

**Internet of Things**

<b>Course Code</b>	20ES1402	<b>Year</b>	II	<b>Semester</b>	II
<b>Course Category</b>	ES	<b>Branch</b>	CSE	<b>Course Type</b>	Theory
<b>Credits</b>	3	<b>L-T-P</b>	3-0-0	<b>Prerequisites</b>	-
<b>Continuous Internal Evaluation:</b>	30	<b>Semester End Evaluation:</b>	70	<b>Total Marks:</b>	100

**Course Outcomes**

Upon successful completion of the course, the student will be able to

<b>CO1</b>	Summarize the genesis and impact of IoT applications, architectures in real world	<b>L2</b>
<b>CO2</b>	Apply diverse methods in deploying smart objects and connecting them to network	<b>L3</b>
<b>CO3</b>	Construct simple applications using Arduino	<b>L3</b>
<b>CO4</b>	Analyze different protocols and select which protocol can be used for a specific application.	<b>L4</b>
<b>CO5</b>	Identify and develop a solution for a given application using APIs	<b>L3</b>

**Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations  
(3:Substantial, 2: Moderate, 1:Slight)**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
<b>CO1</b>	2											2	2	2
<b>CO2</b>	3				3								3	3
<b>CO3</b>	1				1								1	1
<b>CO4</b>		2											2	2
<b>CO5</b>	2				2								2	2

Syllabus		
Unit No.	Contents	Mapped CO
I	Genesis of IoT, IoT and Digitization, IoT Impact-Connected roadways, Smart connected buildings, Convergence of IT and IoT, IoT Challenges, Comparing IoT Architectures - OneM2M IoT Architecture and IoTWF Architecture, A Simplified IoT Architecture.	CO1, CO2
II	Smart Objects: The Things in IoT- Sensors, Actuators, and Smart Objects, Sensor Networks-Advantages and Disadvantages, Communications Criteria-Range, Frequency bands, Power consumption, Topology, IoT Access Technologies- IEEE 802.15.4, IEEE 1901.2a, IEEE 802.11ah (only Standardization and Alliances, Physical Layer, MAC Layer and Topology)	CO1, CO2
III	Embedded Computing Basics- Microcontrollers, System-on-Chips, Choosing Your Platform, Arduino- Developing on the Arduino, Some Notes on the Hardware, Openness	CO1, CO3
IV	Communication in the IoT: Internet Principles, Internet Communications: An Overview- IP, TCP, The IP Protocol Suite (TCP/IP), UDP, IP Addresses- DNS, Static IP Address Assignment, Dynamic IP Address Assignment, IPv6, MAC Addresses, TCP and UDP Ports- An Example: HTTP Ports, Other Common Ports, Application Layer Protocols- HTTP, HTTPS: Encrypted HTTP, Other Application Layer Protocols	CO1, CO4
V	Prototyping Online Components: Getting Started with an API,- Marshing up APIs, Scraping, Legalities, Writing a New API- Clockodillo, Security, Implementing the API (only theory, example not required), using curl to test (only theory, example not required), Real-Time Reactions- polling, comet, , other Protocols-MQ telemetry transport, extensible, messaging and presence protocol, constrained application protocol.	CO1, CO5

### Learning Resources

#### Text Books

1. Adrian McEwen, Hakim Cassimally - Designing the Internet of Thing Wiley Publications, 2012.  
David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Robert Barton, Jerome Henry, IoT
2. Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things, 1st Edition, Pearson Education (Cisco Press Indian Reprint). (ISBN: 978-9386873743)

#### Reference Books

1. Arshdeep Bahga, Vijay Madisetti - Internet of Things: A Hands-On Approach, Universities Press, 2014
2. Srinivasa K G, Internet of Things, CENGAGE Learning India, 2017