

COURSE CODE	COURSE TITLE	L	T	P	C
1153CS110	FUNDAMENTALS OF IOT	3	0	0	3

**Course Category:** Allied Elective

**A. Preamble :**

The core modules of this elective course include introduction to IoT, Elements of IoT, Data Analytics and IoT Platform. This course aims to teach the student to understand the concepts of Internet of Things(IoT) and its applications.

**B. Prerequisite Courses:**

Sl No	Course Code	Course Name
1	1150CS201	Problem Solving using C

**C. Related Courses:**

Sl No	Course Code	Course Name
1	1156CS601	Minor Project
2	1156CS701	Major Project

**D. Course Outcomes:**

Upon the successful completion of the course, students will be able to:

CO Nos.	Course Outcomes	Knowledge Level (Based on revised Bloom's Taxonomy)
CO1	Understand the concepts of Internet of Things.	K2
CO2	Explain the fundamentals and protocols in IoT	K2
CO3	Understand the basics of industrial IoT and clustering	K2
CO4	Explain the IoT concepts of Big data and cloud computing.	K2
CO5	Express the knowledge about Arduino and Raspberry Pi.	K2

**E. Correlation of COs with POs :**

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	M														
CO2	M	L												L	
CO3	M	L			L									L	
CO4	M				L									L	
CO5	M	L		M	L				M	L	L	L		L	

H-High M-Medium L-Low

## **F. Course Content :**

### **Unit I Introduction**

**9**

Introduction – Definition and characteristics of IoT – Physical and Logical Design of IoT - Communication models and APIs – Challenges in IoT - Evolution of IoT – IoT Architecture - and Core IoT Functional Stack.

### **Unit II Fundamentals and Protocols:**

**9**

Components in internet of things: Control Units – Sensors – Communication modules – Power Sources – Communication. Basic of Networking – Communication protocols – M2M and WSN Protocols- Supervisory Control and Data Acquisition and RFID Protocols, CoAP and MQTT.

### **Unit III Industrial IoT and Clustering**

**9**

Cybersecurity in Industry 4.0 - Industrial IoT- Layers – Network Layers, IEEE 802.15.4, ZigBee Architecture. Clustering – Role of Machine language - Software Agents - Software Agents for Object

### **Unit IV Big Data and Cloud Computing concepts in IoT**

**9**

Big Data Analytics and Software Defined Networks– No SQL Databases - Data Management with Hadoop - Security and Fog Computing - Cloud Computing - Cloud Standards –Cloud of Things Architecture - Open Source e-Health sensor platform.

### **Unit V Implementation and its Applications**

**9**

Introduction to Arduino Programming – Installation of Arduino (IDE) – Getting started with Circuits – Components used in circuits – Fritzing for circuit design - IDE programming – Raspberry Pi – Interfaces and Raspberry Pi with Python Programming - Integration of Sensors and Actuators with Arduino.

## **G. Learning Resources**

### **i. Text Books**

1. David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Rob Barton and Jerome Henry, “IoT Fundamentals: Networking Technologies, Protocols and Use Cases for Internet of Things”, Cisco Press, 2017.
2. Michael Margolis, “Arduino Cookbook” OReilly, Second Edition, 2011.

### **ii. References**

1. Arshdeep Bahga, Vijay Madiseti, “Internet of Things (A Hands-On-Approach)”, VPT, 2014.
2. Olivier Hersent, David Boswarthick, Omar Elloumi, “The Internet of Things – Key applications and Protocols”, Wiley, 2012.

### **iii. Online Resources**

1. <https://www.arduino.cc>
2. <http://www.theinternetofthings.eu/what-is-the-internet-of-things>