17ES004 DESIGN OF IoT SYSTEMS

Hours Per Week :

L	T	P	C
3	-	3	5

Total Hours :

L	T	P	WA/RA	SSH/HSH	CS	SA	S	BS
45	-	45	15	30	-	5	5	-

Course Objectives:

This course will help the students to gain adequate knowledge on the Internet of Things. Students will be able to understand the potential of the Internet of Things for our society, in terms of impact on the lives of billions of people and on the world economy. Students will be able to design & develop IOT Devices.

Course Outcomes:

The student will be able to:

- Able to programs for IoT applications
- Able to design the framework necessary for IoT applications
- Able to develop prototypes for IoT devices and app

SKILLS :

- Table to understand IoT Concepts
- Able to design the different IoT system applications.

ACTIVITIES:

o   Design various simple IoT Applications like IoT Based Smart Camera,

o
Air Pollution Meter etc

UNIT – I

Developing Internet of Things & Logical Design using Python: Introduction, IOT Design Methodology, Installing Python, Python Data Types & Data Structures, Control Flow, Functions, Modules, Packages, File Handling, Date/ Time Operations, Classes, Python Packages, IoT Physical Servers and Cloud Offerings: introduction to cloud sotrage models and communication APIs, Python Web Application Framework - Django, SkyNet IoT Messaging Platform.

UNIT - II

Design Principles for Connected Devices: Design Principles for Connected Devices, Calm and Ambient Technology, Magic as Metaphor, Privacy, Web Thinking for Connected Devices, Affordances

UNIT – III

Thinking About Prototyping: Sketching, Familiarity, Costs versus Ease of Prototyping, Prototypes and Production, Open Source versus Closed Source, Tapping into the CommUNITy

Prototyping Embedded Devices: Electronics, Embedded Computing Basics, Arduino, Raspberry Pi, BeagleBone Black, Electric Imp, Other Notable Platforms

UNIT - IV

Prototyping Online Components: Getting Started with an API, Writing a New API, Real-Time Reactions, Other Protocols Techniques for Writing Embedded Code: Memory Management, Performance and Battery Life, Libraries, Debugging

UNIT-V

Case Studies Illustratign IoT Design: Introduction, Home automation-smart lighting-home intrusion detection, Cities-smart parking, Environment-Air pollution monitoring, Agriculture-smart irrigation, productivity appliances-IoT printer,Data Analytics for IoT: Introduction

TEXT BOOKS:

1.   Vijay Madisetti, Arshdeep Bahga," Internet of Things A Hands-On- Approach",2014,

2.   Adrian McEwen, "Designing the Internet of Things", Wiley Publishers, 2013,

3.   Microsensors, MEMS, and Smart Devices, Julian W. Gardner, Vijay K. Varadan Osama O. Awadelkarim, 2001, John Wiley & Sons Ltd 2008 Reprint

REFERENCE BOOKS:

1.   Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1 st Edition, Apress Publications, 2013

2.   Cuno Pfister, Getting Started with the Internet of Things, O Reilly Media, 2011, ISBN: 978-1-4493- 9357-1

Internet of Things (Lab)

Course Learning Outcomes:

- To be able to understand importance of Python Programming and its usage.

- To be able to understand and work with Raspberry Pi and Arduino

LIST OF EXPERIMENTS

1. Familiarization with Python programming, use of various functions
2. Create python code to understand the tendency of users on social media platform
3. Storing the local data to cloud using Python
4. Sending Messages over internet using python
5. Familiarization with raspberry pi board
6. Python Programming for the Raspberry Pi and interfacing with web
7. Familiarization with Arduino board
8. Python Programming for Arduino and interfacing with web
9. Controlling lights remotely using Raspberry Pi
10. Detecting the movement of objects and sending caution signals remotely using Raspberry Pi