MAHARSHI PATANJALI VIDYA MANDIR, PRAYAGRAJ
SYLLABUS BREAKUP: 2021-2022
SUBJECT: COMPUTER SCIENCE
CLASS - XI

MONTH	CHAPTER	TOPICS
MAY	GETTING STARTED WITH PYTHON & DATA HANDLING	INTRODUCTION TO PROBLEM SOLVING: STEPS FOR PROBLEM SOLVING (ANALYSING THE PROBLEM, DEVELOPING AN ALGORITHM, CODING, TESTING AND DEBUGGING). REPRESENTATION OF ALGORITHMS USING FLOW CHART AND PSEUDO CODE, DECOMPOSITION. FAMILIARIZATION WITH THE BASICS OF PYTHON PROGRAMMING: INTRODUCTION TO PYTHON, FEATURES OF PYTHON, EXECUTING A SIMPLE "HELLO WORLD" PROGRAM, EXECUTION MODES: INTERACTIVE MODE AND SCRIPT MODE, PYTHON CHARACTER SET, PYTHON TOKENS (KEYWORD, IDENTIFIER, LITERAL, OPERATOR, PUNCTUATOR), VARIABLES, CONCEPT OF L-VALUE AND R-VALUE, USE OF COMMENTS KNOWLEDGE OF DATA TYPES: NUMBER (INTEGER, FLOATING POINT, COMPLEX), BOOLEAN, SEQUENCE (STRING, LIST, TUPLE), NONE, MAPPING (DICTIONARY), MUTABLE AND IMMUTABLE DATA TYPES.
JULY	OPERATORS AND EXPRESSIONS, ERRORS	OPERATORS: ARITHMETIC OPERATORS, RELATIONAL OPERATORS, LOGICAL OPERATORS, ASSIGNMENT OPERATOR, AUGMENTED ASSIGNMENT OPERATORS, IDENTITY OPERATORS (IS, IS NOT), MEMBERSHIP OPERATORS (IN, NOT IN) EXPRESSIONS, STATEMENT, TYPE CONVERSION & INPUT/OUTPUT: PRECEDENCE OF OPERATORS, EXPRESSION, EVALUATION OF EXPRESSION, PYTHON STATEMENT, TYPE CONVERSION (EXPLICIT & IMPLICIT CONVERSION), ACCEPTING DATA AS INPUT FROM THE CONSOLE AND DISPLAYING OUTPUT ERRORS: SYNTAX ERRORS, LOGICAL ERRORS, RUNTIME ERRORS
	CONDITIONAL STATEMENT & FLOW OF CONTROL	FLOW OF CONTROL: INTRODUCTION, USE OF INDENTATION, SEQUENTIAL FLOW, CONDITIONAL AND ITERATIVE FLOW CONTROL CONDITIONAL STATEMENTS: IF, IF-ELSE, IF-ELIF-ELSE, FLOWCHARTS, SIMPLE PROGRAMS: E.G.: ABSOLUTE VALUE, SORT 3 NUMBERS AND DIVISIBILITY OF A NUMBER ITERATIVE STATEMENTS: FOR LOOP, RANGE FUNCTION, WHILE LOOP, FLOWCHARTS, BREAK AND CONTINUE STATEMENTS, NESTED LOOPS, SUGGESTED PROGRAMS: GENERATING PATTERN, SUMMATION OF SERIES, FINDING THE FACTORIAL OF A POSITIVE NUMBER ETC

