



C. U. SHAH UNIVERSITY, WADHWAN CITY.

Faculty of: **Sciences & Life Sciences**

Course: **Bachelor of Science (Mathematics)**

Semester: **I**

Subject Code: **MDC201-1C**

Subject Name: **Python Software**

Sr. No	Category	Subject Code	Subject Name	Teaching hours/ Week			Credit hours	Credit Points	Evaluation Scheme/ Semester								
				Th	Tu	Pr			Theory				Tutorial / Practical				Total
									Continuous and Comprehensive Evaluation		End Semester Exams		Internal Assessment		End Semester Exams		
									Marks	Marks	Marks	Duration	Marks	Duration	Marks	Duration	
4	MDC	MDC201-1C	Python Software	3	-	2	5	4	10	Assignment	50	2	25	1	-	-	100

Course Objective :

- To define the structure and components of a Python program.
- To learn how to write loops and decision statements in Python.
- To learn how to write functions and pass arguments in Python.
- To learn how to build and package Python modules for reusability.

COURSE CONTENTS

Course Outline for Theory

UNIT	COURSE CONTENT	TEACHING HOURS
I	<p>Python Programming Language: features, Installing Python. Running Code in the Interactive Shell, IDLE. Input, Processing and Output, Editing, Saving, and Running a Script.</p> <p>Data types and expressions: Variables and the Assignment Statement, Program Comments and Doc strings. Data Types-Numeric integers and Floating-point numbers. Boolean string, Mathematical operators, PEMDAS. Arithmetic expressions, Mixed-Mode Arithmetic and type Conversion, type(), Input(), print(), program comments. id(), int(), str(), float().</p> <p>Loops and selection statements: Definite Iteration: for Loop, Executing statements a given number of times, Specifying steps using range(), Loops that count down, Boolean and Comparison operators and Expressions, Conditional and alternative statements- Chained and Nested Conditionals: if, if-else, nested if, nested if-else. Compound Boolean Expressions, Conditional Iteration: while Loop –with True condition, break Statement. Random Numbers. Loop Logic, errors and testing.</p> <p>Strings: Accessing characters, indexing, slicing, replacing, Concatenation (+), Repetition (*). Searching a substring with the ‘in’ Operator, Traversing string using while and for. String methods- find, join, split, lower, upper. len().</p>	10
II	<p>Lists: Accessing and slicing, Basic Operations (Comparison, +), List membership and for loop. Replacing element (list is mutable). List methods append, extend, insert, pop, sort. max(), min().</p> <p>Tuples, Dictionaries: Creating a Dictionary, Adding keys and replacing Values ,</p>	10

	dictionary - key(), value(), get(), pop(), Traversing a Dictionary. Math module: sin(), cos(), exp(), sqrt(), constants- pi, Design with functions: Defining Simple Functions- Parameters and Arguments, the return Statement, tuple as return value. Boolean Functions, Defining a main function, Defining and tracing recursive functions. Working with Numbers: Calculating the Factors of an Integer, Generating Multiplication Tables, converting units of measurement, Finding the roots of a quadratic equation	
III	Algebra and Symbolic Math with SymPy: symbolic math using the SymPy library. Defining Symbols and Symbolic Operations, factorizing and expanding expressions, substituting in Values, Converting strings to mathematical expressions. Solving equations, solving quadratic equations, Solving for one variable in terms of others, solving a system of linear equations. Plotting using SymPy: Plotting expressions input by the user, Plotting multiple functions.	10

Course Outline for Practical

SR. NO	COURSE CONTENT	Lab Hours
1	Convert number from decimal to binary system.	30
2	Convert number from decimal to octal system	
3	Convert from Hexadecimal to binary system.	
4	Write a program to read one subject mark and print pass or fail. Use single ReturnValues function with argument.	
5	Find the median of a given set of numbers	
6	Write a Python function that takes two lists and returns True if they have at least one common member.	
7	Write a program for Enhanced Multiplication Table Generator.	
8	Write down Unit converter code. Write down Fraction Calculator code.	
9	Write down Graphical Equation Solver code. Write down a code for solving Single-Variable Inequalities.	
10	repare an investment report by calculating compound interest. Write a python program to open and write the content to file and read it. Write a python program to check whether a given year is leap year or not and also print all the months of the given year.	

TEACHING METHODOLOGY:

Conventional method (classroom blackboard teaching)

ICT Techniques

Teaching through the classroom

Variety of learning styles and tools (PowerPoint presentations, audio-visual resources, e-resources, seminars, workshops, models)

Arrangement of lectures duration and practical session as per defined credit numbers:

Units	Lecture Duration (In Hrs.)		Calculation of Credits (In Numbers)		Total Lecture Duration	Credit Calculation
	Theory	Practical	Theory	Practical	Theory+ Practical	Theory+ Practical
Unit – 1	15	30	3	1	45+30	4
Unit – 2	15					
Unit – 3	15					
TOTAL	45	30	3	1	75	4

Evaluation:

Theory Marks	Practical Marks	Total Marks
75	25	100

REFERENCE BOOKS:

1. Kenneth A Lambert, Fundamentals of Python: First programs, 2nd edition – Cengage Learning India, 2019.
2. Saha Amit, Doing Math with Python - No starch press, San Francisco, 2015
3. E. Balgurusamy, Problem solving and Python programming- Tata McGraw Hill, 2017.

NPTEL / Swayam Courses Link:

1. <https://archive.nptel.ac.in/courses/111/106/111106149/>
2. <https://nptel.ac.in/courses/106106145>