GUJARAT UNIVERSITY

Department of Animation, IT-IMS & Mobile Application

5 Yrs. Integrated Program (B.Sc. IT + M.Sc. IT) In Data Management & Visual Insight

Paper 1: Data Analytics Programming Language

Objectives:

At the end of the module candidate will be able to learn how to perform iterative operations in Pandas to make code more efficient, learn about evaluation expressions and how to use them, learn how to perform time series data analysis using a variety of methods. Candidates will be able to learn Structured Query Language which is the ubiquitous industry-standard database language and is possibly the most important skill for data analysts to know.

Pre-Requisites: Basic Knowledge of Python

Syllabus:

Block 1: Prepatory notes about Data Analytics, Data Science and Coding Standards.

Explained Relevant Terms, Programming Explained with example, Introduction of Jupyter and installing, Modules, Packages, and the Python Standard Library, Importing Modules, Introduction to Using NumPy and Pandas.

Block 2: Comprehensive Data Analytics with NumPy

Introduction to NumPy , NumPy-Matrix Language , Indexing and Slicing , NumPy-Broadcasting , NumPy-Iterating over array , NumPy-Mathematical Function , NumPy-Sort Function , NumPy-nonzero() ,

numpy-where() , numpy-extract(), Input-Output with NumPy.

Block 3: Comprehensive Data Analytics with Pandas

Introduction to Pandas , Data Preparation with Pandas , Series , DataFrame , Panel , DataFrame Operation , applying mathematical functions with Pandas DataFrame , Filtration of Data based on Condition , Sorting Data by Columns , Splitting data into Groups.

Block 4: Data uploading by using Pandas and Guided Projects.

Extending the features of DataFrame , Uploading excel file and working with it , Uploading CSV file and working with it , uploading PDF file and working with it. Working with excel various sheets , working with excel cells.

Paper 2: Advanced Python Programming

Objectives:

On successful completion of the course students will be able to learn about Object Oriented Concept like Encapsulation, Abstraction, Inheritance, Polymorphism along with GUI Tools where they can design the GUI, Perform the Event Occurrence and How to handle and Database connectivity.

Pre-Requisites: Basic Knowledge of Python

Syllabus:

Block 1: Python OOPS Concept

Main concepts of Object-Oriented Programming, Define the Class and Object and explain how it can be use in application development, Polymorphism, Constructor definition and Overloading, Function definition and overloading, Concept of Encapsulation, Practical examples of Inheritances.

Block 2: Python GUI Concept

Introduction to Tkinter, widgets in Tkinter, Creating GUI applications, creating a button, adding styles, adding image on a Tkinter button, Label widgets, Radio button, checkboxes, Menu Widget, Progress Bar, Connectivity with SQL.

Block 3: Python ODDO Concept

Getting started with Odoo – Starting Server and Using Odoo, learn how to build module in Odoo, learn what module includes, learn about how to inherit module, learn about advance views, learn about wizards, reports, dashboards, learn about building website and themes, Learn about API, In app purchase and app store.

Block 4: Guided Project

Paper 3: Business Intelligence Fundamentals

Objectives:

On successful completion of the course students will be able to perform analytical operations on data and will be able to make the dashboard.

Pre-Requisites: Basic Knowledge of Excel

Syllabus:

Block 1: Excel Function, Power pivot & Editor

Basic of Excel, Explanation of basic function, Vlookup, Hlookup and indexmatch Function, Explanation of pivot chart pivot table, Power query and editor, Exercise.

Block 2: Power BI

Introduction to Power BI and Installation of Power BI, how to import data in POWER BI and importance of data, Explain Canvas, Data, Visualization and Filter pane, Explain Report view, Dataview, Model View, Explain Different types graph in PowerBI, Explain Different types graph in PowerBI, Exercise.

Block 3: Data Manipulation & Filtering of Data

Slicers and Table, transforming data in power BI query editor, Exercise,

drilling down, Filtering data, Hierarchies, Explain Load and connection of more table in model view, how to make more effective report in POWER BI, Exercise.

Block 4: Data modeling, DAX & Project on Power BI

Visualization of Data, Data modeling in POWER BI, Exercise, Importance of DAX Function, Explain basic DAX Function, Exercise, Work on Capstone Project.

Paper 4: VCS & Cloud Fundamentals

Objectives:

On successful completion of the course students will be able to work on cloud application and technologies.

