PSN COLLEGE OF ENGINEERING AND TECHNOLOGY (Autonomous)
Tirunelveli - 627152

COURSE PLAN

Academic year (2023-24)

(Regulation 2018)

Subject Name & Code	**INTERNET OF THINGS**
Course Type	Core
Programme	B.E, Computer Science and Engineering
Year/Semester/Section	IV Year / VII Semester
Nature of Course/Credit	Theory / 3
Course Coordinator	Ms. Booma G,AP/ CSE
Course Code	503236

VISION AND MISSION OF THE INSTITUTE & DEPARTMENT

	Vision	Mission	
Institute	To emerge as a pioneer institute inculcating engineering education, skills, research, values and ethics.	**IM-1**	To achieve greater heights of excellence in technical knowledge and skill development through innovative teaching and learning practices.
		IM-2	To develop the state of art infrastructure to meet the demands of technological revolution.
		IM-3	To improve and foster research in all dimensions for betterment of society.
		IM-4	To develop individual competencies to enhance innovation, employability and entrepreneurship among students.
		IM-5	To instill higher standards of discipline among students, inculcating ethical and moral values for societal harmony and peace.
Department	To emerge as a preeminence program to produce quality Computer Science and Engineering graduates.	**DM-1**	To train the students according to their discipline to meet dynamic needs of the society.
		DM-2	To promote research and continuing education
		DM-3	To enhance professional and entrepreneurial skills through industry institute interaction to enable them in getting better placement

1. PRE REQUISITES

Computer Networks

2. COURSE DESCRIPTION

- Internet of Things is a course that deals with the study of how devices are connected and how it helps to stay connected over the Internet.
- The course teaches the individuals on how the Internet of Things is helpful in our daily lives and how to stay connected over the Internet.

3. CARRIER OPPORTUNITIES:

- **IoT developer:** The job description of an IoT developer includes working on three parameters, i.e., choosing the data, data management, assembling using technology, and performing research. These developers facilitate smart lives for people.

- **IoT engineer**: IoT engineer must know the architecture of IoT. This architecture is divided into four layers. Each layer is responsible for specific features.

4. SYLLABUS

UNIT–I	**INTRODUCTION**	**Hrs**
Introduction to IoT:Sensing,Actuation-Networking basics-Communication Protocols- Sensor Networks- Machine-to-Machine Communications- IoT Definition,Characteristics. IoT Functional Blocks, Physical design of IoT-Logical design of IoT-Communication models &APIs		**9**
UNIT-II	**M2MTO IOT**	**Hrs**

The Vision-Introduction From M2M to IoT-M2M towards IoT-the global context-Ause case example-Differing Characteristics. Definitions-M2M Value Chains-IoT Value Chains-An emerging industrial structure for IoT		**9**
UNIT-III	**M2MVSIOTANARCHITECTURALOVERVIEW**	**Hrs**
M2M vs IoT An Architectural Overview-Building architecture-Main design principles and needed capabilities-An IoT architecture outline-standards considerations-Reference Architecture and Reference Model of IoT.		**9**
UNIT –IV	**DOMAINSPECIFIC APPLICATIONSOFIOT**	**Hrs**
Domain specific applications of IoT-Home automation-Industry applications-Surveillance Applications-Other IoT application-Fog Computing-Connected Vehicles- Data Aggregation for the IoT in Smart Cities- Privacy and Security Issues inIoT.		**9**
UNIT–V	**DEVELOPINGIOTSOLUTIONS**	**Hrs**
Different IoT Tools-Developing IoT Solution for Real Time Applications Using:Arduino-Raspberry Pi-Cloud Computing.		**9**

Total: 45 Periods

5. COURSE OUT COMES

CO's	CO – STATEMENTS	Blooms level	PO's
CO 1	Understand the fundamental concepts of Internet of Things	K1	1,2,3,4,5,8,11,12,PSO2
CO 2	Understand the concept of M2M communications to internet of things	K2	1,2,3,4,5,6,11,12,PSO1
CO 3	Analyze the concept of M2mVsIoTcharacteristics	K4	1,2,3,4,5,8,11,12,PSO2
CO 4	Understand the concepts of domain specific communication models of IoT	K1	1,2,3,4,5,6,12,PSO2
CO 5	Developing the concept of IoT solutions	K4	1,2,3,5,,7,8,12,PSO2

6. INSTRUCTIONAL LEARNING OUTCOMES

UNIT	LEARNING OUTCOMES

I	The outcome will be assess through assignment-1, tutorial-1, Class test -1, MCQ Test-1, CAT-1.
II	The outcome will be assess through assignment-2, tutorial-2, Class test -2, MCQ Test-2, CAT-1, CAT –2.
III	The outcome will be assess through assignment-3, tutorial-3, Class test -3, MCQ Test-3,CAT-2.
IV	The outcome will be assess through assignment-4, tutorial-4, Class test -4, MCQ Test-4,CAT-3.
V	The outcome will be assess through assignment-5,tutorial-5,Classtest-5,MCQTest-5, CAT-3.

7. PROGRAMME EDUCATIONAL OBJECTIVES (PEO's)

S. No	Objective	PEOs
PEO1	**Fundamental Knowledge**	To impart Knowledge on the fundamental principles of mathematics, science, and sub-disciplines in the field of Engineering
PEO2	**Career Development**	To make them undergo industrial training, and Professional development courses inculcating the habit of perpectual learning for career development.
PEO3	**Social Identity**	To develop effective communication skills and make them socially responsible to work cooperatively in all environments.

