Semester: - V

Subject Name: Fundamentals of IOT with Python

Subject Code: 09CE0506

Diploma Branches in which this subject is offered: Computer Engineering

Objective: In these course students will understand fundamentals of various components in Internet of Things such as sensors, communication devices and their connectivity using python programming language. Students will learn basic fundamentals of python programming language to achieve modern computing requirements.

Credits Earned: 6 Credits

Course Outcomes: After learning the course the students should be able:

- ➢ Understand the basic concepts of Internet of Things.
- ➢ Identify various sensors, devices and their application.
- ➢ To learn basic concepts of python.
- ➢ Illustrate various programming syntax in python.
- ➢ Established basic programming principles using python language.
- ➢ To develop console application in python.

Pre-requisite of course: Computer Organisation, Computer Network

Teaching and Examination Scheme

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE (E)	Mid Sem (M)	Internal (I)	Viva (V)	Term work (TW)	
2	0	4	6	50	30	20	25	25	150

Contents:

Unit	Topics	Contact Hours
1	**Introduction to IoT** Defining IoT, Characteristics of IoT, Physical design of IoT, Logical design of IoT, Functional blocks of IoT	5
2	**IoT & M2M** Machine to Machine, Difference between IoT and M2M, Software define Network	5
3	**Domain and Challenges in IoT** Home automation, Industry applications, Environment applications, Other IoT applications, Challenges in IoT	4
4	**Basic of Python language:** History of Python, Structure of Python program, compilation and execution, python syntax, declaring and assigning value to variable, operators, Input and output function, python numbers , python list, python set, python tuple, python casting, python dictionaries	4
5	**Control flow and looping** Decision making statements, simple If statement, If-else, nested If, else-if ladder Looping statements, simple for loop, while loop	4
6	**Array and String:** array declaration & initialization, operation with array, String- declaration & initialization, string functions	3
7	**Function:** Definition of function, Built-in-function, console & standard i/o function, user defined function, recursion	3
	Total Hours	**28**

Suggested Theory distribution:

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

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyze	Evaluate	Create
35%	35%	30%	-	-	-

Suggested List of Experiments:

1. Write a python program to print basic details of students.

2. Write a python program to calculate simple interest.

3. Write a Python program which accepts the radius of a circle from the user and compute the area.

4. Write a python program that accepts two numbers in A and B interchange value of A and B variable.

5. Write a python program to demonstrate the use of Arithmetic operators by getting two numbers from the user.

6. Write a python program that accepts three numbers from the user and print maximum of them.

7. Write a python program that reads the marks for five subjects of a student. Calculate and print the grade for the student [i.e. Grade A,B,C,D and F] using elif ladder.

8. Write a python program that do sum=1+3+5+…….N terms Print value of Sum.

9. Write a python program to print the Fibonacci Series [i.e 1,1,2,3,5,8,13…N terms].

10. Write a python program that accepts a number from the user and print prime numbers from 0 to that number.

11. Write a Python program to reverse the order of the items in the array.

12. Write a Python program to construct the following pattern, using a nested for loop.

*	0	A
* *	0 1	A A
* * *	0 1 2	A A A
* * * *	0 1 2 3	A A A A

13. Write a Python program to print all even numbers from a given numbers list in the same order and stop the printing if any numbers that come after 23 in the sequence.

   Numbers = [386, 462, 47, 418, 907, 344, 236, 375, 823, 566, 597, 978, 328, 23, 953, 345,399, 162, 758, 219, 918, 237, 412, 566, 826, 248, 866, 950, 626, 949, 687, 217,815, 23, 104, 58, 512, 24, 892, 894, 767, 553, 81, 379, 843, 831, 445, 742, 717,958,743].

14. Write a Python program to count the number 4 in a given list.

15. Write a Python program to get the ASCII value of a character.

16. Write a python program to count number of vowels in a given string.

17. Write a Python program to count the number occurrence of a specific character in a string.

18. Write a Python program to get a new string from a given string where "The" has been added to the front. If the given string already begins with "The" then return the string unchanged.

19. Write a python program to check whether entered string is palindrome or not.

20. Write a Python function to calculate the factorial of a number (a non-negative integer). The function accepts the number as an argument.

21. Write a python program to demonstrate the Library function for string.

22. Write a Python program to display the current date and time.

23. Write a Python program to print the calendar of a given month and year.

24. Write a Python program to get the current username.

25. Write a Python program to get OS name, platform and release information.

26. Write a Python program that accepts an integer (n) and computes the value of n+nn+nnn.

27. Study of various sensors and actuators with its applications:

    (a) PIR Motion sensor   (b) Rain drop sensor   (c) Moisture sensor   (d) Touch sensor

    (e) Temperature sensor   (f) Ultra sonic sensor (g) RFID sensor   (h) Servo Moto

28. Demonstrate Arduino and its pins.

29. Demonstrate LED blink using arduino code.

30. Demonstrate Fade in LED using arduino code.

31. Demonstrate PIR Motion sensor using arduino code.

32. Demonstrate Rain drop sensor using arduino code.

33. Demonstrate Moisture sensor using arduino code.

34. Demonstrate Servo Moto sensor using arduino code.

35. Demonstrate Traffic signal LED program using arduino code.

36. Demonstrate Raspberry Pi and its ports.

Instructional Method:

a. The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

b. The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.

c. Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

d. Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory

References:

Supplementary Resources:

- https://www.udemy.com/internet-of-things-iot-for-beginners-getting-started/
- http://playground.arduino.cc/Projects/Ideas
- http://runtimeprojects.com
- http://www.megunolink.com/articles/arduino-garage-door-opener
- http://www.willward1.com/arduino-wifi-tutorial
- http://homeautomationserver.com
- http://www.w3schools.com
- http://docs.python.org
- http://www.tutorialspoint.com
- http://www.learnpython.org