

## Workshop on Self-Balancing Bot

### ABOUT:

The self-balancing robot is a development in the field of robotics. This two-wheeled self-balancing robot is based on the concept of Inverted pendulum theory. This type of robot has gained fame and interest among researchers and engineers because it utilizes a control system that is used to stabilize an unstable system using efficient microcontrollers and sensors. Two-wheeled balancing robots can be used in several applications with different perspectives such as an intelligent gardener in agricultural fields, an autonomous trolley in hospitals, shopping malls, offices, airports, healthcare applications or an intelligent robot to guide blind or disable people.

### DETAILS:

Date: - 3<sup>th</sup> and 4<sup>th</sup> March

Duration: - 2 days/4 sessions (14 – 15 hours)

Time: - 10:00 AM onwards

Venue: - EN Seminar Hall

Amount: -5000/- per group (Max 5 people in a group)

Takeaway kits will be provided

Refreshments will be provided to the participants

National level certificate from Technovision & Innovation cell, IIT Bombay/Robokart

### KIT CONTENTS

- Arduino Nano Board
- DC Motor
- DC Motor Driver
- Bluetooth Module
- Accelero-Gyro Sensor
- Potentiometer for PID
- Wheel Pair
- Robot Chassis
- Screw Packet
- Screw Driver
- USB Cable
- Connecting Wires
- Battery
- Battery Adapter

## **COURSE CONTENT**

- Basics of Embedded Systems
- Introduction to Microcontrollers
- Introduction to PID controllers
- Introduction to Arduino Board & Programming
- Basic Arduino based programs for interfacing I/O Devices
- Motor driver & motor interfacing & programming
- Introduction to Accelero-Gyro sensor & interfacing & reading sensor values
- Interfacing with Bluetooth and reading values from android application
- Tuning of speed and PID parameters to self-balance the robot.

## **RULES**

- It is imperative that you maintain the discipline in the college.
- A valid identity card must be brought by the participants.
- Participants should be present in all the sessions. Failing this, no certificate will be awarded to the participant.

## **PREREQUISITES**

- 1 laptop per group

## **SESSION DETAILS**

### **DAY 1:**

#### **Session 1:**

- Introduction to basic of Embedded Systems
- Introduction & explanation of microcontrollers
- Explanation of PID & formulas
- Explanation of Arduino board & programming

#### **Session 2:**

- Basic Arduino Based programs for interfacing I/O devices
- Motor driver & motor interfacing & programming
- Explanation of Accelero-Gyro sensor & interfacing & reading sensor values
- Assembling of robot

**DAY 2:**

**Session 3:**

- Programming codes for balancing robot
- Setting PID parameters for standalone balancing
- Interfacing with Bluetooth and reading values from android application
- Programming robot with self-balancing with Bluetooth code

**Session 4:**

- Tuning speed and PID parameters to self-balance robot in motion
- Controlling robot using android application
- Doubt solving & questionnaires
- Workshop based challenges for students

**CONTACT**

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