Informatics Practices
CLASS XII
Code No. 065
2023-2024

1. Distribution of Marks

Unit No	Unit Name	Marks
1	Data Handling using Pandas and Data Visualization	25
2	Database Query using SQL	25
3	Introduction to Computer Networks	10
4	Societal Impacts	10
	Total	70

Unit 1: Data Handling using Pandas -I
Introduction to Python libraries- Pandas, Matplotlib.
Data structures in Pandas - Series and Data Frames.
Series: Creation of Series from – ndarray, dictionary, scalar value; mathematical operations; Head and Tail functions; Selection, Indexing and Slicing.
Data Frames: creation - from dictionary of Series, list of dictionaries, Text/CSV files; display; iteration; Operations on rows and columns: add, select, delete, rename; Head and Tail functions; Indexing using Labels, Boolean Indexing;
Importing/Exporting Data between CSV files and Data Frames.
Data Visualization
Purpose of plotting; drawing and saving following types of plots using Matplotlib – line plot, bar graph,
histogram
Customizing plots: adding label, title, and legend in plots.

Unit 2: Database Query using SQL
Revision of database concepts and SQL commands covered in class XI Math functions: POWER (), ROUND (), MOD ().
Text functions: UCASE ()/UPPER (), LCASE ()/LOWER (), MID ()/SUBSTRING ()/SUBSTR (),
LENGTH (), LEFT (), RIGHT (), INSTR (), LTRIM (), RTRIM (), TRIM ().
Date Functions: NOW (), DATE (), MONTH (), MONTHNAME (), YEAR (), DAY (), DAYNAME ().
Aggregate Functions: MAX (), MIN (), AVG (), SUM (), COUNT (); using COUNT (*).

- **Completion of the Mid-Term Syllabus by 15th September 2023**
- **MID TERM EXAM**

Unit 2: Database Query using SQL
Querying and manipulating data using Group by, Having, Order by.
Working with two tables using equi-join

Unit 3: Introduction to Computer Networks
Introduction to networks, Types of network: PAN, LAN, MAN, WAN. Network Devices:

modem, hub, switch, repeater, router, gateway Network Topologies: Star, Bus, Tree, Mesh.
Introduction to Internet, URL, WWW, and its applications- Web, email, Chat, VoIP
Website: Introduction, difference between a website and webpage, static vs dynamic web page, web server and hosting of a website.
Web Browsers: Introduction, commonly used browsers, browser settings, add-ons and plug-ins, cookies.

Unit 4: Societal Impacts
Digital footprint, net and communication etiquettes, data protection, intellectual property rights (IPR), plagiarism, licensing and copyright, free and open-source software (FOSS), cybercrime and cyber laws, hacking, phishing, cyber bullying, overview of Indian IT Act.
E-waste: hazards and management.
Awareness about health concerns related to the usage of technology.

- **Complete the Annual Syllabus by 15th December 2023**
- **PRE BOARD EXAM**
- **Complete Syllabus will be covered in Annual Exam**

Practical Marks Distribution

S. No.	Unit Name	Marks
1	Programs using Pandas and Matplotlib	8
2	SQL Queries	7
3	Practical file (minimum of 15 programs based on Pandas, 4 based on Matplotlib and 15 SQL queries must be included)	5
4	Project Work (using concepts learned in class XI and XII)	5
5	Viva-Voce	5
	TOTAL	30

Project Work
The aim of the class project is to create tangible and useful IT application. The learner may identify a real-world problem by exploring the environment. e.g. Students can visit shops/business places, communities or other organizations in their localities and enquire about the functioning of the organization, and how data are generated, stored, and managed.
The learner can take data stored in csv or database file and analyze using Python libraries and generate appropriate charts to visualize.
Learners can use Python libraries of their choice to develop software for their school or any other social good.
Learners should be sensitized to avoid plagiarism and violation of copyright issues while working on projects. Teachers should take necessary measures for this. Any resources (data, image etc.) used in the project must be suitably referenced.
The project can be done individually or in groups of 2 to 3 students. The project should be started by students at least 6 months before the submission deadline.

Suggested Practical List

Data Handling

1. Create a panda's series from a dictionary of values and a ndarray
2. Given a Series, print all the elements that are above the 75th percentile.
3. Create a Data Frame quarterly sales where each row contains the item category, item name, and expenditure. Group the rows by the category and print the total expenditure per category.
4. Create a data frame for examination result and display row labels, column labels data types of each column and the dimensions
5. Filter out rows based on different criteria such as duplicate rows.
6. Importing and exporting data between pandas and CSV file

Visualization

7. Given the school result data, analyses the performance of the students on differentparameters, e.g subject wise or class wise.
8. For the Data frames created above, analyze, and plot appropriate charts with title andlegend.
9. Take data of your interest from an open source (e.g. data.gov.in), aggregate andsummarize it. Then plot it using different plotting functions of the Matplotlib library.

Data Management

10. Create a student table with the student id, name, and marks as attributes where thestudent id is the primary key.
11. Insert the details of a new student in the above table.
12. Delete the details of a student in the above table.
13. Use the select command to get the details of the students with marks more than 80.
14. Find the min, max, sum, and average of the marks in a student marks table.
15. Find the total number of customers from each country in the table (customer ID,customer Name, country) using group by.
16. Write a SQL query to order the (student ID, marks) table in descending order of themarks.