Course: 303: Database handling using Python

Course Code	303
Course Title	Database Handling using Python
Credit	4
Teaching per Week	4 Hrs
Minimum weeks/ Semester	15 (Including Class work, examination, preparation etc.)
Review / Revision	June, 2021
Medium of Instruction	English
Purpose of Course	- The course is aimed to give knowledge about use of SQLite and handle the dataset using Python. Basic purpose of this course to impart knowledge about database handling, dumping and converting to csv and text file using Python. - It also aims to understand connecting dataset with Python and execute queries using Python.
Course Objective	1. To make students understand working with SQLite. 2. To make students understand various components of database like Triggers. 3. To make students understand handling database and dumping the database to csv and text file as well as converting csv and text files to database. 4. To make students understand the importance of library functions to connect python with SQLite and handle the database using python. 5. To handle csv and excel files using python and use various statistical analysis using Numpy and Pandas library. 6. To make student understand and learn matplotlib functions to perform basic visualization of data.
Pre-requisite	- SQLite Installation, setup and configuration should be shown practically as part of the preparation. - DDL-Create, Alter, Drop table, Rename, Column, Vacuum - DML-Insert, Update ,Delete, Replace - Constraints : Keys (Primary, Unique, Foreign), Null, Check Constraint - Views (Create and Drop).
Course Out come	As an outcome of the subject, it is expected that the students will gain conceptual and practical knowledge about handling database, dump the database, restore database, database interaction with python, important python libraries, and perform basic statistical analysis and basic Data Visualization.
Course Content	**Unit-1: Introduction to SQLite:** 1.1 SQLite advantages, features and Fundamentals: 1.1.1 SQLite datatype : (Dynamic type, SQLite manifest typing & type affinity) (NULL, INTEGER, REAL, TEXT, BLOB) 1.1.2 Transaction, Rollback, Commit 1.2 Data Filtering and Triggers 1.2.1 Filtering: Distinct, where, between, in, like, Union,

	intersect, Except, Limit, IS NULL 1.2.2 Having, Group by, Order by, Conditional Logic (CASE) 1.3 SQLite joins: Inner, left, cross, self, Full outer joins. 1.4 SQLite Trigger: 1.4.1 Concepts of Trigger, Before and After trigger (on Insert , Update, Delete) 1.4.2 Create, Drop trigger, Disable and Enable trigger **Unit-2: Database backup and CSV handling:** 2.1 SQLite dump : 2.1.1 Dump specific table into file, Dump only table structure 2.1.2 Dump entire database into file 2.1.3 Dump data of one or more tables into a file 2.2 CSV files handling: 2.2.1 Import a CSV file into a table 2.2.2 Export a CSV file from table **Unit-3: Python interaction with SQLite:** 3.1 Module: Concepts of module and Using modules in python. 3.1.1 Setting PYTHONPATH, Concepts of Namespace and Scope 3.1.2 Concepts of Packages in python 3.2 Importing sqlite3 module 3.2.1 connect () and execute() methods. 3.2.2 Single row and multi-row fetch (fetchone(), fetchall()) 3.2.3 Select, Insert, update, delete using execute () method. 3.2.4 commit () method. **Unit-4: Python Interaction with text and CSV:** 4.1 File handling (text and CSV files) using CSV module : 4.1.1 CSV module , File modes: Read , write, append 4.2 Important Classes and Functions of CSV modules: 4.2.1 Open(), reader(), writer(), writerows(), DictReader(), DictWriter() 4.3 Dataframe Handling using Panda and Numpy: 4.3.1 csv and excel file extract and write using Dataframe 4.3.2 Extracting specific attributes and rows from dataframe. 4.3.3 Central Tendency measures : 4.3.3.1 mean, median, mode, variance, Standard Deviation 4.3.4 Dataframe functions: head, tail, loc, iloc, value, to_numpy(), describe() **Unit-5: Data Visualization using dataframe:** 5.1 importing matplotlib.pyplot and plotting: (only two dimensional Plots) 5.1.1 range() , subplot() , legend(), columns(), len() functions. 5.2 scatter plot: concept of Scatter plot, set title, xlabel and ylabel) 5.3 Line chart : concept of line plot: plot(), set_title(), legend() 5.4 histogram chart : Concepts of histogram hist(),set title,

	xlabel and ylabel 5.5 Bar Chart : Concepts of Bar chart, bar(),set title, xlabel and ylabel.
	[Practical implementation for this paper is not specific to any editor or UI .]
Reference Book	1. Learning with Python, Author: Allen Downe Publisher: DreamTech Press, ISBN: 978-9351198147 2. Python: The Complete Reference, Author: by Martin C. Brown, McGraw Hill Education,ISBN:978-9387572942 3. Learning Python: Powerful Object-Oriented Programming: 5th Edition, Author: Lutz M, Publisher: Shroff, ISBN:978-9351102014 4. Python In - Depth, Author: Ahidjo Ayeva , Kamon Ayeva, Publisher: BPB Publication, ISBN:978-9389328424 5. 5. The SQLite Handbook, Author: by Rita Blackburn, Publisher: Emereo Publishing, ISBN:978-1489136459 6. Using SQLite, Author: Jay A. Kreibich, Publisher: O'Reily, ISBN:978-0596521189 7. Android SQLite Essentials, Author: Sunny Kumar Adity, Publisher: Packt Publishing:978-1783282951
Teaching Methodology	Class Work, Discussion, Self-Study, Seminars and/or Assignments
Evaluation Method	30% Internal assessment. 70% External assessment.