Swarm Robotics

The Swarm Robotics Workshop is designed to teach students concepts of Swarm Robots . The workshop can be attended by a student of any stream.
This workshop aims at students wanting to introduce themselves to the field of robotics & AI and how it is implemented in real life, This workshop teaches you the fundamentals of designing and building autonomous robots by integration with a microcontroller. It also focuses on conceptualization and designing of complex systems and will help clear concepts related to embedded systems, artificial intelligence and automation.
Proper Hands – On Session would be conducted for the students so that they can grasp practical knowledge by using Special Kits designed by our team which has an immense exposure and expertise in the fields of Robotics and AI at the International Level.

SESSION 1 :INTRODUCTION TO ROBOTICS

TOPICS TO BE COVERED

- Brief history
- Existing robotics applications and types of robots
- Robotics as a field and its constituents
- AI
- Sensors

In this session basic idea of robots and robotics is made clear.Participants are introduced to process of building machine/robots .

SESSION 2 :SWARM ROBOTICS CONCEPT

- The basic Approach
- Definitions
- Wireless Control
- Applications
- How to use a Wireless Device and Interface it with a uC?

SESSION 3 : MECHANICAL WORKING

- Differential drive system
- Differential drive dynamics
- Dead reckoning

ACTUATORS

- Stepper motors
- Servo motors
- Hydraulic arms
- Control of actuators

- Motor Drivers

Everything would be taught in detail about the actuators , their working and real life implementation. After the above lecture the students will be well acquainted with the concepts of controlled actuation with various kinds of actuators mentioned above and will also understand the basics of various types of motor drivers.

SESSION 4 : INTRODUCTION TO MICROCONTROLLERS

- Architecture
- Functioning
- Overview of available microcontrollers
- Features and capabilities will be studied in depth.
- Functioning and use of RS-232

In this session , students would be taught about the microcontrollers in details and how to use a development or the microcontroller with the system. The above lecture will enable students to understand the microcontroller functioning and program it.

SESSION 5 : BASIC PROGRAMMING

- Micro Controller Programming
- Programming the chip
- Controlling H-bridge
- Developing algorithms for Intelligent ROBOTS and writing programs for the same

The above lecture will build upon the last one and get students acquainted with programming API and students will also be taught to run their codes on emulator for testing

SESSION 6 : INTRODUCTION TO SENSORS

- Line detection sensors
- LDRs
- Range detection sensors
- And other Sensors

It is essential for students and also knowing about the interfacing with microcontroller , the above lecture will cover both the aspects of the given sensors. In this session students would be taught about the sensors in details and how to use these sensors in the competition

HANDS – ON

- Intelligent Swarm Robots
- Line Following Swarm Robots
- Making a pattern with Robots

- Obstacle Avoider

Multipurpose Robotic Kit - Free Takeaway Kit to a Team of 4 Members.Total 28 Items in the Kit

The Multipurpose Kit can also be used for the following tasks:

- Line follower robot
- Obstacle chaser robot
- Wall Follower
- Robo Soccer
- Obstacle avoider robot
- Object follower robot
- Photophobic robot
- Phototropic robot
- Wall Follower
  And Many Embedded Applications

Kit Content: Free kit to a group of 4 students

- One Multipurpose Development Board (Atmega 8 Based) [1Pc]
  - 4 channels of motor control(L293NE), capable of driving 2 dc motors or 1 stepper motor at a time
  - 8 digital input channels for sensor interfacing
  - ADC – with 8 inputs for Transducer interfacing
  - Onboard Port Connector for In System Programming
  - USB Connectivity for PC /Laptop Interfacing
- One USB Programmer [1 Pc]
- One Robot Chassis [3 Pc]
- Two Geared Motor [2 Pc]
- Two IR Sensors [2Pc]
- One USB Cable [1Pc]
- Sensor Connectors and Cables [4 Pc]
- Batteries 9V [2 Pc]
- Battery Snaps [2 Pc]
- Two Wheels with Grip [2 Pc]
- Two Castor Wheels [2 Pc]
- One Pack of Nut and Bolts [1 Pack]
- One Screw Driver [1Pc]
- One CD Containing All Software and Study Material [1Pc]
- One Atmega 8 IC [1Pc]
- One Motor Driver IC [1Pc]
- Wireless Module (Optional)