AUGUST	STRING	STRINGS: INTRODUCTION, INDEXING, STRING OPERATIONS (CONCATENATION, REPETITION, MEMBERSHIP & SLICING), TRAVERSING A STRING USING LOOPS, BUILT-IN FUNCTIONS: LEN(), CAPITALIZE(), TITLE(), LOWER(), UPPER(), COUNT(), FIND(), INDEX(), ENDSWITH(), STARTSWITH(), ISALNUM(), ISALPHA(), ISDIGIT(), ISLOWER(), ISUPPER(), ISSPACE(), LSTRIP(), RSTRIP(), STRIP(), REPLACE(), JOIN(), PARTITION(), SPLIT()
	LIST	LISTS: INTRODUCTION, INDEXING, LIST OPERATIONS (CONCATENATION, REPETITION, MEMBERSHIP & SLICING), TRAVERSING A LIST USING LOOPS, BUILT-IN FUNCTIONS: LEN(), LIST(), APPEND(), EXTEND(), INSERT(), COUNT(), INDEX(), REMOVE(), POP(), REVERSE(), SORT(), SORTED(), MIN(), MAX(), SUM(); NESTED LISTS, SUGGESTED PROGRAMS: FINDING THE MAXIMUM, MINIMUM, MEAN OF NUMERIC VALUES STORED IN A LIST; LINEAR SEARCH ON LIST OF NUMBERS AND COUNTING THE FREQUENCY OF ELEMENTS IN A LIST
SEPTEMBER	TUPLES AND DICTIONARY	TUPLES: INTRODUCTION, INDEXING, TUPLE OPERATIONS (CONCATENATION, REPETITION, MEMBERSHIP & SLICING), BUILT-IN FUNCTIONS: LEN(), TUPLE(), COUNT(), INDEX(), SORTED(), MIN(), MAX(), SUM(); TUPLE ASSIGNMENT, NESTED TUPLE, SUGGESTED PROGRAMS: FINDING THE MINIMUM, MAXIMUM, MEAN OF VALUES STORED IN A TUPLE; LINEAR SEARCH ON A TUPLE OF NUMBERS, COUNTING THE FREQUENCY OF ELEMENTS IN A TUPLE DICTIONARY: INTRODUCTION, ACCESSING ITEMS IN A DICTIONARY USING KEYS, MUTABILITY OF DICTIONARY (ADDING A NEW ITEM, MODIFYING AN EXISTING ITEM), TRAVERSING A DICTIONARY, BUILT-IN FUNCTIONS: LEN(), DICT(), KEYS(), VALUES(), ITEMS(), GET(), UPDATE(), DEL(), CLEAR(), FROMKEYS(), COPY(), POP(), POPITEM(), SETDEFAULT(), MAX(), MIN(), COUNT(), SORTED(), COPY(); SUGGESTED PROGRAMS : COUNT THE NUMBER OF TIMES A CHARACTER APPEARS IN A GIVEN STRING USING A DICTIONARY, CREATE A DICTIONARY WITH NAMES OF EMPLOYEES, THEIR SALARY AND ACCESS THEM
OCTOBER	PYTHON MODULE & SORTING ALGORITHM	INTRODUCTION TO PYTHON MODULES: IMPORTING MODULE USING 'IMPORT <MODULE>' AND USING FROM STATEMENT, IMPORTING MATH MODULE (PI, E, SQRT, CEIL, FLOOR, POW, FABS, SIN, COS, TAN); RANDOM MODULE (RANDOM, RANDINT, RANDRANGE), STATISTICS MODULE (MEAN, MEDIAN,MODE) SORTING TECHNIQUES: BUBBLE AND INSERTION SORT

