

## Distance-Measurement Robotics

An ultrasonic sensor transmits ultrasonic waves into the air and detects reflected waves from an object. In this project you will be introduced to ultrasonic sensor and how to use it. And we're going to build obstacle avoider robot using ultrasonic sensor which avoids obstacles or drives itself not running into a obstacle and finds itself a safer path.

### **Session 1 : Introduction**

- Robotics Overview and Modern Trend
- What fields involved Robotics?
- Mechanical System - Machines and Mechanisms
- Wheeled Mobile Robots (WMRs)
- Simple DC Motors Overview and Control Circuit
- Making and Controlling a Robot from Wired Remote

### **Session 2 : Essential Electronics**

- Basic components, tools, instruments, protections.
- Project - Making a Power Supply for Robot.
- Opamp/Comparators and application circuits.
- Timer IC 555 introduction and application circuit.
- Sensors -Introduction and Type of Sensors
- Designing Ultrasonic Sensor circuits for transmitter and Receiver.

### **Session 3 : Ultrasonic Robotics**

- How do Ultrasonic Sensors work?
- What is a Obstacle Avoider Robot?
- How does a Robot Avoided the Obstacle ?
- Test your ultrasonic Sensor

### **Session 4 : Introduction to Microcontroller**

- Working of a Microcontroller

- Structure of a Microcontroller
- Development Board Schematic
- Explaining various components on Development Board

## **Session 5: Robotics Programming**

- Robot programming concepts
- Microcontroller Architecture and overview
- Oscillator, A/D converter, RAM, Program memory, Timers, Interrupts, Input and Output Ports.
- Advanced Simulation tool for embedded programming
- Programming in C, Debugging and Testing
- Burning code to microcontroller
- Input/Output Port Programming
- Attaching LCD to your robot, interfacing and programming the LCD
- Interfacing Motors with microcontroller
- Interfacing ultrasonic sensor with microcontroller

## **Section 6: Motors and Motor Drivers**

- How does a Robot move ?
- Motors and Motor Drivers IC
- Working of a DC Motor

## **Section 7: Assembling**

- Assembling of the Robotics Kits.
- Software Installation

## **Section 8: Testing**

- Troubleshooting
- Testing Distance -measurement Robot

## **Section 9: Competition and Certification distribution**