RCETECAC01 - IoT with Arduino

Course outcomes:

- Recall the basics of sensors, its functioning.

- Execute basic and advanced assembly language programs.

- Learn the ways to interface I/O devices with processor for task sharing.

- Recall the basics of co-processor and its ways to handle float values by its instruction set.

- Recognize the functionality of micro controller, latest version processors and its applications.

- Acquire design thinking capability, ability to design a component with realistic constraints, to solve real world engineering problems and analyze the results.

Syllabus:

UNIT I

INTRODUCTION-SENSORS

Transducers, classification, roles of sensors in IOT, various types of sensors, design of sensors, sensor architecture, special requirements for IOT sensors, role of actuators, types of actuators.

UNIT II

Physical device- Arduino interface, hardware requirement for Arduino, connecting remotely over the network using VNC, GPIO basics, controlling GPIO outputs using a web interface – programming, APIs / packages – quark SOC processor programming, Arduino boards using GPIO (LED, LCD, Keypad motor control and sensor)

UNIT III

History – creative coding platforms – open source platforms – PIC – Arduino, sketch, interactive coding methodology – python programming – mobile phones and similar devices – arm devices – basic electronics (circuit theory, measurements, parts identification) sensors and softwares – understanding processing code structure, variables and flow control, interfacing to the real world.

UNIT-4

Programming and Arduino IoT Device

Preparing the development environment (Arduino IDE) , exploring the Arduino language (C/C++) syntax, coding, compiling, and uploading to the micro controller, working with Arduino communication modules – Bluetooth modules, wifi modules and I2C and SPI, interfacing Arduino and blynk via USB – LED blinking controlling a servomotor.

UNIT V

Programming ESP 8266 Module

ESP 8266 wifi serial module – overview, setting up the hardware, interfacing with Arduino, creating an IOT temperature and humidity sensor system, overview of DHT – 22 sensor, interfacing the hardware Arduino, ESP 8266 wifi module and DHT - 22 sensor, checking your data via thingspeak connecting your Arduino set – uptoblynk via wifi.

Reference Text Books:

1. IoT Fundamentals: Networking Technologies, Protocols and Use Cases for Internet of Things, David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Rob Barton and Jerome Henry, Cisco Press, 2017

2. Internet of Things – A hands-on approach, Arshdeep Bahga, Vijay Madisetti, Universities Press, 2015

3. Internet of Things: Architecture, Design Principles And Applications, Rajkamal, McGraw Hill HigherEducation

4. The Internet of Things – Key applications and Protocols, Olivier Hersent, David Boswarthick, Omar Elloumi and Wiley, 2012 (for Unit2).