Programme: Diploma in Information Technology (Sandwich Pattern)													
Course Code: IT23					**Course Title: Python Programming**								
Compulsory / Optional: Compulsory													
Teaching Scheme and Credits							**Examination Scheme**						
CL	**TL**	**LL**	**SLH**	**NLH**	**Credits**	**FA-TH**		**SA-TH (2:30 Hrs.)**	**FA-PR**	**SA**		**SLA**	**Total**
										PR	**OR**		
3	-	4	1	8	4	20	20	60	25	25#	-	25	175

Total IKS Hrs. for course:

Abbreviations: CL- Class Room Learning, TL- Tutorial Learning, LL- Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, SLA- Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination, @$ Internal Online Examination

Note:
1. FA-TH represents an average of two class tests of 20 marks each conducted during the term.
2. SA-TH represents the end term examination.

I. Rationale

Python is powerful programming language. It has efficient high level data structure and a simple but effective approach to object oriented programming. Python code is simple,short, readable, intuitive and powerful and thus it is effective for introducing computing and problem solving to beginners. It's elegant syntax and dynamic typing together with its interpreted nature make it ideal language for scripting and rapid application development in many areas and most platforms.

II. Industry / Employer Expected Outcome

This course develops necessary skills in students to apply object oriented programming techniques in Python so that students will be able to develop complete applications using Python Programming.

III. Course Outcomes: Students will be able to achieve & demonstrate the following COs on completion of course based learning

CO1	Perform different operation on data structures in python with decision making and functions
CO2	Apply object oriented concept in python programming.
CO3	Perform file handling with exceptions.
CO4	Validate the fields using regular expression
CO5	Design GUI forms and Database connectivity

Course Content Details:

Unit No.	Theory Learning Outcomes (TLO's)aligned to CO's	Topics / Sub-topics
1	**TLO 1.1:** **TLO 1.2**: **TLO 1.3:** **TLO 1.4:** **TLO 1.5:** **TLO 1.6:**	**Introduction to Python** 1.1 Features of Python 1.2 Python building blocks: Identifiers ,Keywords , Indention ,Variables ,Comments 1.3 Python Environment setup: Installation and working on IDE. 1.4 Python Data Types: Number, String, Tuple, Array, List, Dictionary Declaration and use of data types. 1.5 Basic Operations: Arithmetic ,Comparison/Relational ,Logical ,Assignment , Bitwise ,Membership ,Identity Operator **Course Outcome: CO1** **Teaching Hours: 05 hrs** **Marks: 10**
2	**TLO 2.1:**. **TLO 2.2**: **TLO 2.3:**. **TLO 2.4:** **TLO 2.5:** **TLO 2.6:**	**Decision Making and Functions** 2.1 decision making statements(if ….elif…else , Nested if) 2.2 looping statement(for ,while) 2.3 Loop Manipulation using continue, break, pass statements 2.4 Functions 2.5 Use Of Python Built –in -Functions: type/data conversion functions, Maths Functions **Course Outcome: CO1,** **Teaching Hours: 10 hrs** **Marks: 10**

3	**TLO 3.1:**. **TLO 3.2:** **TLO 3.3:** **TLO 3.4:** **TLO 3.5:** **TLO 3.6:** **TLO 3.7:**	**Object Oriented Programming in Python** 3.1 Creating a Class 3.2 Self Variables, Types of Methods, Constructors, Inheritance, Polymorphism 3.3 Operator Overloading 3.4 Method Overloading & Overriding 3.5 Exception Handling Errors in a Python Program Exceptions Types of Exceptions The Except Block 3.6 Introduction to Multithreading. **Course Outcome: CO2** **Teaching Hours: 10 hrs** **Marks: 10**
4	**TLO 4.1:** **TLO 4.2:** **TLO 4.3:**	**File Handling** 4.1 Types of Files in Python Opening a File Closing a File 4.2 Knowing Whether a File Exists or Not 4.3 Working with Binary Files 4.4 Appending Text to a File 4.5 Understanding read functions, read(), readline() and readlines() 4.6 Understanding write functions, write() and writelines() 4.7 Manipulating file pointer using seek 4.8 File Exceptions **Course Outcome: CO3** **Teaching Hours: 05 hrs** **Marks: 8**
5	**TLO 5.1:** **TLO 5.2:** **TLO 5.3**: **TLO 5.4:** **TLO 5.5:** **TLO 5.6:** **TLO 5.7:** **TLO 5.8:**	**Python Regular Expressions** 5.1 Powerful pattern matching and searching 5.2 Power of pattern searching using regex in python 5.3 Password, email, url validation using regular expression **Course Outcome: CO4** **Teaching Hours: 05 hrs** **Marks: 10**

6	**TLO 6.1:** **TLO 6.2:** **TLO 6.3**: **TLO 6.4:** **TLO 6.5:** **TLO 6.6** **TLO 6.7:**	**GUI Programming and Databases** 6.1 GUI Programming: 6.2 Writing a GUI with Python GUI Programming Toolkits Creating GUI Widgets with Tkinter Creating GUI using Turtle Creating Layouts, Radio Buttons and Checkboxes, Dialog Boxes. 6.3 Database Access Python's Database Connectivity Types of Databases Used with Python Mysql database Connectivity with Python Performing Insert, Deleting & Update operations on database **Course Outcome: CO5** **Teaching Hours: 10 hrs** **Marks: 12**

