Informatics Practices (2022-23)
CLASS XI Code No. 065

1. **Prerequisite.** None

2**. Learning Outcomes**

At the end of this course, students will be able to:

- Identify the components of computer system.
- Create Python programs using different data types, lists and dictionaries.
- Understand database concepts and Relational Database Management Systems.
- Retrieve and manipulate data in RDBMS using Structured Query Language
- Identify the Emerging trends in the fields of Information Technology.

3. Distribution of Marks and Periods

Unit No	Unit Name	Marks	Periods Theory	Periods Practical	Total Period
1	Introduction to computer system	10	10	-	10
2	Introduction to Python	25	35	28	63
3	Database concepts and the Structured Query Language	30	23	17	40
4	Introduction to Emerging Trends	5	7	-	7
	Practical	30	-	-	-
	Total	100	75	45	120

4. Unit Wise syllabus

Unit 1: Introduction to Computer System

Introduction to computer and computing: evolution of computing devices, components of a computer system and their interconnections, Input/output devices.
Computer Memory: Units of memory, types of memory – primary and secondary, data deletion, its recovery and related security concerns.
Software: purpose and types – system and application software, generic and specific purpose software.

Unit 2: Introduction to Python

Basics of Python programming, Python interpreter - interactive and script mode, the structure of a program, indentation, identifiers, keywords, constants, variables, types of operators, precedence of operators, data types, mutable and immutable data types, statements, expressions, evaluation and comments, input and output statements, data type conversion, debugging.

Control Statements: if-else, for
loop

Lists: list operations - creating, initializing, traversing and manipulating lists, list methods and built-in functions.

Dictionary: concept of key-value pair, creating, initializing, traversing, updating and deleting elements, dictionary methods and built-in functions.

Unit 3: Database concepts and the Structured Query Language

Database Concepts: Introduction to database concepts and its need, Database Management System.

Relational data model: Concept of domain, tuple, relation, candidate key, primary key, alternate key

Advantages of using Structured Query Language, Data Definition Language, Data Query Language and Data Manipulation Language, Introduction to MySQL, creating a database using MySQL, Data Types

Data Definition: CREATE TABLE

Data Query: SELECT, FROM, WHERE.

Data Manipulation: INSERT

Unit 4: Introduction to the Emerging Trends

Artificial Intelligence, Machine Learning, Natural Language Processing, Immersive experience (AR, VR), Robotics, Big data and its characteristics, Internet of Things (IoT), Sensors, Smart cities, Cloud Computing and Cloud Services (SaaS, IaaS, PaaS); Grid Computing, Block chain technology.

Practical Marks Distribution

S.No.	Unit Name	Marks
1	Problem solving using Python programming language	11
3	Creating database using MySQL and performing Queries	**7**
4	Practical file (minimum of 14 python programs, and 14 SQL queries)	7
5	Viva-Voce	5
	Total	30

5. Suggested Practical List

5.1 Programming in Python

1. To find average and grade for given marks.
2. To find sale price of an item with given cost and discount (%).
3. To calculate perimeter/circumference and area of shapes such as triangle, rectangle, square and circle.
4. To calculate Simple and Compound interest.
5. To calculate profit-loss for given Cost and Sell Price.
6. To calculate EMI for Amount, Period and Interest.
7. To calculate tax - GST / Income Tax.
8. To find the largest and smallest numbers in a list.
9. To find the third largest/smallest number in a list.
10. To find the sum of squares of the first 100 natural numbers.
11. To print the first 'n' multiples of given number.
12. To count the number of vowels in user entered string.
13. To print the words starting with a alphabet in a user entered string.
14. To print number of occurrences of a given alphabet in each string.
15. Create a dictionary to store names of states and their capitals.
16. Create a dictionary of students to store names and marks obtained in 5 subjects.
17. To print the highest and lowest values in the dictionary.

5.3 Data Management: SQL Commands

18. To create a database
19. To create student table with the student id, class, section, gender, name, dob, and marks as attributes where the student id is the primary key.
20. To insert the details of at least 10 students in the above table.
21. To display the entire content of table.
22. To display Rno, Name and Marks of those students who are scoring marks more than 50.
23. To find the average of marks from the student table.

24. To find the number of students, who are from section ‘A’.
25. To display the information all the students, whose name starts with ‘AN’ (Examples: ANAND, ANGAD,..)
26. To display Rno, Name, DOB of those students who are born between ‘2005- 01-01’ and ‘2005-12-31’.
27. To display Rno, Name, DOB, Marks, Email of those male students in ascending order of their names.
28. To display Rno, Gender, Name, DOB, Marks, Email in descending order of their marks.
29. To display the unique section available in the table.

Suggested material

NCERT Informatics Practices - Text book for class - XI (ISBN- 978-93-5292-148-5)

Excluded topics

- Nested loop(Chapter -3, Section - 3.13)
- Loading and saving NumPy array in text files (Chapter-6, Sections- 6.10 and 6.11)