INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)
Dundigal - 500 043, Hyderabad, Telangana

COURSE CONTENT

INTERNET OF THINGS								
I Semester: EPS								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
BPSE05	**Elective**	3	-	-	3	40	60	100
Contact Classes: 45	**Tutorial Classes: Nil**	**Practical Classes: Nil**				**Total Classes: 45**		
Prerequisite: -								

I. COURSE OVERVIEW:
The course provides a good understanding of IoT principles, and their policy and challenges and the protocols in Internet. It will also help students to understand the various modes of communications with internet and to learn to manage the resources in the Internet. This course will provide the environment to deploy the resources into business.

II. COURSE OBJECTIVES:
The students will try to learn:

I. The basic issues, policy and challenges in the Internet.
II. The components and the protocols in Internet.
III. Build a small low cost embedded system with the internet.
IV. The various modes of communications with internet.

III COURSE OUTCOMES:
After successful completion of the course, students will be able to:

CO1 Explain internal building blocks of IOT for the evolution of Internet of Things
CO2 Understand the programming of microcontroller for the functional stack of IoT ecosystem.
CO3 Understand the concepts of data synchronization for agility and autonomy in protocols
CO4 Apply IEEE 802.11 protocol for topology and security in physical and MAC layers
CO5 Identify the applications of IoT including home automation, smart cities, and smart environment to implement the real time applications.
CO6 Make use of appropriate communication protocols to acquire the knowledge of programming with Raspberry PI.

IV. COURSE CONTENT:

MODULE -I: –INTRODUCTION (9)

Definition, phases, foundations, policy, challenges and issues, identification, security, privacy. Components in internet of things: Control units, sensors, communication modules, power sources, communication technologies, RFID, Bluetooth, Zigbee, Wifi, Rflinks, mobile Internet, wired communication.

MODULE -II: PROGRAMMING THE MICROCONTROLLER FOR (9)

Ecosystem, embedded communications software, software partitioning, module and task decomposition: Partitioning case study , protocol software, debugging protocols, tables and other data structures, table access routines, buffer and timer management, management software, device and router management: CLI
based management and HTTP based management, agent to protocol interface, device to manager communication, system setup, boot and post-boot configuration, saving and restoring the configuration.

MODULE -III: RESOURCE MANAGEMENT IN THE INTERNET OF THINGS (9)

Clustering, software agents, data synchronization, clustering principles in an internet of things architecture, the role of context, design guidelines, software agents for object. data synchronization types of network architectures, fundamental concepts of agility and autonomy.
Enabling autonomy and agility by the internet of things, technical requirements for satisfying the new demands in production, evolution from the RFID, based EPC network to an agent based internet of things- agents for the behaviour of objects.

MODULE – IV: BUSINESS MODELS FOR THE INTERNET OF THINGS (9)

The Meaning of DiY in the Network Society- Sensor-actuator Technologies and Middleware as a Basis for a DiY Service Creation Framework - Device Integration – Middleware Technologies Needed for a DiY Internet of Things Semantic Interoperability as a Requirement for DiY Creation-Ontology- Value Creation in the Internet of Things-Application of Ontology Engineering in the Internet of Things-Semantic WebOntology - The Internet of Things in Context of EURIDICE - Business Impact.

MODULE -V: FROM THE INTERNET OF THINGS TO THE WEB OF THINGS (9)

Resource-oriented architecture and best practices- designing rest ful smart things - web- enabling constrained devices - the future web of things - set up cloud environment – send data from microcontroller to cloud – case studies – open source e-health sensor platform – be close elderly monitoring – other recent projects.

V. TEXTBOOKS:

1. Charalampos Doukas , Building Internet of Things with the Arduino, Create space, April, 2002.
2. Dieter Uckelmann et.al, “Architecting the Internet of Things”, Springer, 201.1

VI. REFERENCE BOOKS:

1. Luigi Atzor et.al, “The Internet of Things: A survey, “, Journal on Networks, Elsevier Publications, October 2010.

VII. ELECTRONICS RESOURCES:

1. https://mitpress.mit.edu/books/internet-things
2. http://atkinsapps.uncc.edu/etextbooks

VIII. MATERIALS ONLINE

1. Course template
2. Tutorial question bank
3. Tech-talk topics
4. Assignments
5. Model question paper-I
6. Model question paper-II
7. Lecture notes
8. Early learning readiness videos (ELRV)
9. Power point presentations