

**SUBJECT – COMPUTER SCIENCE (083)****CLASS : XI**

Unit No.	Unit Name	Marks
1	Computer Systems and Organisation	10
2	Computational Thinking and Programming	45
3	Society, Law and Ethics	10
4	Practicals	30
<b>TOTAL</b>		<b>100</b>

Month	Topic	Sub Topic	Learning Outcomes	Innovative Pedagogy/ Art Integration/ Interdisciplinary Approach	Practical
April	Computer Systems and Organisation	<ul style="list-style-type: none"><li>• Basic computer organisation: description of a computer system and mobile system, CPU, memory, hard disk, I/O, battery</li><li>• Types of software: application, System, utility.</li><li>• Memory Units: bit, byte, MB, GB, TB, and PB.</li><li>• Boolean logic: OR, AND, NAND, NOR, XOR, NOT, truth tables, De Morgan's laws</li><li>• Information representation: numbers in base 2, 8, 16, binary addition</li><li>• Strings: ASCII, UTF8, UTF32, ISCII (Indian script code), Unicode</li><li>• Running a program: Notion of an operating system, how an</li></ul>	Ability to develop a basic understanding of computer systems - architecture, OS, mobile and cloud computing.	Prepare a presentation on Types of software. Memory units and number representation using binary, octal, decimal and hexa decimal.	Algorithms to convert the numbers from one base to the other.

		<p>operating system runs a program, idea of loading, operating system as a resource manager.</p> <ul style="list-style-type: none"> <li>• Concept of cloud computing, cloud (public/private), introduction to parallel computing.</li> </ul>			
<b>May</b>	<b>Basics of Python</b>	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Introduce the notion of a variable, and methods to manipulate it (concept of L-value and Rvalue even if not taught explicitly)</li> <li>• Knowledge of data types and operators: accepting input from the console, assignment statement, expressions, operators and their precedence.</li> </ul>	<p>Ability to understand basic computational thinking.</p> <p>Ability to understand the notion of data types, data structures.</p>	Python Coding in Lab. Assignment booklet for practice.	Basic Python Programs based on Input / Output statements and operators.
<b>July</b>	Conditional Statements in Python	<ul style="list-style-type: none"> <li>• if, if-else, if-elif-else; simple programs: e.g.: absolute value, sort 3 numbers, and divisibility.</li> <li>• Notion of iterative computation and control flow: for, while, flowcharts, decision trees and pseudo code; write a lot of programs: interest</li> </ul>	Ability to appreciate the notion of an algorithm, and understand its structure, including how algorithms handle corner cases	Python Coding in Lab. Sample codes to predict output and errors. Assignment booklet for practice	Python programs using Selection / looping constructs

		calculation, primarily testing, and factorials. • Idea of debugging: errors and exceptions; debugging: pdb, break points.			
<b>August</b>	Lists, tuples and dictionary	• Finding the maximum, minimum, mean; linear search on list/tuple of numbers, and counting the frequency of elements in a list using a dictionary. • Introduce the notion of accessing elements in a collection using numbers and names.	Ability to understand the concept of Lists, Tuples and Dictionary sequence data types.	Python Coding in Lab. Assignment booklet for practice.  Group presentation on ideal/safe settings of Social Media apps	Python programs using Lists, Tuples and Dictionaries
<b>September</b>	<b>HALF YEARLY EXAMINATION</b>				
<b>October</b>	Sorting & Strings	• Bubble and insertion sort; count the number of operations while sorting. • Compare, concat, substring; notion of states and transitions using state transition diagrams.	Ability to manipulate the list data. Learning the bubble sort and insertion sort algorithms.	Python Coding in Lab. Assignment booklet for practice. Real life examples – Google / Search engines match keywords using advanced searches.	Python programs to sort the data using bubble / insertion sort. Programs based on strings.
<b>November</b>	Introduction to Python modules	• Importing math module (pi, e, sqrt, ceil, floor, pow, fabs, sin, cos, tan); random module (random, randint, randrange), statistics module (mean, median, mode).	Understand the concept of built in modules	Python Coding in Lab. Assignment booklet for practice. Prepare a python program to manage records of your favourite sport.	Python programs based on Math module, random module
<b>December</b>	Society, Law and Ethics - Cyber safety	• Cyber safety: safely browsing the web, identity protection, confidentiality, social networks, cyber trolls and bullying	Ability to work in the cyber world with understanding of cyber ethics, cyber safety and cybercrime.	Prepare a questionnaire based on Cyber safety and ethics and conduct a survey on the awareness of level of people in the society.	Case study based on various cyber crimes.

		<ul style="list-style-type: none"> <li>• Appropriate usage of social networks: spread of rumours, and common social networking sites (Twitter, LinkedIn, and Facebook) and specific usage rules.</li> <li>• Safely accessing web sites: adware, malware, viruses, Trojans.</li> <li>• Safely communicating data: secure connections, eavesdropping, phishing and identity verification.</li> </ul>		Prepare a poster on Cyber Safety.	
December	Society, Law and Ethics	<ul style="list-style-type: none"> <li>• Intellectual property rights, plagiarism, digital rights management, and licensing (Creative Commons, GPL and Apache), open source, open data, privacy.</li> <li>• Privacy laws, fraud; cyber-crime- phishing, illegal downloads, child pornography, scams; cyber forensics, IT Act, 2000.</li> <li>• Technology and society:</li> <li>• understanding of societal issues and cultural changes induced by technology.</li> <li>• E-waste management: proper disposal of used electronic gadgets.</li> <li>• Identity theft, unique ids and biometrics.</li> <li>• Gender and disability issues while teaching and using computers.</li> </ul>	Ability to make use the value of technology in societies, gender and disability issues and the technology behind biometric ids.	Make a presentation based on real case studies to spread awareness about Cyber ethics and Laws.	-

February	ANNUAL EXAMINATION
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TEXT BOOK : Computer Science with Python by Preeti Arora (Publisher : Sultan Chand)

REFERENCE BOOK : Question Bank and Sample paper by Rachna Sagar

Computer Science with Python by Sumita Arora (Publisher : Dhanpat Rai)