

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Artificial Intelligence and Data Science, VI-Semester

Open Elective AD 604 (A) Internet of Things

Course Objective:

The objective of this course is to provide an understanding of the technologies and the standards relating to the Internet of Things and to develop skills on IoT technical planning.

Unit I

IoT definition, Characteristics, IoT conceptual and architectural framework, Components of IoT ecosystems, Physical and logical design of IoT, IoT enablers, Modern day IoT applications, M2M communications, IoT vs M2M, IoT vs WoT, IoT reference architecture, IoT Network configurations, IoT LAN, IoT WAN, IoT Node, IoT Gateway, IoT Proxy, Review of Basic Microcontrollers and interfacing.

Unit II

Define Sensor, Basic components and challenges of a sensor node, Sensor features, Sensor resolution; Sensor classes: Analog, Digital, Scalar, Vector Sensors; Sensor Types, bias, drift, Hysteresis error, quantization error; Actuator; Actuator types: Hydraulic, Pneumatic, electrical, thermal/magnetic, mechanical actuators, soft actuators.

Unit III

Basics of IoT Networking, IoT Components, Functional components of IoT, IoT service oriented architecture, IoT challenges, 6LowPAN, IEEE 802.15.4, ZigBee and its types, RFID Features, RFID working principle and applications, NFC (Near Field communication), Bluetooth, Wireless Sensor Networks and its Applications Unit IV MQTT, MQTT methods and components, MQTT communication, topics and applications, SMQTT, CoAP, CoAP message types, CoAP Request-Response model, XMPP, AMQP features and components, AMQP frame types.

Unit V

IoT Platforms, Arduino, Raspberry Pi Board, Other IoT Platforms; Data Analytics for IoT, Cloud for IoT, Cloud storage models & communication APIs, Attacks in IoT system, vulnerability analysis in IoT, IoT case studies: Smart Home, Smart framing etc.

References:

1. Vijay Madiseti, Arshdeep Bahga, "Internet of Things, A Hands on Approach", University Press
2. Dr. SRN Reddy, Rachit Thukral and Manasi Mishra, "Introduction to Internet of Things: A practical Approach", ETI Labs
3. Pethuru Raj and Anupama C. Raman, "The Internet of Things: Enabling Technologies, Platforms, and Use Cases", CRC Press
4. Jeeva Jose, "Internet of Things", Khanna Publishing House, Delhi
5. Adrian McEwen, "Designing the Internet of Things", Wiley

6. Raj Kamal, "Internet of Things: Architecture and Design", McGraw Hill
7. CunoPfister, "Getting Started with the Internet of Things", O Reilly Media

Course Outcomes:

After the completion of this course, the students will be able to:

1. Understand Internet of Things and its hardware and software components
2. Interface I/O devices, sensors & communication modules
3. Analyze data from various sources in real-time and take necessary actions in an intelligent fashion
4. Remotely monitor data and control devices
5. Develop real life IoT based projects