8. PROGRAM OUTCOMES [PO's]

PO's No	KNOWLEDGE	STATEMENTS	APPLIANCE
1	Engineering Knowledge	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.	Theory/ Practical / Project work
2	Problem Analysis	Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.	Theory / Practical / Projects

3	Design / Development of Solutions	Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.	Theory / Practical / Projects
4	Conduct Investigations of Complex Problems	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.	Theory / Practicals
5	Modern Tool usage	Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.	Theory / Practical / Project work
6	The Engineer and Society	Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.	Theory / Industrial visit / In plant training
7	Environment and Sustainability	Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.	Theory / Industrial Visit/ In plant Training
8	Ethics	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.	Theory / Industrial visit / In plant training
9	Individual and Team Work	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	Projects
10	Communication	Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	Projects/ Seminar/ Mini Project

11	Project Management and Finance	Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.	Projects
12	Life-long Learning	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.	Projects / Higher Studies

9. PROGRAMME SPECIFIC OBJECTIVE (PSO's)

PSO1	Proficient and Innovative with a strong cognizance in the IOT, through the Application of acquired knowledge and skills.
PSO2	Design and Implement IOT based solutions for improving operational efficiency by investigating existing industrial environment.

10. CO- PO MAPPING

CO's NO	COURSE OUTCOME	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2
CO1	Understand the fundamental concepts of Internet of Things	2	2	1	2	1	-	-	3	-	-	2	1	-	2
CO2	Understand the concept of M2M communications to internet of things	1	1	2	2	2	2	-	-	-	-	2	2	2	-

CO3	Analyze the concept of M2mVsIoTcharacteristics	2	2	1	2	2	-	-	2	-	-	2	2	-	1
CO4	Understand the concepts of domain specific communication models of IoT	1	1	2	2	2	2	-	-	-	-	-	1	-	1
CO5	Developing the concept of IoT solutions	1	3	1		2	-	2	2	-	-	-	1	-	1

Enter correlation levels 1,2 & 3 define as: 1-low, 2-medium, 3-high

11. TEXT BOOK & REFERENCE BOOK LIST

Sl. No	Description	Lege
Text Book(s):		
1	JanHoller,VlasiosTsiatsis,CatherineMulligan,StefanAvesand,StamatisKarnouskos,David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a NewAge ofIntelligence",Academic Press,FirstEdition,2014.	T
Reference Book(s):		
1	Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to ConnectingEverything",ApressPublications,FirstEdition2013.	R
2	Vijay Madisetti and ArshdeepBahga, "Internet of Things (A Hands-on-Approach)", VPT,FirstEdition,2014	R

12. Web Resources

Sl. No	Topic	Web link
1.	Industrial Internet of Things	https://www.shiksha.com/online-courses/articles/best-online-resources-to-learn-iot-internet-of-things/

13. E- learning / NPTEL

NPTEL/ OTHER UNIVERSITY video lectures related to syllabus:	
Video	https://onlinecourses.nptel.ac.in/noc22_cs53/preview
Lecture Notes	https://www.iare.ac.in/sites/default/files/IARE_IOT_LECTURE_NOTES.pdf

14. MAGAZINE & JOURNALS

Magazine	https://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=8548628
Journals	https://www.sciencedirect.com/journal/internet-of-things

15. Lesson Plan & Content Delivery Methodology

S. No.	Unit	Topic to be covered	Hours Needed	Mode of Teaching (BB/PPT/Others)	Text/ Ref. Book	Page No.
	Introduction					
1	I	Introduction to IoT, Sensing ,Actuation	2	**PPT**		
2		Networking basics, Communication Protocols	1	**PPT**		
3		Sensor Networks, Machine-to-Machine Communications	2	**PPT**		
4		IoT Definition, Characteristics	1	**PPT**		
5		IoT Functional Blocks, Physical design of IoT-Logical design of IoT	2	**PPT**		
6		Communication models &APIs	1	**PPT**		
	M2MTO IOT					
7		Introduction From M2M to IoT-M2M towards IoT	2	**PPT**		

8		The global context-A use case example	2	**PPT**		
9		Differing Characteristics- Definitions-M2M Value Chains	2	**PPT**		
10		IoT Value Chains	1	**PPT**		
11	**II**	An emerging industrial structure for IoT	2	**PPT**		
		M2MVSIOTANARCHITECTURALOVERVIEW				
12		M2M vs IoT An Architectural Overview	2	**PPT**		
13		Building architecture	2	**PPT**		
14		Main design principles and needed capabilities	2	**PPT**		
15		An IoT architecture outline	2	**PPT**		
16		Standards considerations	1	**PPT**		
17	**III**	Architecture and Reference Model of IoT.	2	**PPT**		
		DOMAINSPECIFIC APPLICATIONSOFIOT				
18		Domain specific applications of IoT	2	**PPT**		
19	**IV**	Home automation,Industry applications	1	**PPT**		
20		Surveillance Applications,Other IoT application	2	**PPT**		
21		FogComputing,ConnectedVehicles	1	**PPT**		

22		Data Aggregation for the IoT in Smart Cities	2	**PPT**		
23		Privacy and Security Issues in IoT	1	**PPT**		
		DEVELOPINGIOTSOLUTIONS				
24	V	Different IoT Tools	2	**PPT**		
25		Developing IoT Solution for Real Time Applications Using:Arduino	3	**PPT**		
26		RaspberryPi-	2	**PPT**		
27		CloudComputing	2	**PPT**		
				Total Hours : 45Hours		

Signature	**Prepared by:**	**Approved by:**	
Name :	**Ms.G.Booma**	**Dr. M. Vargheese**	**Dr. V. Manikandan**
Designation:	Assistant Professor / CSE	HoD / CSE	Principal
Date:			