COURSE TITLE	**PYTHON PROGRAMMING**
COURSE CODE	**01CE1531**
COURSE CREDITS	**3**

Objective:

1 Python is general purpose programming language becomes very popular in last decade. In this age, Electrical engineers must learn Python Programming to build applications in core domain. Python is becoming popular in artificial intelligence and machine learning. MicroPython is sub-set of Python Programming useful to port in hardware for embedded and IoT applications.

Course Outcomes: After completion of this course, student will be able to:

1 Apply various data type, operations and control structure in python.

2 Develop python programs with conditionals and loops

3 Perform file operations, to read and write the data from/to files in python Programs.

4 Develop programs for general purpose I/O devices using MicroPython

5 Incorporate single and multiple exception handlers to manage errors during program execution.

Pre-requisite of course: Fundamental knowledge about computer systems, Basic knowledge of C Programming.

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
3	0	0	50	30	20	0	0

Contents : Unit	Topics	Contact Hours
1	**Introduction, Data Types and Operators** Installation and working with IDLE to develop python programs, Variables and data types in python, Perform computations and create logical statements using Python's operators: Arithmetic, Assignment, Comparison, Logical, Membership, Identity, Bitwise operators, list, tuple and string operations	8
2	**Python Decision making and Loops** Write conditional statements using If statement, if else statement, elif statement and Boolean expressions, While loop, For loop, Nested Loop, Infinite loop, Break statement, Continue statement, Pass statement, Use for and while loops along with useful built-in functions to iterate over and manipulate lists , sets and dictionaries, Plotting data, Programs using decision making and loops	12

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Contents : Unit	Topics	Contact Hours
3	**Python Functions and Modules** Defining custom functions, Organizing Python codes using functions, Create and reference variables using the appropriate scope, Basic skills for working with lists, tuples, work with dates and times, get started with dictionaries, Importing own module as well as external modules, Programming using functions, modules and external packages	8
4	**Python File Operations and exception handling** An introduction to file I/O, use text files, use CSV files, use binary files, Handle a single exception, handle multiple exceptions, Illustrative programs, Exercises	6
5	**MicroPython** Introduction, main difference between MicroPython and Python, Installation of MicroPython on Hardware, MicroPython libraries, GPIO programming on MicroPython Hardware, Sensor Programming using MicroPython	8
Total Hours		**42**

Textbook :

1 Introduction to Computation and Programming Using Python, John V Guttag, The MIT Press, 2013

2 Python Programming Fundamentals: A Beginner's Handbook, Nischay kumar Hegde, eBooks2go Inc, 2018

3 Fundamentals of Python: First Programs, Kenneth A. Lambert, Cengage Learning, 2018

4 Introduction to Python for Engineers and Scientists, Sandeep Nagar, Apress, 2017

5 MicroPython for the Internet of Things A Beginner’s Guide to Programming with Python on Microcontrollers, Charles Bell, Apress, 2017

References:

1 Programming with MicroPython Embedded Programming with Microcontrollers and Python, Programming with MicroPython Embedded Programming with Microcontrollers and Python, Nicholas H. Tollervey, O'Reilly Media, 2017

Suggested Theory Distribution:

The suggested theory distribution as per Bloom’s taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery					
Remember / Knowledge	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Higher order Thinking / Creative**
20.00	20.00	25.00	15.00	10.00	10.00

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Supplementary Resources:

1. https://www.coursera.org/learn/python-programming
2. Turtle - https://docs.python.org/2/library/turtle.html
3. PyLab - https://scipy.github.io/old-wiki/pages/PyLab
4. http://docs.python.org
5. https://www.anaconda.com/download