Pre-Requisites: Basic Knowledge of Cloud Application and Technologies.

Syllabus:

Block 1: VCS Fundamentals

What is VCS, why we use it , Introduction to Git, GitHub , Installation of Git , Open GitHub Account on website and create new repo , initialized git, adding files to git, track files , Status, git remote, creating branch , switching between branches, commit , Push, remove unwanted branch , Git ignore, add and update readme.

Block 2: Cloud Fundamentals and services

What is Cloud Computing, Types of Platforms- IaaS, PaaS, SaaS , Deployment models of Cloud , Public, Private, Hybrid, Community , Advantages of Cloud Applications , AWS CLI , CLI Practical , IAM Policy , IAM Role, IAM MFA , EC2 Initialization , EC2 running instance , Access EC2.

Block 3: More important services

Introduction to Simple Storage Service , S3 storage practical , S3 bucket details and upload object , S3 versioning , Introduction to Database , Introduction to RDS , RDS Practical , Introduction to Athena , Athena Practical.

Block 4: Faculty guided projects

Paper 5: Fundamentals of Statistical Analysis

Objectives:

At the end of the module candidate will be able to learn basic theoretical and applied principles of statistics needed to enter the job force. Candidate will be able to communicate key statistical concepts to non-statisticians. Candidate will gain proficiency in using statistical software for data analysis.

Pre-Requisites: Basic Knowledge of excel

Syllabus:

Block 1: Overview of Statistics

Introduction and definition of Statistics, Terminologies in Statistics - Statistics for Data Science, Types of Analysis, Quantitative Analysis, Qualitative Analysis, Categories in Statistics, Descriptive Statistics, Inferential Statistics, Descriptive statistics in excel.

Block 2: Descriptive Statistics

Understanding Descriptive analysis , Compute the mean, median and mode of values in a column , Compute sum, standard deviation and range of values in a column ,Percentiles , Range, Compute geometric mean, harmonic mean and trimmed mean , Widths - Practical Example.

Block 3: Advanced Statistical Analysis

Description about Measures of Variability , Variance , Standard deviation , Covariance , Skewness , Summary of descriptive statistics analysis , Measures of Correlation Between Pairs of Data , Pearson's Correlation , Spearman's Correlation

Block 4: Probability and Mathematical Expectation

Introduction - Definitions of Some Important Terms - Random Experiment - Trial Event - Favourable Cases - Equally Likely Events - Mutually Exclusive Events - Exhaustive Events - Dependent Events -

Independent Events - Classical approach to probability - Statistical approach to probability - Modern approach to probability - Symbols associated with probability - Algebra of sets - Conditional Probability - Theorems (Laws) of Probability(Without Proof only Examples) - Addition (Only for two events) - Multiplication (Only for two events) - Bayes' Rule(only for two events), Introduction to Probability Distributions , Probability Functions and Empirical Distributions , Introduction to Sampling and the Central Limit Theorem , Sampling Distributions - Practical Example , Central Limit Theorem - Practical Example.

Paper 6: Business Analytics

Objectives:

On successful completion of the course students will be able to learn the various functional model of business analytics. Students will be able to connect the SQL with Python and can perform the various operations in SQL through Python.

Pre-Requisites: Python fundamentals

Syllabus:

Block 1: Introduction to Database Management System & Basic SQL

Introduction of Database management system in SQL, Introduction of method in SQL like DDL, DML, TCL, DQL. Create database using command prompt & use of it, Explain Create table, insert values &

Datatypes with Example, explain update values in table & where clause with example, explain order by command, Delete, Truncate & Drop Table with example.

Block 2: Analytical function in SQL

Introduction to Basic Aggregation function in SQL like sum, count, distinct with example. Explain Group by and having command. Explain ALTER command with example. Explain different types of Joins in SQL with example. Introduction String function in SQL with Example. Introduction Date function in SQL with Example. Explain Case-when with example. Explain subquery & CTE in SQL.

Block 3: SQL Data Analytics using Python

SQL connection with Python, performing various operations (Table Creation, Record insertion, Views the Record, Conditional views, Group by statements, Record update, Record deletion, Table joining) using python connectivity. Performing Subqueries in SQL using Python, use string patterns and ranges; ORDER and GROUP result sets, and built-in database functions.

Block 4: Faculty Guided projects on SQL Analytics

(Minimum Four Industrial datasets)