

## Workshop Content

**Note:-**

- Kit will be provided in group of two/three students during workshop for practice.
- Students are request to come with laptop, Pen Drive, mobile charging cable (one per group) during workshop.

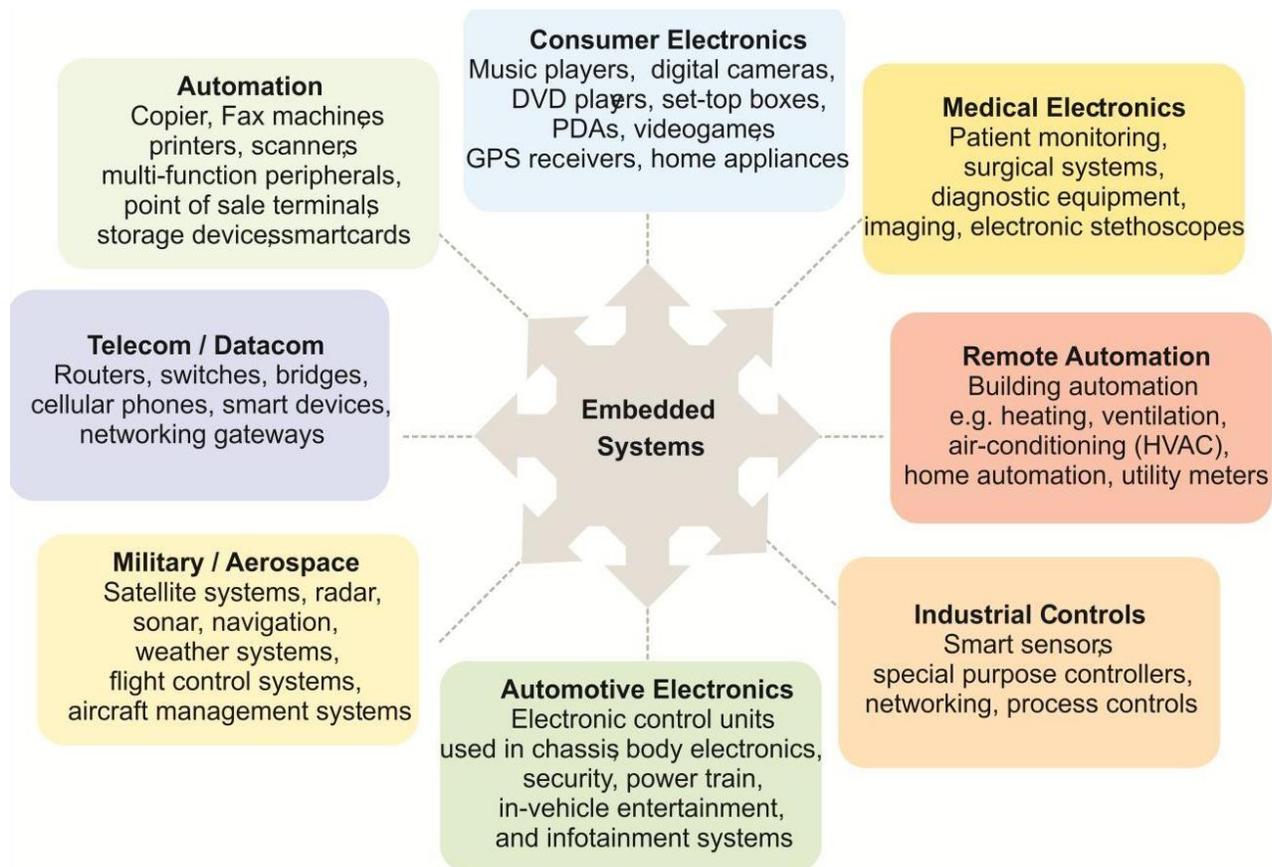
<b>DAYS</b>	<b>Topics to be Covered</b>
<b>Day 1</b>	IoT architecture and devices
	Interactive Computing with NodeMCU
	Online & Offline Web server using HTTP protocol
<b>Day 2</b>	MQTT : light weight IoT Protocol
	Data logging & utilization of Cloud services
	Visual Programming for IoT with NodeRED

The Internet of Things (IoT) is an important topic in technology industry, policy, and engineering circles and has become headline news in both the specialty press and the popular media. This technology is embodied in a wide spectrum of networked products, systems, and sensors, which take advantage of advancements in computing power, electronics miniaturization, and network interconnections to offer new capabilities not previously possible. An abundance of conferences, reports, and news articles discuss and debate the prospective impact of the “IoT revolution”—from new market opportunities and business models to concerns about security, privacy, and technical interoperability.

