Program : **Diploma in Computer Engineering / Computer Hardware Engineering**	
Course Code : **6132A**	Course Title: **Introduction to IoT**
Semester : **3**	Credits: **4**
Course Category: **Open Elective**	
Periods per week: **4 (L:3 T:1 P:0)**	Periods per semester: **60**

Course Objectives:

- Provide basic concepts of Internet of Things.

Course Pre-requisites:

Topic	Course code	Course name	Semester
Basics of computer		Introduction to IT systems	1
Fundamentals of Electronics		Fundamentals of Electrical and Electronics	2

Course Outcomes :

On completion of the course, the student will be able to:

COn	Description	Duration (Hours)	Cognitive Level
CO1	Explain the fundamental concepts of Internet of Things (IoT)	12	Understanding
CO2	Illustrate the IoT applications using Embedded Computing Board - Arduino	14	Applying
CO3	Identify the Python programming constructs for IoT	12	Applying
CO4	Illustrate the IoT applications using Embedded Computing Board - Raspberry PI	20	Understanding
	Series Test	2	

CO – PO Mapping with values

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	2						
CO2	3						
CO3	3						
CO4	2						

3-Strongly mapped, 2-Moderately mapped, 1-Weakly mapped

Course Outline

Module Outcomes	Description	Duration (Hours)	Cognitive Level
CO1	**Explain the fundamental concepts of Internet of Things (IoT)**		
M1.01	Outline the key features of Internet of Things (IoT).	2	Understanding.
M1.02	Interpret IoT hardware, protocols and software using IoT Stack.	3	Understanding.
M1.03	Summarize different IoT enabling technologies.	3	Understanding.
M1.04	Classify IoT based on the complexity to build and operate.	3	Understanding.
M1.05	Explain challenges in IoT	1	Understanding
Contents: Introduction and Definition of IoT, Applications – Characteristics - Things in IoT - IoT Stack – IoT enabling Technologies – IoT challenges – IoT Levels			
CO2	**Illustrate the IoT applications using Embedded Computing Board - Arduino**		
M2.01	Illustrate the working of sensors and actuators	2	Understanding
M2.02	Outline the features of embedded computing boards - Arduino.	3	Understanding
M2.03	Illustrate the interfacing of sensors and actuators with Arduino	5	Applying
M 2.04	Illustrate the interaction with web page and cloud	4	Applying
	Series Test I	1	

Contents:

Sensors and Actuators - Role of Sensors and Actuators in IoT - Working of Sensors and Actuators - Examples.

Embedded Computing Boards - features and characteristics of Arduino/Node MCU, Interfacing with Arudino, Configure Arduino for IoT, Transferring data from Web and Cloud.

CO3	**Identify the Python programming constructs for IoT**		
M3.01	Explain the basic programming concepts of Python	2	Understanding.
M3.02	Illustrate the working of control structures in Python	4	Applying.
M3.03	Develop python programs to solve simple applications	4	Applying.
M3.04	Make use of Python packages for IoT	2	Applying.

Contents:

Python - variables and data types - executing a python program - control structures - python module - simple programs - python for IoT.

CO4	**Illustrate the IoT applications using Embedded Computing Board - Raspberry PI**		
M4.01	Outline the features of embedded computing boards - Raspberry PI	2	Understanding
M4.02	Illustrate the interfacing of basic sensors with embedded computing board - Raspberry PI	8	Understanding
M4.03	Case Study - the applications building with IoT - Smart Perishable tracking/Smart transportation, Smart Healthcare, Smart Lavatory maintenance, Smart water through IoT, Smart warehouse monitoring, Smart Retail, Smart Driver assistance system etc	10	Understanding
	Series Test – II	1	

Contents:

Programming Raspberry Pi with python, Interfacing sensors and actuators with Raspberry PI.

Case Study - Applications building with IoT- Smart Perishable tracking/Smart transportation, Smart Healthcare, Smart Lavatory maintenance, Smart water through IoT, Smart warehouse monitoring, Smart Retail, Smart Driver assistance system.

Text / Reference

T/R	Book Title/Author
T1	RMD Sundaram Shriram K Vasudevan, Abhishek S Nagarajan, **Internet of Things,** Wiley Publications
R1	Vijay Madisetti, Arshdeep Bahga, **Internet of Things: A Hands-On Approach,** Orient Blackswan
R2	Raj Kamal, **Internet of Things : Architecture And Design Principles,** McGraw Hill Education
R3	Gary Smart, **Practical Python Programming for IoT,** Packt Publishing
R4	Marco Schwartz, **Internet of Things with Arduino Cookbook,** Packt Publishing

Online Resources

Sl.No	Website Link
1	https://nptel.ac.in/courses/106/105/106105166/
2	https://www.raspberrypi.org/blog/getting-started-with-iot/
3	https://learn.adafruit.com/category/internet-of-things-iot
4	https://www.arduino.cc/en/IoT/HomePage
5	http://esp32.net/