

<b>Name of Faculty</b>	:	Faculty of Engineering & Technology
<b>Name of Program</b>	:	Master of Technology (M. Tech)
<b>Course Code</b>	:	2MSE01
<b>Course Title</b>	:	Internet of Things
<b>Type of Course</b>	:	PC
<b>Year of Introduction</b>	:	2023-24

<b>Prerequisite</b>	:	Networking, Electronics & Hardware, Programming & Software Development
<b>Course Objective</b>	:	The course objectives for an Internet of Things (IoT) course can vary depending on the level and focus of the course. However, here are some common objectives you might find in an IoT course: Understand the fundamentals, Explorer IOT Technology, Development Programming Skills, Learn Data Handling and Analytics, Understand the data security and Privacy, Explore IoT application and Use Cases, Design and Development IoT System etc.
<b>Course Outcomes</b>	:	At the end of this course, students will be able to:
	CO1	Describe what IoT is and how it works today.
	CO2	Recognise the factors that contributed to the emergence of IoT.
	CO3	Use real IoT protocols for communication.
	CO4	Assess the genesis and impact of IoT applications and architectures in real world.
	CO5	Illustrate diverse methods of deploying smart objects and connect them to network.

### Teaching and Examination Scheme

Teaching Scheme (Contact Hours)			Credits	Examination Marks				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	SEE	CIA	SEE	CIA	
3	0	2	4	70	30	30	20	150

*Legends: L-Lecture; T-Tutorial/Teacher Guided Theory Practice; P – Practical, C – Credit, SEE – Semester End Examination, CIA – Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)*

**Course Content**

Unit No.	Topics	Teaching Hours	Weightage	Mapping with CO
1	<b>Introduction of IoT</b> Introduction, Domains of IoT, M2M Vs. IoT, European Standards, ISO/IEC JTC 1/WTC 7 Sensor Networks, ETSI, IEEE, IETF, ITU-T, Internet of Things today and tomorrow	06	10%	CO1
2	<b>IoT in dept</b> Internet of Things: layers, languages, protocols, packets, services, performance parameters of a packet network as well as applications such as web, Peer-to-peer, sensor networks, and multimedia.	10	25%	CO2
3	<b>Scalable and Trust based Framework</b> Main Concepts and Motivations for the framework Identity Management Context Awareness, Policy based framework for Security and Privacy in IoT.	12	30%	CO3
4	<b>Research and Innovation in IoT</b> IoT Vision and common Definitions IoT Research and Innovation Directions IoT Applications and Use Case Scenarios, IoT Application Areas IoT Smart-X applications including Smart Cities, Smart Mobility, Smart Transport etc. IoT and Future related technologies: Cloud Computing, Semantic Technologies Network and Communication: Networking Technology, Growth of Wireless Networks, Mobile Networks, IoT and IPV6 etc.	11	20%	CO4
5	<b>IoT Tools and Data Analytics</b> Tools in IoT, Data Analytics in IoT, IoT Physical Systems.	06	15%	CO5

Suggested Distribution of Theory Marks Using Bloom's Taxonomy						
Level	Remembrance	Understanding	Application	Analyse	Evaluate	Create
Weightage	40	20	20	10	-	10

*NOTE: This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.*

### Suggested List of Experiments/Tutorials

Sr. No.	Name of Experiment/Tutorial	Teaching Hours
1	Getting started with Node-MCU, Arduino with ESP8266 and ESP32 in the Arduino IDE.	01
2	GPIO Interfacing and programming.	02
3	Digital on/off sensor (PIR and IR) Interfacing programming.	01
4	Analog sensor programming and uploading sensor data on cloud.	01
5	Controlling devices remotely using Bluetooth link, Wi-Fi link.	02
6	Interfacing and programming of actuators, controlling devices remotely using cloud.	02
7	Web based device control.	01
8	Development of Android applications suitable for IoT.	02
9	Experiments on Agriculture IoT (Soil moisture, PH monitor).	01
10	IoT based home automation.	02
11	Smart energy experiments.	02
12	Smart city IoT applications.	02
13	IoT based mini project.	02
14	Developing Voice App for IoT device.	02

### Suggested Learning Websites

Sr. No.	Name of Website
1	<a href="http://www.vs.inf.ethz.ch/res/show.html?what=iot">http://www.vs.inf.ethz.ch/res/show.html?what=iot</a> - For Research Papers
2	<a href="http://www.ieee.org">www.ieee.org</a> - For standards and technical research papers

### Reference Books

Sr. No.	Name of Reference Books
1	Internet of Things: A hands on approach by Arhdeep Bahga and Vijay Madiseti.
2	Research papers from IEEE, Springer etc.