The large-scale implementation of IoT devices promises to transform many aspects of the way we live. For consumers, new IoT products like Internet-enabled appliances, home automation components, and energy management devices are moving us toward a vision of the “smart home”, offering more security and energy efficiency. Other personal IoT devices like wearable fitness and health monitoring devices and network enabled medical devices are transforming the way healthcare services are delivered. This technology promises to be beneficial for people with disabilities and the elderly, enabling improved levels of independence and quality of life at a reasonable cost. IoT systems like networked vehicles, intelligent traffic systems, and sensors embedded in roads and bridges move us closer to the idea of “smart cities”, which help minimize congestion and energy consumption. IoT technology offers the possibility to transform agriculture, industry, and energy production and distribution by increasing the availability of information along the value chain of production using networked sensors.

IoT is the network of physical objects or ‘things’ embedded with electronics, software, sensors & network connectivity, which enables these objects to collect & exchange data.

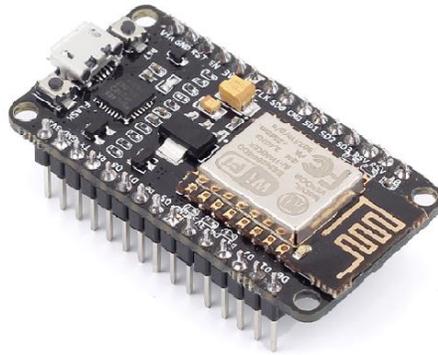
Embedded systems have become an integral part of IoT. The embedded systems industry was born with the invention of microcontrollers and since then it has evolved into various forms, from primarily being designed for machine control applications to various other new verticals with the convergence of communications. Embedded systems are transforming themselves into really complex systems, thus creating newer opportunities and challenges to develop and market more powerful, energy efficient processors, peripherals and other accessories. It has electronics – both digital and analog, special purpose sensors and actuators, software, mechanical items etc., and with design challenges of space, weight, cost and power consumption.



### What would you learn?

- Development Board for Internet of Things
- ESP8266 and NodeMCU Module
- Embedded C and eLua scripting language
- GPIO Programming
- Sensor Interfacing
- Graphical Programming with NodeRED and App Inventor
- Interaction of various objects without manual intervention
- Various Embedded and IoT Protocols
- Implementation of IoT
- Implementation of NoT

## Hardware Used in Workshop



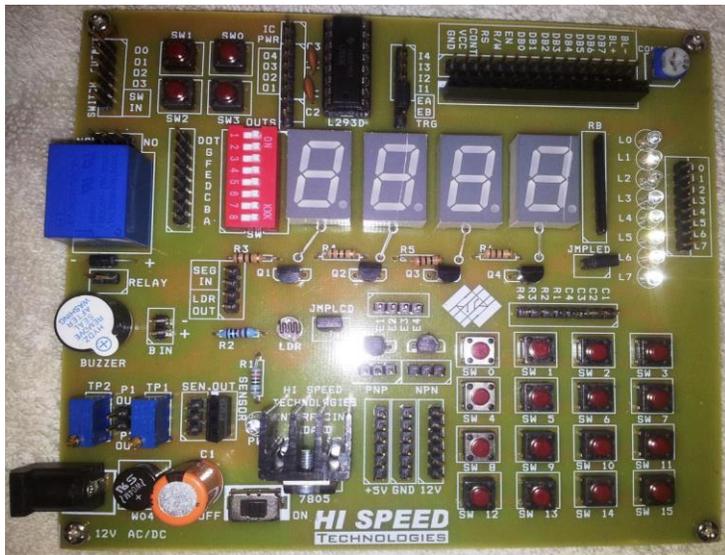
### Features of ESP8266

- 32-bit RISC CPU: Tensilica Xtensa LX106 running at 80 MHz\*
- 64 KiB of instruction RAM, 96 KiB of data RAM
- External QSPI flash - 512 KiB to 4 MiB\* (up to 16MiB is supported)
- IEEE 802.11 b/g/n Wi-Fi
- Integrated TR switch, balun, LNA, power amplifier and matching network
- WEP or WPA/WPA2 authentication, or open networks
- 16 GPIO pins
- SPI, I<sup>2</sup>C,
- I<sup>2</sup>S interfaces with DMA (sharing pins with GPIO)
- UART on dedicated pins, plus a transmit-only UART can be enabled on GPIO2
- 1 10-bit ADC

### Features of NodeMCU

- An open-source firmware based on ESP8266 WiFi SoC
- Transformation of ESP8266 to provide Arduino-like hardware IO
- Nodejs style network API
- USB-TTL included, plug & play
- Simple Prototyping Development Kit

# Interfacing Board



## Features

- On board power supply (5V-10V)
- 8 array LEDs
- 4 array Push switch
- Multiplexing Seven-segment
- 4\*4 Matrix keypad
- 16\*2 LCD
- LDR
- Potentiometer
- 12v Relay
- Mini buzzer
- 6V geared DC motor(60 rpm)
- 12V Bipolar stepper motor
- Motor driver IC L293D