INTERNET OF THINGS (IoT)

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		

OBJECTIVES:

The course should enable the students to:

I. Understand the architecture of Internet of Things and connected world.
II. Explore on use of various hardware, communication and sensing technologies to build IoT applications.
III. Illustrate the real time IoT applications to make smart world.
IV. Understand challenges and future trends in IoT.

COURSE OUTCOMES (COs):

The Students should enable to:

CO 1 Understand the architecture of Internet of Things and connected world.
CO 2 Explore the use of various hardware and sensing technologies to build IoT applications.
CO 3 Illustrate the real time IoT applications to make smart world.
CO 4 Understand the available cloud services and communication API's for developing smart cities.

COURSE LEARNING OUTCOMES(CLOs):

Students, who complete the course, will have demonstrated the ability to do the following:

1. Understand and intuition of the whole process line of extracting knowledge from data about the Internet of Things.
2. Deep insight in one of the specializations within the network, depending on the study and the choice of the concepts of IoT.
3. Solid knowledge in a broad range of methods based on design and implementation of IoT in network performance, analysis and problem solving with design of networks.
4. Experience in deriving theoretical properties of methods involved in IoT.
5. Design and implementation/modification of methods involved in IoT.
6. Describe what IoT is and the skill sets needed to be a network analysis.
7. Use IoT design to carry out basic statistical modeling and analysis.
8. Motivate and explain trade-offs in IoT tool technique design and analysis of applications with IoT.
9. Understand significance of models in IoT.
10. Describe the Transport layer protocols and how its uses in IoT.
11. Apply basic IoT algorithms for predictive network performance.
12. Understand basic terms what security issues. Identify key distribution methods.
13. Identify common approaches used for Feature Generation of IoT.
14. Create effective results of IoT future approaches.
15. Work effectively in teams on IoT projects.

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 PLATFORMS DESIGN METHODOLOGY	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 andSons2014.
2. Francis daCosta, **"**Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", A press Publications,1st Edition2013.

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