IV. Laboratory Learning Outcome and Aligned Practical / Tutorial Experiences.

NOTE: Total 10 experiments (or turns) out of 18 experiments (or turns)

Sr No	Practical / Tutorial / Laboratory Learning Outcome (LLO)	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
1	**LLO**:	Write python programs to understand Expressions, Variables, Basic Math operations, Strings: Basic String Operations & String Methods. (Minimum four Programs based on math operations, Strings)	4	CO1
2	**LLO**:	Develop programs to understand the control structures of python (minimum 4 programs on decision making and looping) 1.Armstrong Number 2. factorial number 3. Array calculations 4. even odd number OR any other suggested by teacher	4	CO2
3	**LLO**:	Write python programs to understand classes and objects. (minimum 2 programs to create classes and objects)	4	CO2
4	**LLO**:	Write python programs to understand different File handling operations 1. Create a file Copy contents from one file to another file.	4	CO3

5	**LLO**:	Develop programs to validate the fields using regular expressions in python.	4	CO4
6	**LLO**:	1. Develop programs to learn GUI programming using Tkinter 2. Develop a program to draw different shapes on Canvas using Tkinter	4	CO5
7	**LLO**:	Develop programs to learn different types of structures and operations on (list, dictionary, tuples, arrays) in python. 1. Add 2. Delete 3. Merge 4. Sort 5. Membership Operator	4	CO1
8	**LLO**:	Develop a python programs for function 1. Returing result from a function Returing multiple values from a function (minimum 4 similar programs for practice)	4	CO1
9	**LLO**:	Develop a program for Functions are First class objects 1. Assign function to a variable 2. to define one function inside another function 3. to pass a function as parameter to another function a function can return another function	4	CO1
10	**LLO**:	Develop a program for 1. pass by value or call by value 2. pass by reference or call by reference 3. Types of arguments lambda Functions	4	CO2
11	**LLO**:	Write a python program to implement multiple inheritances.	4	CO3
12	**LLO**	Develop a program for validating the fields in file using regular expression	4	CO4
13	**LLO**:	Draw graphics using Turtle.	4	CO5
14	**LLO**:	Develop a program to add different Widgets on Frame 1.Button 2. Label 3. Message/text Scrollbar 5.Checkbutton	4	CO5
15	**LLO**	Write python programs to understand database connectivity	4	CO6
		Total	60	

V. Suggested Micro Project / Assignment/ Activities for Specific Learning / Skills Development (Self Learning):

1. Prepare journal of practical.
2. Undertake mini project. Develop a Pthon application for the requirement given by faculty.
3. Prepare a presentation on the topic given by faculty.

VI. Specification Table:

Unit No	Topic Title	Distribution of Theory Marks			
		R Level	U Level	A Level	Total Marks
1	**Introduction to Python**	2	2	6	**10**
2	**Decision Making and Functions**	2	4	4	**10**
3	**Object Oriented Programming in Python**	4	4	2	**10**
4	**File Handling**	2	4	2	**08**
5	**Python Regular Expressions**	2	4	4	**10**
6	**GUI Programming and Databases**	2	4	6	**12**
Total		**10**	**14**	**22**	**24**

VII. Assessment Methodologies/Tools

Formative assessment (Assessment for Learning)

- Rubrics for continuous assessment based on process and product related performance indicators (60 marks)

Summative Assessment (Assessment of Learning)

- End term examination, Viva-voce, Workshop performance (140 marks)

VIII. COs - POs Matrix Form

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Log Learning	PSO-1	PSO-2	PSO-3
CO1	1	2				2	2	3		1
CO2	1			1		2	2	3	1	2
CO3	1		1				2	3		
CO4	1	3	3	1		3	3	3	2	2
CO5	1	2	2	1		3	3	3	2	3

Legends: - High:03, Medium:02, Low:01, No Mapping: --

IX. Suggested Learning Materials / Books

Sr.No	Author/ Publisher	Title	ISBN
1	Core Python Programming	Dr.R.Nageswara Rao 2017 Edition Dreamtech Press.	978-93-5119-942-7
2	Python: The Complete Reference	Martin C Brown , McGraw Hill Publication	9780072127188
3	Learning Python	Mark Lutz, David Ascher , O'Reilly Publication	ISBN-13 :978-0-596-00281-7

X. Learning Websites & Portals

Sr.No	Link / Portal
1	https://www.javatpoint.com/java-tutorial
2	https://www.w3schools.com/java/
3	https://www.geeksforgeeks.org/java/
4	https://www.programiz.com/java-programming

XI. Academic Consultation Committee/Industry Consultation Committee:

Sr. No	Name	Designation	Institute/Organization
1	Mrs Dipali Gosavi	Lecturer Information Technology Department	Government Polytechnic, Mumbai
2			
3			

Coordinator,
Curriculum Development,
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I/C, Curriculum Development Cell

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