IOT

SYLLABUS

I. INTRODUCTION TO IOT (What is IOT, IOT health-care an example, why IOT, current roles for IOT professionals, emerging roles for IOT professionals, Skills required, IOT products, Notion of network, Networking concept-communication modes)
II. INTRODUCTION TO EMBEDDED SYSTEMS (Definition and characteristics of Embedded systems, Real time systems and real time tasks, microcontrollers and it properties, components of Embedded systems, introduction to Embedded systems)
III. IOT CHARACTERISTICS AND PHYSICAL DESIGN (Dynamic and self-adapting, self-configuration, interoperable communication protocols, unique identity, integration into information network, things, IOT protocols)
IV. LOGICAL DESIGN OF IOT (Functional blocks of IOT, IOT communication models, IOT communication APIs)
V. ENABLING TECHNOLOGY (Wireless sensor networks, cloud computing, Big DATA Analytics, communication protocols, Embedded system and domain specific IOT)
VI. IOT DESIGN METHODOLOGY (Case study on home automation system)

PRACTICAL PART

- The practical part is aimed at introducing the learners to the understanding and programming of IOT components.

I. Introduction into Arduino ie installing and how it function/ notions on breadboard and how to use it/ writing the first code that will enable the LED found on the Arduino circuit to blink and finally how to mount and blink the LED on a Breadboard. (Requirements: A 330Ω resistor, a LED, Breadboard, cables, Arduino and a computer).

II. How to use variables in Arduino/ review on binary and BCD coding/Using the notion of binary and BCD coding to realize a small project on a breadboard on LED counter from 1 to 15. (Requirements: 4 resistors of 330Ω, cables, 4 LED, a breadboard, an Arduino and a computer)

III. Pulse with modulation/notion on potentiometer/notion on the if statement/a project on the dimmable of a LED. (Requirements: A potentiometer, a resistor of 330Ω, cables, a LED, a breadboard, an Arduino and a computer)

IV. From the dimmable LED project, understanding the for loop/while loop. (Requirements: Two resistors of 330Ω, cables, two LED of different colour, a breadboard, an Arduino and a computer)

V. Controlling of a DC motor/understanding and using servos in projects/understanding and using joystick in a project/Project on the control of the speed and direction of a DC motor using a joystick. (Requirements: A 12V DC battery, cables, DC motor, a joystick, a breadboard, an Arduino and a computer)

- References:

  - [1] M. Wu, T. J. Lu, F. Y. Ling, J. Sun, and H. Y. Du, "Research on the architecture of Internet of Things," ICACTE 2010 - 2010 3rd Int. Conf. Adv. Comput. Theory Eng. Proc., vol. 5, pp. 484–487, 2010.
  - [2] R. Khan, S. U. Khan, R. Zaheer, and S. Khan, "Future internet: The internet of things architecture, possible applications and key challenges," Proc. - 10th Int. Conf. Front. Inf. Technol. FIT 2012, pp. 257–260, 2012.
  - [3] S. Li, L. Da Xu, and S. Zhao, "The internet of things: a survey," Inf. Syst. Front., vol. 17, no. 2, pp. 243–259, 2015.