SEMESTER S6

IOT AND APPLICATIONS

Course Code	OECPT612	CIE Marks	40
Teaching Hours/Week (L: T:P: R)	3: 0: 0: 0	ESE Marks	60
Credits	3	Exam Hours	2 Hrs. 30 Min.
Prerequisites (if any)	_	Course Type	Theory

Course Objectives:

1. To understand the fundamentals of IoT, its vision, and strategic research directions.
2. To explore various connectivity technologies and their application in sensor networks and M2M communications
3. To gain practical experience with Arduino and Raspberry Pi, integrating sensors and actuators.
4. To learn about interoperability in IoT systems and software-defined networking.

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SYLLABUS

Module No.	Syllabus Description	Contact Hours
1	Introduction to IoT: The Internet of Things Today, Time for Convergence, Towards the IoT Universe, Internet of Things Vision, IoT Strategic Research and Innovation Directions, IoT Applications, Future Internet Technologies, Review of sensing and actuation, Basics of IoT Networking.	9
2	Connectivity Technologies, Sensor Networks, UAV networks. Machine-to-Machine Communications: M2M to IoT – A Basic Perspective– Introduction, Some Definitions, M2M Value Chains, IoT Value chains, LoRa Technology in M2M Communications:- Introduction to LoRa and LoRaWAN, LoRa Protocols and Standards, Applications of LoRa in M2M and IoT	9

3	Interoperability in IoT, Introduction to Arduino Programming, Integration of Sensors and Actuators with Arduino. Introduction to Raspberry Pi, Implementation of IoT with Raspberry Pi, Software Defined Networking, Software Defined IoT Networking	**9**
4	Smart and Connected Cities-An IoT Strategy for Smarter Cities-Vertical IoT Needs for Smarter Cities, Global vs. Siloed Strategies-Smart City IoT Architecture-Street Layer, City Layer, Data Center Layer, Services Layer-Smart City Security Architecture - Smart City Use-Case Examples – Street lighting, smart parking, smart traffic and air pollution monitoring	**9**

Course Assessment Method
(CIE: 40 marks, ESE: 60 marks)

Continuous Internal Evaluation Marks (CIE):

Attendance	Assignment/ Microproject	Internal Examination-1 (Written)	Internal Examination- 2 (Written)	Total
5	**15**	**10**	**10**	**40**

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End Semester Examination Marks (ESE)

In Part A, all questions need to be answered and in Part B, each student can choose any one full question out of two questions

Part A	Part B	Total
• 2 Questions from each module. • Total of 8 Questions, each carrying 3 marks **(8x3 =24marks)**	• Each question carries 9 marks. • Two questions will be given from each module, out of which 1 question should be answered. • Each question can have a maximum of 3 sub divisions. **(4x9 = 36 marks)**	**60**

Course Outcomes (COs)

At the end of the course students should be able to:

Course Outcome		Bloom's Knowledge Level (KL)
CO1	Describe the current state and future prospects of IoT technologies.	**K2**
CO2	Explain various connectivity technologies and sensor network frameworks.	**K2**
CO3	Develop basic IoT applications using Arduino and Raspberry Pi platforms.	**K3**
CO4	Apply IoT concepts to real-world scenarios	**K3**

Note*: K1- Remember, K2- Understand, K3- Apply, K4- Analyse, K5- Evaluate, K6- Create*

CO-PO Mapping Table:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2										
CO2	3	2	3									
CO3	3	2	3	2	2							
CO4	3	2		2	2							

Note: *1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), -: No Correlation*

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Text Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	Internet of Things: A Hands-On Approach" by is the 1st Edition	Arshdeep Bahga and Vijay Madisetti	VPT (Universal Publishing)	1e, 2014
2	The Internet of Things: Enabling Technologies, Platforms, and Use Cases	Pethuru Raj and Anupama C. Raman	CRC Press	1e, 2017
3	Internet of Things (A Hands-on-Approach)	Raj Kamal	McGraw Hill Education	2e, 2017

Reference Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	The Internet of Things: How Smart TVs, Smart Cars, Smart Homes, and Smart Cities Are Changing the World.	Michael Miller	Pearson Education	2015
2	Internet of Things	RMD Sundaram, Shriram K Vasudevan, and Abhishek S Nagarajan	**John Wiley & Sons**.	2019
3	https://lora-developers.semtech.com/uploads/documents/files/LoRa_and_LoRaWAN-A_Tech_Overview-Downloadable.pdf			

Video Links (NPTEL, SWAYAM…)	
Module No.	**Link ID**
1	https://youtu.be/WUYAjxnwjU4, https://youtu.be/nE1C4ghfvac
2	https://youtu.be/WUYAjxnwjU4
3	https://youtu.be/WUYAjxnwjU4
4	https://youtu.be/WUYAjxnwjU4

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