



KONGU ENGINEERING COLLEGE

(Autonomous)

PERUNDURAI, ERODE – 638060



CERT No. 99-105-20785
ISO 9001:2015

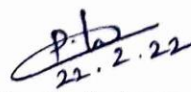
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Date: 22.02.2022

CIRCULAR

The following courses are approved by Curriculum and Development Cell (CDC) for this semester (2021-2022 even). The students may enroll themselves based on their willingness to attend the course. The courses will start from March 2022 onwards.

S.No.	Course Code	Name of the One credit course
1.	18VAC81	ASIC design using Cadence
2.	18VAC69	Real time project development using Image Processing and Machine Learning
3.	20VC015	Modeling and deployment Onto SoC using MATLAB and SIMULINK
4.	20VC024	Biomedical Systems and Wearable Medical Services
5.	18VAC88	System Design using MSP430 microcontroller and Code Composer Studio
6.	18VAC89	Industrial communication standards and measurements
7.	18VAC90	Long range technology for IoT application using LORA WAN
8.	20VC025	Long range technology for IoT application using LORA WAN
9.	18VAC91	QCA design for digital Electronics


22.2.22
Faculty Incharge


22/2/2022
HOD / ECE

 Estd: 1994	KONGU ENGINEERING COLLEGE (Autonomous) PERUNDURAI - 638060 INTERNAL QUALITY ASSURANCE CELL	 CERT 144.001.120-0218 ISO 9001:2015
	Approval for Value Added Course (One / Two Credits)	

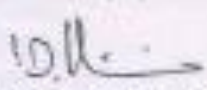
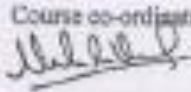
Academic Year: 2021 -2022 EVEN Semester
DEPARTMENT OF ECE

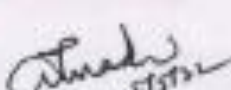
Date: 05.05.2022

1.	Academic Year	: 2021 -22		Semester: ODD / EVEN		
2.	Course Title	: Long Range Technology for IoT Applications		Credit(s): One / Two		
3.	Type of Course	: Already Offered Course / Updated Course / New Course				
	• If "Already offered course",	Course Code: --		Version:--		
4.	Course Coordinator(s)	: 1. Dr. N. Karthikeyan, Professor 2. Mr. Vign Mammen Vinod, Assistant Professor (SRG)				
5.	Course offered by	: Internal faculty & External experts				
6.	Name and designation of external resource persons	: Mr. Karthikeyan Technical Lead, Enthu Technology Solutions India Pvt Ltd, Coimbatore				
7.	Details about external organization	: • M/s Enthu Technology Solutions India Pvt Ltd, Coimbatore • M/s Enthu Technology, Coimbatore is a regional partner for LoRa Alliance and have wide experience in designing and marketing LoRa based embedded solutions. Their rich experience can benefit our student community to take up projects and to create better market ready products.				
8.	Course fee for external experts	Rs. 48,000/- (Rs.1200*40)		Max. number of students/Batch		Course fee / student
				40		Rs. 1500/-
9.	No. of days	Period		No. of hours		
		From	To	Lecture	Practical	Total
	10	20.05.2022 27.05.2022	22.05.2022 04.06.2022	20	30	50
		Venue/ Meet ID Smart Classroom, Department of ECE, Kongu Engineering College				
10.	Pre-requisites for offering the course	: Basic knowledge on Digital Electronics				
11.	Course offered to	Programme		Branch		Year/Semester
		BE		ECE, EEE, EIE, MTS, CSE, IT		II Year/IV Semester
12.	Course Main Contents	Day 1 (8.45am to 5.30pm)		Introduction to Embedded Systems and Wireless network protocols & Review on the Embedded C concepts and CPU architectures. Getting started with the programming environment		

The above proposal may kindly be approved.

80


Course co-ordinator(s)



HOD STS

Chief Coordinator/Academic

Encl:

1. Copy of the syllabus of the course
2. Financial proposal from the external organization (if any)

28VC025 - LONG RANGE TECHNOLOGY FOR IOT APPLICATIONS

L	T	P	Credit
1	0	2	2

Preamble: To impart a solid understanding of the role of IoT systems design and development with focus on long range connectivity technologies

Unit - I IoT

Introduction to Embedded Systems - Review on Embedded C - Getting started with IDE environment - Difference between Embedded Systems and IoT - Introduction to IoT - Comparing different wireless technology for IoT - Key role of LoRa in IoT - Insight about LoRa - Application of LoRa - Introduction to LoRa Modules

Unit - II WDM based LoRa Node

Introduction to WDM Based LoRa End Node - WDM Programming and Library Installation - Sensor Integration with WDM - Introduction to BLE - Creating Services and Characters - Introduction MQTT Protocol - MQTT protocol via Node MCU - Introduction to LoRaWAN Gateway - How to Configure LoRaWAN Gateway - Introduction to Network Server - Introduction to LBS Library - Customization of LBS Library - Payload Forwarder for viewing Real Data - Downlink Data from Application Payload to End Device - SMS/ Email/ Call Alert for Emergency Notification System

List of Experiments / Experiments:

1. Digital Sensor integration with WDM
2. Analog Sensor integration with WDM
3. I2C interface with WDM
4. OLED interfacing with WDM
5. BLE interface with WDM to transfer data
6. Upload of Sensor data using MQTT Protocol to Application Server
7. Downlink data from Application Server to End Node
8. Gateway Registration with Network Server
9. Sending Data from End Node to Network Server using ASF Mode
10. Data storage and monitoring using Third party application server integration

Lecture: 28, Practical: 14, Total 52

REFERENCES:

