DHANALAKSHMI SRINIVASAN ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE & Affiliated to Anna University, Chennai)
Re-Accredited by NAAC with 'A' Grade
Accredited by NBA for AERO, BME, CSE, ECE, EEE, IT & MECH.
PERAMBALUR-621212, TAMILNADU, INDIA.
Website: www.dsengg.ac.in

. COURSE PLAN

Course Code/Name	**U20AI702/INTERNET OF THINGS**			
Year/Section/Department	IV/AI&DS			
Credits Details	L:3	T:0	P:0	C:3
Total Contact Hours Required	45			

Syllabus:

UNIT I FUNDAMENTALS OF IOT	**9**
Introduction - Definition and Characteristics of IoT - Physical design - IoT Protocols - Logical design - IoT communication models, IoT Communication APIs - Enabling technologies - Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols, Embedded Systems, IoT Levels and Templates - Domain specific IoTs - IoT Architectural view.	
UNIT II ELEMENTS OF IOT	**9**
IoT and M2M- difference between IoT and M2M - Software Defined Networks - Network Function Virtualization - IoT systems management – Needs - NETCONF, YANG - IoT design methodology.	
UNIT III IOT PROTOCOLS	**9**
Sensors and actuators - Communication modules – Zigbee - LoRa - RFID - Wi-Fi - Power sources.	
UNIT IV BUILDING IoT WITH CLOUD AND DATA ANALYTICS	**9**
IoT platforms – Arduino – Raspberry Pi - Cloud Computing in IoT - Cloud Connectivity - Big Data Analytics- Data Visualization	
UNIT V CHALLENGES IN IOT AND CASESTUDIES	**9**
Security Concerns and Challenges - Real time applications of IoT – Home automation – Automatic lighting– Home intrusion detection – Cities – Smart parking – Environment – Weather monitoring system –Agriculture – Smart irrigation.	

Objective:

- Identify the various IoT elements appropriate to the applications
- Design a portable IoT using Arduino/Raspberry Pi incorporating cloud and analytics
- Implement IoT applications for real-time environment

Text Books:

1. Arshdeep Bahga, Vijay Madisetti, "Internet of Things-A hands-on approach", Universities Press, 2015

Reference Book:

R1. Raj Kamal, "Internet of Things – Architecture and Design Principles", Mc Graw Hill Education Pvt. Ltd., 2017
R2. Internet of Things and Data Analytics, Hwaiyu Geng, P.E, Wiley Publications, 2017

Website:

W1.http://nptel.ac.in/courses/106105031/lecture by Dr. Deb deep Mukhopadhyay IIT Kharagpur
W2. IoT Tutorial | Internet of Things Tutorial - Javatpoint
W3. https://docs.aws.amazon.com/iot/latest/developerguide/connect-iot-lorawan.html

Online Mode of Study (if Any):

- https://www.coursera.org/learn/crypto#syllabus

Course Plan:

Topic Number	Topic	Reference Detail	Page Number	Mode of teaching	Number of Periods Required	Cumulative Period
UNIT I FUNDAMENTALS O FIOT						
1	Introduction-Definition and Characteristics of IoT	T1	19-22	BB	1	1
2	Physical design - IoT Protocols	T1	23	BB	1	2
3	Logical design – IoT communication models	T1	30-32	BB	1	3
4	IoT Communication APIs	T1	30-32	BB	1	4
5	Enabling technologies - Wireless Sensor Networks, Cloud Computing,	T1	35-36	BB	1	5
6	Big data analytics, Communication protocols, Embedded Systems	T1	37-38	BB	1	6
7	IoT Levels and Templates	T1	39-44	BB	1	7
8	Domain specific IoTs	T1	47	BB	1	8
9	IoT Architectural view	W2	-	PPT	1	9

Outcome of Unit I:
CO1: Explain the basic concept of Internet of Things.

