SARVAJANIK UNIVERSITY
Sarvajanik College of Engineering and Technology
Bachelor of Technology

Year: B. Tech IV (Semester VII)

Subject Name: IOT and Applications **Subject Code:** BTIT14704
Type of course: Professional Elective Course
Prerequisite (if any): Computer networking

Rationale: IoT market is growing rapidly from installed base of about 30 billion devices in the year 2020 and expected to grow up to 75 billion devices by 2025. IoT is useful in many sectors like consumer, commercial, infrastructure, health, industry and military. Industry 4.0 is based on IoT. This course will provide opportunity to the students for contribution in IoT applications

Teaching and Examination Scheme:

Teaching Scheme				Theory Marks			Practical Marks		Total
L	T	P	C	TEE	CA1	CA2	TEP	CA3	
3	0	0	3	60	25	15	0	0	100

CA1: Continuous Assessment (assignments / projects / open book tests / closed book tests) CA2: Sincerity in attending classes / class tests / timely submissions of assignments / self-learning attitude / solving advanced problems TEE: Term End Examination TEP: Term End Practical Exam (Performance and viva on practical skills learned in course) CA3: Regular submission of Lab work / Quality of work submitted / Active participation in lab sessions / viva on practical skills learned in course.

Contents:

Sr. No.	Contents	Total Hours
1.	**Introduction** **Introduction to Internet of Things:** IoT Definition, IoT characteristics, M2M and IoT, End to End IoT Architecture, Physical design of IoT, Logical Design of IoT, Overview of IoT protocols, IoT levels and deployment templates, Challenges for IoT, Interdependencies of IoT and cloud computing, Web of things **Security and challenges :** IOT Security, Dangers, Assigning values to Information, Security Components, Key Management, Update Management, Challenges in IoT Security.	08
2.	**IoT Protocols** Link Layer Protocols, Network/Internet Layer Protocols, Transport Layer Protocols, Application Layer Protocols: Hypertext Transfer Protocol (HTTP), Systematic HTTP Access Methodology, Web Socket, Constrained Application Protocol (CoAP), Message Queue Telemetry Transport Protocol (MQTT), XMPP, DDS, AMQP .	07

3.	**IoT and M2M** Software defined Networks, Network function Virtualization, Difference between SDN and NFV for IoT, Basics of IoT System Management with NETCOZF, YANG-NETCONF, YANG, SNMP NETOPEER	07
4.	**IoT Physical Devices and Endpoints** Introduction to Arduino and Raspberry Pi: Installation, Interfaces (serial, SPI, I2C), Programming – Python program with Raspberry PI with focus on Interfacing External Gadgets, Controlling Output, Reading Input from Pins	08
5.	**IoT Physical Servers and Cloud Offerings** Introduction to Cloud Storage Models and communication APIs Webserver – Web server for IoT, Cloud for IoT, Python Web Application Framework Designing a RESTful web API	08
6.	**IoT Applications and case study Broad categories of IoT Applications** Consumer IoT, Commercial IoT, Industrial IoT, Infrastructure IoT, Military Things (IoMT) IoT, Case studies: Home Automation with IoT, River Water Pollution Monitoring, Smart City Street Light Control and Monitoring, Health Care Monitoring, Voice Apps on IoT Device	07

Suggested Specification table with Marks (Theory): (For B. Tech only)

Distribution of Theory Marks					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
20	**20**	**10**	**10**	**-**	**-**

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyse and E: Evaluate C: Create (Revised Bloom's Taxonomy)

Reference Books:

Sr no	**Title of book /article**	**Author(s)**	**Publisher and details like ISBN**	**Year of publication**	**Publication Edition**
1.	Internet of Things - A Hands-on Approach	Arshdeep Bahga and Vijay Madisetti,	Universities Press ISBN: 9788173719547	2015	-
2.	Getting Started with Raspberry Pi	Matt Richardson, Shawn Wallace and Wolfram Donat	Make: Community ISBN: 9781680452464	2016	3rd Edition
3.	Raspberry Pi Cookbook,	Simon Monk,	O'Reilly , ISBN	2016	2nd Edition

	Software and Hardware Problems and solutions		7989352133895		
4.	Internet of Things: Architecture and Design Principles	Raj Kamal	McGraw Hill Education	2017	2nd Edition
5.	21 Internet of Things Experiments	Yashwant Kanetkar	BPB Publication	2018	1st Edition
6.	An Introduction to Internet of Things: Connecting Devices, Edge Gateway, and Cloud with Applications	Rahul Dubey	Cengage India Private Limited	2019	1st Edition

Course Outcomes (CO):

Sr. No.	CO statements	Marks % weightage
CO-1	Understand IoT architecture and protocols	34%
CO-2	Understand basics of IoT system management	16%
CO-3	Explore and learn about Internet of Things with the help of preparing projects designed for Raspberry Pi	16%
CO-4	Understanding IoT physical devices and physical servers	18%
CO-5	Explore different IoT applications	16%

List of Open learning website:

1. NPTEL online course on IoT: https://onlinecourses.nptel.ac.in/noc18_cs08