

Branch Name:	Computer Engineering
Program Code:	ET103
Course Title:	Internet of Things Practicals
Course Code:	2ET1030603P
Pre-requisite Course:	Programming and Digital Concepts

Course Objectives:

- To introduce the terminology, technology of IoT
- To learn the concept of M2M (machine to machine) with necessary protocols
- Familiar with the Language which is used in many IoT devices
- To learn about platforms, that is widely used in IoT applications
- To implementation of web-based services on IoT devices

Teaching and Examination Scheme:

Credit	Teaching Scheme Hours per week				Evaluation Scheme (Marks)								Total (Marks)
					Theory (Marks)				Practical (Marks)				
	L	T	P	Total	SEE		CCA		SEE		CCA		
					Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
1	-	-	2	2	-	-	-	-	10	25	10	25	50

Course Contents:

Sr. No	Practical Exercise
1.	Familiarization with the concept of IOT, Arduino / Raspberry Pi and perform necessary software installation.
2.	Study of different operating systems for Raspberry Pi / Beagle board. Understanding the process of Os installation on Raspberry – Pi/ Beagle board
3.	Study of Connectivity and Configuration of Raspberry-Pi/ BeagleBoard circuit with basic peripherals, LEDs, Understanding GPIO and its use in programs.
4.	Controlling the Light Emitting Diode (LED) with a push button.
5.	Interfacing the RGB LED with the Arduino
6.	Controlling the LED blink rate with the potentiometer interfacing with Arduino
7.	Detection of the light using photoresistor
8.	Interfacing of temperature sensor LM35 with Arduino
9.	Interfacing Servo Motor with the Arduino
10.	Interfacing of the Active Buzzer with Arduino.
11.	Interfacing of the Relay with Arduino.
12.	Building Intrusion Detection System with Arduino and Ultrasonic Sensor
13.	Directional Control of the DC motor using Arduino

Reference Books:

- Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547
- Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759
- Raspberry Pi Cookbook, Software and Hardware Problems and solutions, Simon Monk, O'Reilly (SPD), 2016, ISBN 9789352133895
- Peter Waher, 'Learning Internet of Things', Packt Publishing, 2015 3. Editors Ovidiu Vermesan
- Peter Friess, 'Internet of Things – From Research and Innovation to Market Deployment', River Publishers, 2014
- N. Ida, Sensors, Actuators and Their Interfaces, SciTech Publishers, 2014

List of Open-Source Software/learning website:

- [Tinkercad - Create 3D digital designs with online CAD](#)
- [AWS Skill Builder - Internet of Things Foundation Series](#)
- [Calculator, breakout & Icon editor - Wokwi ESP32, STM32, Arduino Simulator](#)
- [Introduction to Internet of Things - Course \(nptel.ac.in\)](#)
- [An Introduction to Programming the Internet of Things \(IOT\) | Coursera](#)
- [Introduction to the Internet of Things and Embedded Systems | Coursera](#)

Course Learning Outcomes (CLO):

Course Outcomes	Description	Bloom's Taxonomy Level
COL1	Understanding of IoT value chain structure (device, data cloud), application areas and technologies involved.	1.Remembering 2.Understanding
COL2	Understand IoT sensors and technological challenges faced by IoT devices, with a focus on wireless, energy, power, and sensing modules	3. Apply
COL3	Market forecast for IoT devices with a focus on sensors	3. Apply 4. Analyze
COL4	Explore and learn about Internet of Things with the help of preparing projects designed	4. Analyze 5. Evaluate

Mapping of CLO with PO and PSO:

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes(PSOs)	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PSO2
CLO1	H	L	H	L	L	L	L	L	L		L	M	M	M
CLO2	H	L	H	L	M	L	L	L	L		L	M	M	M
CLO3	H	H	H	M	H	M	M	L	M		M	H	H	H
CLO4	H	H	H	M	H	H	M	H	H		H	H	H	H

H: High, M: Medium, L: Low