Course Code	Course Name	Theory	Practical	Tutorial	Theory	TW/Practical	Tutorial	Total
ITL404	Python lab	--	2+2*	--	--	02	--	02

Course Code	Course Name	Examination Scheme						
		Theory Marks				Term Work	Oral & Practical	Total
		Internal assessment			End Sem. Exam			
		Test1	Test 2	Avg. of two Tests				
ITL404	Python lab	--	--	--	--	50	50	100

*2 hours shown as practical's to be taken class wise lecture and other 2 hours to be taken as batch wise practicals in Lab.

Lab Objectives: The course will help the students to get familiar with:

1. Basics of Python programming
2. Decision Making and Functions in Python
3. Object Oriented Programming using Python
4. Files Handling in Python
5. GUI Programming and Databases operations in Python
6. Network Programming in Python

Lab Outcomes: Upon Completion of the course the learner should be able to:

1. Describe the Numbers, Math functions, Strings, List, Tuples and Dictionaries in Python
2. Express different Decision Making statements and Functions
3. Interpret Object oriented programming in Python
4. Understand and summarize different File handling operations
5. Explain how to design GUI Applications in Python and evaluate different database operations
6. Design and develop Client Server network applications using Python

Hardware & Software Requirements:

Hardware Requirements	Software Requirements	Other Requirements
PC With following Configuration 1. Intel PIV Processor 2. 2 GB RAM 3. 500 GB Harddisk 4. Network interface card	1. Windows or Linux Desktop OS 2. Python 3.6 or higher 3. Notepad ++ 4.Python IDEs like Pydev, Netbeans or Eclipse 5. Mysql	1. Internet Connection for installing additional packages

Prerequisite Subjects: Structured Programming Approach & Java Programming

Detailed Syllabus:

Sr. No.	Module	Detailed Content	Hours	LO Mapping
0	Prerequisite	Basic Programming syntax of Java/C. Installation and configuration of python.	02	
I	Basics of Python	**Theory**: Numbers in Python, Basic & Built-in Math functions, Number Formats, Strings, Quotes, print() Function, Assigning Values to Names & Changing Data Through Names, Copying Data, Tuples — Unchanging Sequences of Data, Lists — Changeable Sequences of Data, Dictionaries — Groupings of Data Indexed by Name, Special String Substitution Using Dictionaries , Arrays, Treating a String Like a List, Special Types, Ranges of Sequences, Working with Sets, Arrays. **Lab Experiment:** Write python programs to understand Expressions, Variables, Quotes, Basic Math operations, Strings: Basic String Operations & String Methods, List, Tuples, Dictionaries, Arrays. (Minimum Three Programs based on math operations, Strings and List/Tuples/ Dictionaries)	10	LO 1
II	Decision Making and Functions	**Theory:** If statement, if-elif-else, Repetition using while loop, for loop, break statement, Handling Errors- try: statement, except: statement, Functions-Grouping Code under a Name, defining a Function, describing a	10	LO 2

		function in the function, Checking & Setting Your Parameters, Calling Functions from within Other Functions, Functions Inside of Functions, Layers of Functions **Lab Experiment:** Write python programs to understand different decision making statements and Functions. (Minimum Three Programs based on Decision making, Looping Statements and Functions)		
III	Object Oriented Programming using Python programming	**Theory:** Creating a Class, Self Variables, Constructors, Types of Methods, Inner Classes, Constructors in Inheritance, Polymorphism,, The super() Method, Method Resolution Order (MRO), Operator Overloading, Method Overloading & Overriding, Interfaces in Python. Exceptions Handling: Errors in a Python Program, Exceptions, Exception Handling, Types of Exceptions, The Except Block, The assert Statement. Modules and Packages: Creating Modules and Packages, Documenting & Viewing Module, Basics of Testing Your Modules and Packages, Importing & exporting Modules. **Lab Experiment:** Write python programs to understand different Object oriented features in Python (Minimum four programs based on a) Classes & objects,	10	LO 3

		b) Constructors, c) Inheritance & Polymorphism, d) Exception handling		
IV	Files Handling	**Theory:** Types of Files in Python, Opening a File, Closing a File. Writing Text Files, Knowing Whether a File Exists or Not, Working with Binary Files, Appending Text to a File, Reading Text Files, File Exceptions, The with Statement Pickle in Python, Lambda and Filter, Map & range functions. **Lab Experiment:** Write python programs to understand different File handling operations	07	LO 4
V	GUI Programming and Databases	**Theory:** GUI Programming - Writing a GUI with Python: GUI Programming Toolkits, Creating GUI Widgets with Tkinter, Creating Layouts, Radio Buttons and Checkboxes, Dialog Boxes. Database Access - Python's Database Connectivity, Types of Databases Used with Python, Mysql database Connectivity with Python, Performing Insert, Deleting & Update operations on database **Lab Experiment:** Write python programs to understand GUI designing and database operations (Minimum Three programs based on GUI designing using Tkinter, Mysql database creation & Database connectivity with DML	07	LO 5

		operations using python		
VI	Web Programming	**Theory:** Understanding Protocols, Introduction to Sockets, TCP/IP Server, TCP/IP Client, UDP Server, UDP Client, File Server, File Client, Two-Way Communication between Server and Client, Multithreaded Client-Server Chat Application **Lab Experiment:** Write python programs to understand TCP and UDP Sockets in Python (Minimum One programs based on TCP or UDP Sockets)	06	LO 6

Text Books:

1. James Payne, "Beginning Python: Using Python 2.6 and Python 3.1",Wrox Publication
2. Dr. R. Nageswara Rao,"Core Python Programming" , Dreamtech Press, Wiley Publication.
3. Magnus Lie Hetland,"Beginning Python From Novice to Professional", Second Edition", Apress Publication.

Reference Books:

1. Wesley J Chun," Core Python Applications Programming",Third Edition, Pearson Publication.
2. E. Balguruswamy," Introduction to Computing and Problem Solving using Python", McGraw Hill Publication
3. Learn to Master Python, from Star EDU solutions , by ScriptDemics

Term Work:
The term Work shall consist of at least 12 to 15 practical's based on the above list. The also Term work Journal must include at least 2 assignments.
Term Work Marks: 50 Marks (Total marks) = 40 Marks (Experiment) + 5 Marks (Assignments) + 5 Marks (Attendance)

Oral & Practical Exam: An Oral & Practical exam will be held based on the above syllabus.