NOVEMBER	COMPUTER SYSTEMS AND ORGANISATION	BASIC COMPUTER ORGANISATION: INTRODUCTION TO COMPUTER SYSTEM, HARDWARE, SOFTWARE, INPUT DEVICE, OUTPUT DEVICE, CPU, MEMORY (PRIMARY, CACHE AND SECONDARY), UNITS OF MEMORY (BIT, BYTE, KB, MB, GB, TB, PB) TYPES OF SOFTWARE: SYSTEM SOFTWARE (OPERATING SYSTEMS, SYSTEM UTILITIES, DEVICE DRIVERS), PROGRAMMING TOOLS AND LANGUAGE TRANSLATORS (ASSEMBLER, COMPILER & INTERPRETER), APPLICATION SOFTWARE OPERATING SYSTEM (OS): FUNCTIONS OF OPERATING SYSTEM, OS USER INTERFACE BOOLEAN LOGIC: NOT, AND, OR, NAND, NOR, XOR, TRUTH TABLE, DE MORGAN'S LAWS AND LOGIC CIRCUITS NUMBER SYSTEM: BINARY, OCTAL, DECIMAL AND HEXADECIMAL NUMBER SYSTEM; CONVERSION BETWEEN NUMBER SYSTEMS. ENCODING SCHEMES: ASCII, ISCII AND UNICODE (UTF8, UTF32) EMERGING TRENDS: CLOUD COMPUTING, CLOUD SERVICES (SAAS, IAAS, PAAS), BLOCKCHAINS, ARTIFICIAL INTELLIGENCE (AI), MACHINE LEARNING (ML), INTERNET OF THINGS (IOT)
DECEMBER		
JANUARY	SOCIETY, LAW AND ETHICS	DIGITAL FOOTPRINTS DIGITAL SOCIETY AND NETIZEN: NET ETIQUETTES, COMMUNICATION ETIQUETTES, SOCIAL MEDIA ETIQUETTES DATA PROTECTION: INTELLECTUAL PROPERTY RIGHT (COPYRIGHT, PATENT, TRADEMARK), VIOLATION OF IPR (PLAGIARISM, COPYRIGHT INFRINGEMENT, TRADEMARK INFRINGEMENT), OPEN SOURCE SOFTWARES AND LICENSING (CREATIVE COMMONS, GPL AND APACHE) CYBER-CRIME: DEFINITION, HACKING, EAVESDROPPING, PHISHING AND FRAUD EMAILS, RANSOMWARE, PREVENTING CYBER CRIME CYBER SAFETY: SAFELY BROWSING THE WEB, IDENTITY PROTECTION, CONFIDENTIALITY, CYBER TROLLS AND BULLYING. SAFELY ACCESSING WEB SITES: MALWARE, VIRUSES, TROJANS, ADWARE E-WASTE MANAGEMENT: PROPER DISPOSAL OF USED ELECTRONIC GADGETS INDIAN INFORMATION TECHNOLOGY ACT (IT ACT) TECHNOLOGY & SOCIETY: GENDER AND DISABILITY ISSUES WHILE TEACHING AND USING COMPUTERS
FEBRUARY	PRESENTATION BASED ON RESEARCH.	
TEST – I	GETTING STARTED WITH PYTHON, DATA HANDLING, OPERATORS AND EXPRESSIONS, ERRORS	
HALF YEARLY EXAMINATION	GETTING STARTED WITH PYTHON, DATA HANDLING, OPERATORS AND EXPRESSION,ERRORS, CONDITIONAL STATEMENT & FLOW OF CONTROL, STRING, LIST	
TEST – II	TUPLES AND DICTIONARY, PYTHON MODULE & SORTING ALGORITHM	
ANNUAL EXAMINATION	GETTING STARTED WITH PYTHON, DATA HANDLING, OPERATORS AND EXPRESSION,ERRORS, CONDITIONAL STATEMENT & FLOW OF CONTROL, STRING, LIST, TUPLES AND DICTIONARY, PYTHON MODULE & SORTING ALGORITHM, COMPUTER SYSTEMS AND ORGANISATION, SOCIETY, LAW AND ETHICS	

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MONTH	CHAPTER
MAY - SEPTEMBER	• GETTING STARTED WITH PYTHON & DATA HANDLING • OPERATORS AND EXPRESSIONS • OPERATORS AND EXPRESSIONS • STRING • LIST
OCTOBER- FEBRUARY	• TUPLES AND DICTIONARY • PYTHON MODULE & SORTING ALGORITHM • COMPUTER SYSTEMS AND ORGANISATION

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MONTH	Topics	PRACTICAL
JULY	Programming in Python: I	1. Input a welcome message and display it. 2. Input two numbers and display the larger / smaller number. 3. Input three numbers and display the largest / smallest number. 4. Given two integers x and n, compute x^n. 5. Write a program to input the value of x and n and print the sum of different series. 6. Determine whether a number is a perfect number, an armstrong number or a palindrome. 7. Input a number and check if the number is a prime or composite number. 8. Display the terms of a Fibonacci series. 9. Compute the greatest common divisor and least common multiple of two integers. 10. Count and display the number of vowels, consonants,
AUGUST		

SEPTEMBER		uppercase, lowercase characters in string. 11. Input a string and determine whether it is a palindrome or not; convert the case of characters in a string. 12. Find the largest/smallest number in a list/tuple
OCTOBER	Programming in Python: II	13. Input a list of numbers and swap elements at the even location with the elements at the odd location. 14. Input a list of elements, sort in ascending/descending order using Bubble/Insertion sort. 15. Input a list/tuple of elements, search for a given element in the list/tuple. 16. Input a list of numbers and test if a number is equal to the sum of the cubes of its digits. Find the smallest and largest such number from the given list of numbers. 17. Create a dictionary with the roll number, name and marks of n students in a the names of students who have marks above 75.
NOVEMBER		
DECEMBER		
JANUARY		
FEBRUARY	PRESENTATION BASED ON RESEARCH	