UNIT II ELEMENTS OF IOT						
10	IoT and M2M	T1	65-66	BB	1	10
11	Difference between IoT and M2M	T1	67-68	BB	1	11
12	Software Defined Networks	T1	69-72	BB	1	12
13	Network Function Virtualization	T1	73-78	BB	1	13
14	IoT systems management, Needs	T1	79-80	BB	1	14
15	NETCONF,YANG	T1	83-84	BB	2	16
16	IoT design methodology.	T1	100-111	BB	2	18
Outcome of Unit II: CO 2:Understand the various elements of IOT						
UNIT III IoT PROTOCOLS						
17	Sensors and actuators	R1	233-240, 257-259	BB	2	20
18	Communication modules	W2	-	BB	2	22
19	Zigbee	W1	-	PPT	1	23
20	LoRa	W3	-	BB	1	24
21	RFID	R1	266-270	BB	1	25
22	Wi-Fi	R1	273-280	BB	1	26
23	Power sources	W3	-	BB	1	27
Outcome of Unit III: CO 3: Analyze various IOT protocols.						
UNIT IV BUILDING IoT WITH CLOUD AND DATA ANALYTICS						
24	IoT platforms	W2	-	PPT	1	28
25	Arduino	W5	-	PPT	2	30
26	Raspberry Pi	T1	162-166	BB	2	32
27	Cloud Computing in IoT	R2	683-696	BB	1	33
28	Cloud Connectivity	R2	683-696	BB	1	34
29	BigData Analytics	R2	329-345	BB	1	35
30	Data Visualization	W3	-	BB	1	36
Outcome of Unit IV: CO 4: Build IOT application With Cloud And Data Analytics.						

UNIT V CHALLENGESIN IOT AND CASESTUDIES						
31	Security Concerns and Challenges	W1	-	BB	1	37
32	Real time applications of IoT	T1	217	BB	1	38
33	Home automation- Automatic lighting- Home intrusion detection	T1	218-236	BB	2	40
34	Cities-Smart parking	T1	237-246	BB	2	42
35	Environment- Weather monitoring	T1	247-263	BB	2	44
36	Agriculture–Smart irrigation.	T1	275-277	BB	1	45

Outcome of Unit V:
CO 5: Apply various Challenges in IOT
CO 6 :Build various applications using IOT.

Course Outcome:

At the end of course:
Students should be able to do:
CO1: Explain the basic concept of Internet of Things.
CO 2: Understand the various elements of IOT
CO 3: Analyze various IOT protocols.
CO 4: Build IOT application With Cloud And Data Analytics.
CO 5: Apply various Challenges in IOT
CO 6 : Build various applications using IOT.

Course Outcome Vs Program Outcome Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	**PSO 1**	**PSO 2**
CO1	2	1	-	-	1	-	-	-	-	-	-	-	2	2
CO2	2	1	-	-	1	-	-	-	-	-	-	-	2	2
CO3	1	3	2	2	1	-	-	-	-	-	-	-	2	2
CO4	3	2	1	1	2	-	-	-	-	-	-	-	2	2
CO5	3	2	1	1	1	-	-	-	-	-	-	-	2	2
CO6	3	2	1	1	2	-	-	-	-	-	-	-	2	2
	2	2	1	1	1	-	-	-	-	-	-	-	2	2

Content Beyond Syllabus:

- BACNet Protocol
- Modbus Architecture
- CoAP (Constrained Application protocol)
- Case Studies for Health & Lifestyle
- Case Studies for Industrial automation

Web portal	Assignment	Components	Topic Number with Topic/Unit Details	Relevance to CO	
Assignment I		**Assessment – I (60)**			
		Assignment-Handwritten (20)	1. Explain in details about IoT physical design. 2. Explain the characteristics and application of IOT in detail 3. State and design IoT System Management with NETCONF and YANG.	CO1 CO1 CO2	K2 K2 K3
		Poster/PPT Presentation (20)	1. Describe the levels of IoT with the help of neat diagrams give an example of each 2. Demonstrate the key steps involved in IoT Design methodology. 3. Explain SDN Architecture and how SDN can be used for various levels of IoT	CO1 CO2 CO2	K2 K2 K2
Assignment II		**Assessment – II (60)**		**CO3**	K2
		Seminar (20)	1. Briefly Explain about Zigbee architecture 2. Discuss in details about Sensor and Actuators in IOT. 3. Explain on Cloud Storage Models	CO3 CO4	K2 K2
			1. Write short notes on LoRa and WiFi 2. Illustrate the arduino board details and explain the steps for installing the board 3. Build and explain IOT with RASPERRY PI		
Assignment III		**Model Exam (75)**	.	CO5	K2
		Technical Aptitude (15)	1. Security Concerns and Challenges. 2. Explain the implementation of IoT technology in Smart Parking Weather monitoring. 3.Home automation	CO6	K2
		Attendance (Course attendance-10)			

Submission Details:

Phase 1(Before AT 1)	Phase 2 (Before AT 2)	Phase 3 (Before Model)
Assignment 1	Assignment2	Assignment3

Prepared By **Verified By**

Approved By
PRINCIPAL