tokenize words
- Tokenizing sentences
- Stop words customization
- Stemming and Lemmatization
- Feature Extraction
- Sentiment Analysis
- Count Vectorizer
- TfidfVectorizer
- Naive Bayes Algorithms

Dimensionality Reduction
- Principal Component Analysis(PCA)

Open CV
- Reading images
- Understanding Gray Scale Image
- Resizing image
- Understanding Haar Classifiers
- Face,eyes,smile,body classification
- How to use webcam in open cv
- Building image data set
- Capturing video
- Face classification in video

Deep Learning & Neural Networks

Introduction To Artificial Neural Network
- What is Artificial Neural Network (ANN)?

- How Neural Network Works?
- Perceptron
- Multilayer Perceptron
- Feed Forward
- Back propagation

Introduction To Deep Learning

- What is Deep Learning?
- Deep Learning Packages
- Deep Learning Applications
- Building Deep Learning Environment
  - Installing Tensor Flow Locally
  - Understanding Google Colab

Tensor Flow Basics

- What is Tensorflow?
- Variables, Constants
- Scalar, Vector, Matrix
- Operations using tensorflow
- Difference between tensorflow and numpy operations

Optimizers

- What does optimizers do?
- Gradient Descent (full batch and min batch)
- Stochastic Gradient Descent
- Learning rate,epoch

Activation Functions

- What does Activation Functions do?
- Sigmoid Function,
- Hyperbolic Tangent Function (tanh)
- ReLU –Rectified Linear Unit
- Softmax Function
- Vanishing Gradient Problem

Building Artificial Neural Network

- Using scikit implementation
- Using Tensorflow
- Understanding MNIST Dataset
- Initializing weights and biases
- Gradient Tape
- Defining loss/cost Function

- Train the Neural Network
- Minimizing the loss by adjusting weights and biases

Modern Deep Learning Optimizers and Regularization

- SGD with Momentum
- RMSprop
- AdaGrad
- Adam
- Dropout Layers and Regularization
- Batch Normalization

Building Deep Neural Network Using Keras

- What is Keras?
- Keras Sequential Model and Functional API
- Solve a Linear Regression and Classification Problem with Example
- Saving and Loading a Keras Model

Convolutional Neural Networks (CNNs)

- Introduction to CNN
- CNN Architecture
- Convolutional Operations
- Pooling,Stride and Padding Operations
- Data Augmentation
- Building,Training and Evaluating First CNN Model
- Model Performance Optimization
- Auto encoders for CNN
- Transfer Learning and Object Detection Using Pre-trained CNN Models
  - LeNet
  - AlexNet
  - VGG16
  - ResNet50
  - Yolo algorithm

Word Embedding

- WWhat is Word Embedding?
- Word2Vec Embedding
  - CBOW
  - skipgram
- Keras Embedding Layers
- Visualize Word Embedding
- Google Word2Vec Embedding
- GloVe Embedding

Recurrent Neural Networks (RNNs)

- Introduction to RNN
- RNN Architecture
- Types of RNN
- Implementing basic RNN in tensorflow
- Need for LSTM and GRU
- Deep RNN/LSTM/GRU
- Text Classification Using LSTM
- Prediction for Time Series problem
- Bidirectional RNN/LSTM
- Seq-2-Seq Modeling
- Encoder-Decoder Model
- Attention Mechanism

Speech Recognition APIs

- Text To Speech
- Speech To Text
- Automate task using voice
- Voice Search on Web

Partners : ORACLE
WORKFORCE DEVELOPMENT PROGRAM

redhat.
CERTIFIED
TRAINING PARTNER

UBI
Unica Business and Innovation Centre

edexcel

Java

DUCAT
The IT Training School

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