

INSTITUTE	DIPLOMA STUDIES
PROGRAM	DIPLOMA ENGINEERING (COMPUTER ENGINEERING)
SEMESTER	5
COURSE TITLE	FUNDAMENTAL OF IOT WITH PYTHON
COURSE CODE	09CE1506
COURSE CREDITS	4

Objective:

- 1 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.
- 2 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.

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

- 1 Apply the functional blocks of IoT to design simple IoT system architectures for real-world scenarios
- 2 Demonstrate the difference between IoT and M2M concepts by implementing a basic communication model using software-defined networking principles
- 3 Apply IoT concepts to propose a suitable solution for a specific domain such as home automation or environmental monitoring
- 4 Develop basic Python programs involving variables, data types, input/output, and simple data structures
- 5 Construct Python programs using conditional and looping constructs to solve decision-based problems
- 6 Apply array, string, and function concepts in Python to develop efficient programs that perform data processing and modular code execution for practical computing problems

Pre-requisite of course:Syllabus of FUNDAMENTAL OF IOT WITH PYTHON for diploma Computer Engineering

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
2	0	4	50	30	20	25	25

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 List of Experiments:

Contents : Unit	Topics	Contact Hours
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1	<p>Practical List</p> <p>Write a python program to print basic details of students, Write a python program to calculate simple interest, Write a Python program which accepts the radius of a circle from the user and compute the area., Write a python program that accepts two numbers in A and B interchange value of A and B variable., Write a python program to demonstrate the use of Arithmetic operators by getting two numbers from the user., Write a python program that accepts three numbers from the user and print maximum of them., 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., Write a python program that do sum=1+3+5+.....N terms Print value of Sum., Write a python program to print the Fibonacci Series [i.e 1,1,2,3,5,8,13...N terms]., Write a python program that accepts a number from the user and print prime numbers from 0 to that number, Write a Python program to reverse the order of the items in the array., Write a Python program to construct the following pattern, using a nested for loop., 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]., Write a Python program to count the number 4 in a given list., Write a Python program to get the ASCII value of a character., Write a python program to count number of vowels in a given string., Write a Python program to count the number occurrence of a specific character in a string., 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., Write a python program to check whether entered string is palindrome or not., Write a Python function to calculate the factorial of a number (a non-negative integer). The function accepts the number as an argument., Write a python program to demonstrate the Library function for string., Write a Python program to display the current date and time., Write a Python program to print the calendar of a given month and year., Write a Python program to get the current username., Write a Python program to get OS name, platform and release information., Write a Python program that accepts an integer (n) and computes the value of n+nn+nnn., 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, Demonstrate Arduino and its pins., Demonstrate LED blink using arduino code., Demonstrate Fade in LED using arduino code., Demonstrate PIR Motion sensor using arduino code., Demonstrate Rain drop sensor using arduino code., Demonstrate Moisture sensor using arduino code., Demonstrate Servo Moto sensor using arduino code., Demonstrate Traffic signal LED program using arduino code., Demonstrate Raspberry Pi and its ports.</p>	56
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Total Hours	56
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Textbook :

- 1 Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, “From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence”, 1 st Edition, Academic Press, 2014., Jan Holler, Academic Press, 2014
- 2 “Internet of Things (A Hands-on-Approach)”, Vijay Madiseti and Arshdeep Bahga, 1st Edition, VPT, 2014

References:

- 1 Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, “From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence”, 1 st Edition, Academic Press, 2014.
- 2 Vijay Madiseti and Arshdeep Bahga, “Internet of Things (A Hands-on-Approach)”, 1st Edition, VPT, 2014
- 3 Francis daCosta, “Rethinking the Internet of Things: A Scalable Approach to Connecting Everything”, 1st Edition, Apress Publications, 2013
- 4 Cuno Pfister, Getting Started with the Internet of Things, O’Reilly Media, 2011, ISBN: 978-1-4493- 9357-1

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
35.00	35.00	30.00			

Instructional Method:

- 1 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, ecourses, Virtual Laboratory

Supplementary Resources:

- 1 <https://www.udemy.com/course/internet-of-things-iot-for-beginners-getting-started/>
- 2 <https://www.udemy.com/course/internet-of-things-iot-for-beginners-getting-started/>
- 3 <https://www.udemy.com/course/internet-of-things-iot-for-beginners-getting-started/>

Supplementary Resources:

- 4 <http://playground.arduino.cc/Projects/Ideas>
- 5 <https://runtimeprojects.com/>
- 6 <https://www.megunolink.com/articles/arduino-garage-door-opener/>
- 7 <http://homeautomationserver.com/>
- 8 <https://www.w3schools.com/>
- 9 <https://docs.python.org/3/>
- 10 <https://www.tutorialspoint.com/index.htm>
- 11 <https://www.learnpython.org/>
- 12 <https://youtu.be/k8yFGj5qQNk?si=yrBtN0J2UvLC-pCE>
- 13 <https://youtu.be/bSup09QJenM?si=EqAAUGC9OUfz2Wqb>
- 14 <https://www.youtube.com/watch?v=fz7AUMvIZAs6>
- 15 <https://www.youtube.com/watch?v=ngJ00GTsNg&pp=ygUZdWx0cmFzb25pYyBzZW5zb3IgaXJkdWlubw%3D%3D>
- 16 https://alison.com/course/a-guide-to-arduino-motion-detection-through-sms-using-python#google_vignette
- 17 <https://alison.com/course/build-esp32-iot-smart-garden-with-blynk-app>
- 18 <https://alison.com/course/internet-of-things-a-theoretical-approach>
- 19 <https://alison.com/course/diploma-in-python-programming-revised>
- 20 <https://alison.com/course/starting-python-programming>
- 21 <https://alison.com/course/starting-python-programming>
- 22 <https://www.coursera.org/specializations/python>
- 23 <https://youtu.be/rfscVS0vtbw>