INTERNET OF THINGS

II Group: CSE / IT

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
ACS510	Elective	3	-	-	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes: 45		

I. COURSE OVERVIEW:

Internet of things (IOT) is a network of things that are embedded with software and sensors to process data. This course include physical and logical design of IOT systems, M2M systems, SDN, IOT Architecture components such as physical devices and endpoints, physical servers and cloud offerings. This is used in various applications such as Smart Refrigerator, Smart Homes and Smart environments.

II. OBJECTIVES:

The course should enable the students to:

I	The significance of the Internet of Things
II	The sensors, actuators and communication protocols used for establishingcommunication in M2M.
III	The real time IOT applications related to smart environments.

III. COURSE OUTCOMES:

After successful completion of the course, students should be able to:

CO 1	**Relate** the characteristics and appropriate levels of IOT for reusing of deployed IOT resources across application domains.	Remember
CO 2	**Identify** the necessity of communication models, protocols and API's for accessing data from sensors and actuators to overcome issues like failure of any connected devices.	Apply
CO 3	**Compare** Machine to Machine with IOT and identifying the role of SDN, NFV, and NET CONFG-YANG for data exchange between devices and management on network.	Understand
CO 4	**Relate** architectural reference model and state of the art methodologies in IOT application domains for managing access control of IOT devices.	Understand
CO 5	**Choose** raspberry Pi device and set up the environment for connecting other devices/sensors to communicate with raspberry piusing Python language.	Apply
CO 6	**Analyze** different cloud storage models and protocols that are scalable& available on demand for designing IOT applications.	Analyze

IV. SYLLABUS:

UNIT-I	**INTRODUCTION TO INTERNET OF THINGS (IOT)**	**Classes: 08**

Definition and characteristics of IOT, physical design of IOT, logical design of IOT, IOT enabling technologies, IOT levels and deployment, domain specific IOTs.

UNIT-II	**IOT AND M2M**	**Classes: 10**

Introduction, M2M, difference between IOT and M2M, software defined networking (SDN) and network function virtualization (NFV) for IOT, basics of IOT system management with NETCONF-YANG.

UNIT-III	**IOT ARCHITECTURE AND PYTHON**	**Classes: 10**

IOT Architecture: State of the art introduction, state of the art; Architecture reference model: Introduction, reference model and architecture, IOT reference model.

Logical design using Python: Installing Python, Python data types and data structures, control flow, functions, modules, packages, file handling.

UNIT-IV	IOT PHYSICAL DEVICES AND ENDPOINTS	Classes: 08
Introduction to Raspberry Pi interfaces (Serial, SPI, I2C), programming Raspberry PI with Python, other IOT devices.		
UNIT-V	**IOT PHYSICAL SERVERS AND CLOUD OFFERINGS**	**Classes: 09**
Introduction to cloud storage models and communication APIs; WAMP: AutoBahn for IOT, Xively cloud for IOT; Case studies illustrating IOT design: Home automation, smart cities, smart environment.		

Text Books:

1. Arshdeep Bahga, Vijay Madisetti, "Internet of Things: A Hands-on-Approach", VPT, 1st Edition, 2014.
2. Matt Richardson, Shawn Wallace, "Getting Started with Raspberry Pi", O'Reilly (SPD), 3rd Edition, 2014.

Reference Books:

1. Adrian McEwen, Hakim Cassimally, "Designing the Internet of Things", John Wiley and Sons, 1st Edition, 2014.
2. Francis Da Costa, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", A press Publications, 1st Edition, 2013.

Web References:

1. https://www.upf.edu/pra/en/3376/22580.
2. https://www.coursera.org/learn/IOT.
3. https://bcourses.berkeley.edu.
4. www.innovianstechnologies.com.

E-Text Books:

1. https://mitpress.mit.edu/books/internet-things
2. http://www.apress.com

Course Home Page: