TERMWISE SYLLABUS

CLASS - XI

SUBJECT – Informatics Practices (New)

Code No. 065

(Optional for the academic year 2018-19 and mandatory for the academic year 2019-20 onwards)

Prerequisites

We are not assuming any pre-requisites for this course other than basic mathematical skills. However, it will be helpful if the student has a basic knowledge of Computer Applications.

Learning Outcomes

1. Basic computational thinking. Learn how to reason with variables, state transitions, conditionals, and iteration.
2. Notion of data types, and higher order data structures such as lists, and dictionaries.
3. Concepts of data handling: creating, managing and working with Data Frames using Python Pandas.
4. Structure of simple SQL queries.
5. Cyber safety.

Distribution of Marks

	Unit No.	Unit Name	Marks
	1.	Programming and Computational Thinking	30
	2.	Data Handling - 1	20
	3.	Data Management - 1	10
	4.	Society, Law and Ethics - 1	10
	5.	Practicals	30
		Total	**100**

TERM	CONTENTS
July 2018 to September 2018	**Programming and Computational Thinking (PCT-1)** • Basic computer organisation: describe a computer system and mobile system, CPU, memory, hard disk, I/O, battery, power, transition from a calculator to a computer • Familiarization with the basics of Python programming: a simple "hello world" program, process of writing a program, running it, and print statements; simple data-types: integer, float, string • Introduce the notion of a variable, and methods to manipulate it (concept of L-value and R-value even if not taught explicitly) • Knowledge of data types and operators: accepting input from the console, assignment statement, expressions, operators and their precedence. • Conditional statements: if, if-else, if-elif-else; simple programs: e.g.: absolute value, sort 3 numbers, divisibility. • Notion of iterative computation and control flow: for, while, flowcharts, decision trees and pseudo code; write a lot of programs: interest calculation, EMI, tax calculation (examples from GST), standard deviation, correlation • Lists and dictionary: finding the maximum, minimum, mean; linear search on a list of numbers, and counting the frequency of elements in a list using a dictionary. • Text handling: compare, concat, and substring operations. • Introduction to Python modules: creating and importing .
	Revision for SA - I Exam.
	Summative Assessment SA-I
Note: SA-II Examination will include the Syllabus covered in SA-I.	
OCTOBER 2018 TO JANUARY 2019	**Discussion of question paper of SA-I** **Data Handling (DH-1)** **I.** Introduction to Python Pandas • Introduction to data structures in Pandas: Series, and Data Frame. • Operations on a Series: head, tail, vector operations.

	• Data Frame operations: create, display, iteration, select column, add column, delete column. • Binary operations in a Data Frame: add, sub, mul, div, radd, rsub. • Matching and broadcasting operations. • Missing data and filling values. • Comparisons, Boolean reductions, comparing Series, and combining Data Frames. **II.** Transfer data between CSV files/SQL databases, and Data Frame objects **Data Management (DM-1)** • Relational databases: idea of a database and the need for it, relations, keys, primary key, foreign key; use SQL commands to create a table, keys, foreign keys; insert/delete an entry, delete a table. • SQL commands: select, project, and join; indexes, and a lot of in-class practice. • Basics of NoSQL databases - Mongo DB. **Society, Law and Ethics (SLE-1) - Cyber safety** • Cyber safety: safely browsing the web, identity protection, confidentiality, social networks, cyber trolls and bullying • Appropriate usage of social networks: spread of rumours, and common social networking sites (Twitter, LinkedIn, and Facebook) and specific usage rules. • Safely accessing web sites: adware, malware, viruses, Trojans • Safely communicating data: secure connections, eavesdropping, phishing and identity verification.
W I N T E R B R E A K	
FEBRUARY 2019	Revision Work , Topic Related Problems of Students and their Solutions .
MARCH-2019	**SA-II Examination, Evaluation and Result**

Practical

S.No.	Unit Name	Marks
1.	**Lab Test (12 marks)**	
	Python programs to test PCT (60% logic + 20% documentation + 20% code quality)	4
	Python programs to test data handling (same rules as above)	4
	SQL program (at least 4 queries)	4
2.	**Report File + viva (10 marks)**	
	Report file: Minimum 20 Python programs (PCT + DH) and at least 8 SQL commands	7
	Viva voce (based on the report file)	3
3.	Project (that uses most of the concepts that have been learnt)	8

Programming in Python:

At least the following Python concepts should be covered in the lab sessions: expressions, conditionals, loops, list, dictionary, and strings. The following are some representative lab assignments.

- Find the largest and smallest numbers in a list.
- Find the third largest number in a list.
- Find the sum of squares of the first 100 natural numbers.
- Find whether a string is a palindrome or not.
- Given two integers *x* and n, compute x^n.
- Compute the greatest common divisor and the least common multiple of two integers.
- Test if a number is equal to the sum of the cubes of its digits. Find the smallest and largest such numbers in the range of 100 to 1000.

Data Management: SQL Commands At least the following SQL commands should be covered during the labs: create, insert, delete, select, and join. The following are some representative assignments.

- Create a student table with the student id, name, and marks as attributes where the student id is the primary key.
- Insert the details of a new student in the above table.
- Delete the details of a particular student in the above table.
- Use the select command to get the details of the students with marks more than 80.
- Create a new table (name, date of birth) by joining two tables (student id, name) and (student id, date of birth).
- Create a new table (order ID, customer Name, and order Date) by joining two tables (order ID, customer ID, and order Date) and (customer ID, customer Name, contact Name, country).

Data Handling: The following are some representative lab assignments.

- Subtract the mean of a row from each element of the row in a Data Frame.
- Filter out rows based on different criteria such as redundant rows (same data as the row above or below).
- Find the sum of each column, or find the column with the lowest mean.
- Locate the 3 largest values in a data frame.
- Replace all negative values in a data frame with a 0.