1. Warner, Peter, "IoT, building Arduino-based projects explore and learn about Internet of Things to develop interactive Arduino-based Internet projects" Packt Publishing, 2016
2. Pradeep Chennur, "Beginning LoRa Radio Networks with Arduino: Build Long Range, Low Power Wireless IoT Networks" Apress, 2018
3. <https://www.arduino.cc/en/Guide>

COURSE OUTCOMES

On completion of the course, the students will be able to:

- CO1 describe the fundamental concepts of IoT and LoRa Modules
- CO2 interface various analog and digital sensors with WDM based LoRa end node
- CO3 configure and integrate network and application servers of LoRaWAN gateway
- CO4 develop applications using WDM based LoRa end node

BT Mapper:
(Highest Level)
Understanding (K1)
Applying (K3)
Manipulation (C1)
Applying (K3)
Manipulation (C2)
Analyzing (K4)
Process (S3)

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	1	1	2							2	2	2
CO2	3	3	2	3	3				2		2	2	3	3
CO3	3	3	2	3	3				2		2	2	3	3
CO4	3	3	2	3	3				2		2	2	3	3

1 - Slight, 2 - Moderate, 3 - Substantial, BT - Bloom's Taxonomy

ASSESSMENT PATTERN - THEORY

Test / Bloom's Category	Remembering (K1) %	Understanding (K2) %	Applying (K3) %	Analysing (K4) %	Evaluating (K5) %	Creating (K6) %	Total %
MCQ Assessment (50 Marks)	20	50	30	10			110
Mini Project (50 Marks)			50	50			100

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Signature



COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	describe the fundamental concepts of IOT and LoRa Modules	Understanding(K2)
CO2	interface various analog and digital sensors with WDM based LoRa end node	Applying(K3)/ Manipulation (S2)
CO3	configure and integrate network and application servers of LoRaWAN gateway	Applying(K3)/ Manipulation (S2)
CO4	develop applications using WDM based LoRa end node	Analyzing(K4)/ Precision (S3)

Mapping of COs with POs and PSOs														
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	1	1	2							2	2	2
CO2	3	3	2	3	3				2		2	2	3	3
CO3	3	3	2	3	3				2		2	2	3	3
CO4	3	3	2	3	3				2		2	2	3	3

1 – Slight, 2 – Moderate, 3 – Substantial, BT- Bloom's Taxonomy

ASSESSMENT PATTERN - THEORY							
Test / Bloom's Category*	Remembering (K1) %	Understanding (K2) %	Applying (K3) %	Analyzing (K4) %	Evaluating (K5) %	Creating (K6) %	Total %
MCQ Assessment(50 Marks)	20	50	20	10			100
Mini Project(50 Marks)			50	50			100

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5/10/20

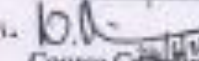
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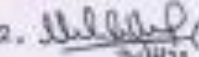
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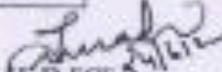
Two credit course on Long range Technology for IoT Applications
 Class: II Years - BCE, ECE, IT
 Total Hours: 50

Attendance Percentage

S.No.	Name of the participant	Roll Number	No. of hours Present	Attendance Percentage
1	Akshaya R S	20EC3036	50	100.00%
2	Arav Praveeth G	20EC3010	43	86.00%
3	Arumprashath V S	20ECR013	43	86.00%
4	Ashika K	20ECR014	39.5	79.00%
5	Boornika A	20ECR022	39.5	79.00%
6	Dineshkumar M	20ECR088	50	100.00%
7	Elango V	20ECR040	46.5	93.00%
8	Gokul S	20EC3045	50	100.00%
9	Gowtham T P	20ECR046	43	86.00%
10	Mohanasri K	20ECR101	50	100.00%
11	Nehra C S	20ECR109	50	100.00%
12	Nisaaanth P	20ECR110	50	100.00%
13	Niveditha M	20ECR113	50	100.00%
14	Pradeepa V	20ECR119	50	100.00%
15	Prasanna G	20ECR121	50	100.00%
16	Preetha K	20ECR126	50	100.00%
17	Ranjith S	20ECR129	50	100.00%
18	Rudhranarath N	20ECR132	50	100.00%
19	Sahari U P	20ECR133	43	86.00%
20	Sakshi Priya G	20ECR134	43	86.00%
21	Sengamithira V	20ECR135	50	100.00%
22	Sengavi S	20ECR136	50	100.00%
23	Santhosh Srava V	20ECR143	50	100.00%
24	Sathika S	20ECR146	50	100.00%
25	Satheshkumar G	20ECR147	50	100.00%
26	Sathyavardhan K	20ECR149	50	100.00%
27	Subha Shree T	20ECR158	50	100.00%
28	Sowmitha K	20ECR166	50	100.00%
29	Sreedharshan K	20ECR169	50	100.00%
30	Subash S	20ECR175	50	100.00%
31	Suhashini B	20ECR179	50	100.00%
32	Vishnavardhan S	20ECR199	43	86.00%
33	Bharath Karthikeyan R	20EIR001	50	100.00%
34	Danushika D	20EIR002	50	100.00%
35	Divyashree K	20EIR020	50	100.00%
36	Kashamatha P	20EIR037	50	100.00%
37	Kirithi Babu T	20EIR038	50	100.00%
38	Madhen Kumar A	20EIR042	50	100.00%
39	Malithra S	20EIR044	50	100.00%
40	Chitrasena Nethu Kanthari	20EIR056	43	86.00%

1.  (Dr. A. Kasthuri)
 Course Coordinators

2.  (V. S. Pradeepa)
 24/12/22


 HOD-BCE

Two credit course on Long range Technology for IoT Applications
Class: II Years - ECE, EEE, IT