www.go4tech.in | support@go4tech.in

Embedded ROBOTICS

A 15 days program on
Embedded Systems & Robotics Development with
Microcontroller Technology & Image Processing

Workshop Designed & Conceptualized by

Robotics | Ethical Hacking | Projects |Educational Trainings | Animation | Automobile
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Training Courseware

We will provide following benefits to the college:-

Session 1: Sensors

- Different kinds of sensors
- IR sensor
- Light sensor
- TSOP sensor
- Temperature sensor
- Moisture sensor

Hands On:

- Debugging IR sensor using multi meter
- Building and testing TSOP based obstacle sensor

Session 2: Actuators and Drivers

- Different kinds of actuators
- DC motor
- DC Geared motor
- Stepper motor(Unipolar & Bipolar)
- Servo motor
- DC Geared and bipolar stepper motor driver i.e. H Bridge(L293D)
- Unipolar stepper motor driverULN2803

Hands On:

- Driving DC geared motor using H Bridge
- Driving Stepper motor using ULN 2803
- Driving servo motor using microcontroller(to be taught in next session)

Session 3: Microcontroller Basics

- AVR microcontrollers
- Atmega16 pin configuration
- Simple input output
- Current and voltage ratings of Atmega16
- What is clock & its significance
- First programming session
- Which compiler to choose (Win AVR,CV AVR)
- Writing first simple code to blink LED's
- Demonstration of using microcontroller pins for simple input output

- Choosing resistance for driving LED with microcontroller pins
- Compiling the program
- What is Burner
- Burner hardware and burner software
- Transferring hex file to microcontroller

Hands On:

- Running various LED patterns on microcontroller board with programming

Session 4: Very first simplest robot (Line follower and wall follower)

- Interfacing IR sensor with microcontroller
- Interfacing H Bridge with microcontroller
- Putting logic in microcontroller to make the system behave as line follower
- Putting logic in microcontroller to make the system behave as wall follower

Hands On:

- Making a line follower and increasing its speed and efficiency
- Making a wall follower and increasing its speed and efficiency

Session 5: Another simple Robot (Edge Avoider) to enhance understanding of coding

- Introducing delays
- What role clock plays in generating delays
- Writing code to make an edge avoider robot

Hands On:

- Building a robot that runs continuously on table but never falls off

Session 6: Small Competition

- Very difficult track for a line follower with sharp turns less than 150 degree
- 1 hour to complete the robot
- Winners to be given special gifts

Hands On:

- Testing logics and programming skills of students

Session 7: Advanced microcontroller features

- Timers
- Counters
- USART

- Interrupt handling
- Masking interrupts
- Built in ADC's

Hands On:

- Making small programs to illustrate use of timers, ADC, UART and counters

Session 8: Display Devices

- 16X2 LCD interlacing with microcontroller
- Displaying your name on LCD
- How to use seven segment displays

Hands On:

- Displaying your name on LCD

Session 9: Making an RPM meter

- Use of IR sensor in making an RPM meter
- Practical use of interrupts and timers
- Displaying calculated RPM value on LCD
- Testing RPM meter with our DC geared motors

Hands On:

- Building a tachometer(RPM meter)
- Making it non contact type RPM meter

Session 10: Frequency Generator & Frequency Counter

- Using timer to generate a square wave at a particular frequency
- Using timers and interrupts to calculate frequency generated using another microcontroller
- Displaying calculated frequency on LCD

Hands On:

- Generate square waves of different frequencies
- Counting the frequency produced

Session 11: Obstacle avoider

- Generating 38 KHz square wave with microcontroller
- Use it to driver TSOP sensor and detect obstacles
- Writing code to avoid obstacles and follow the same line of path

Session 12: Computer controlled Robot

- Practical use of UART
- Controlling robot with keyboard by pressing keys

Hands On:

- Communication between robot and computer
- Controlling robot using computer

Session 13: SIRC (TV remote) controlled Robot

- Use TSOP sensor to detect the data emitted by TV remote
- Use timers and interrupts to find the key pressed
- Move the robot according to key pressed on TV remote

Hands On:

- SIRC protocol implementation

Session 14: Mobile controlled Robot

- DTMF decoding
- DTMF decoder IC (HT9170,8870)
- Choosing proper headphones to get the DTMF tones
- Programming your Robot to follow the DTMF commands

Hands On:

- Building a robot to control it remotely via mobile phone

Session 15: VoIP (Internet) controlled Robot/Remote crawler

- Voice Over Internet Protocol
- Use of VoIP to reduce call costs
- Controlling your robot through VoIP

Hands On:

- Controlling robot through Internet
- Using a webcam keeping an eye on where it moves remotely

Session 16: TG Proto (a new communication protocol)

- Designing a new communication protocol
- Making it more efficient
- Testing TG Proto

Hands On:

- Building a brand new communication protocol and testing it

Session 17: Grid Follower robot

- Putting logic into microcontroller to follow a grid instead of just a line
- Various moving patterns to reach the end of grid

Hands On:

- Putting logic to make the robot start from one end of grid and reach the other end

Session 18: Mat LAB (Image Processing)

- Matrix Laboratory
- Image processing Toolbox
- Reading Images
- Writing images
- Image Types(colored, b/w, grayscale)
- Color spaces (RGB,HSV etc)
- Color based image processing
- Point Detection
- Line detection
- Edge detection
- Motion Detection

Hands On:

- Small programs illustrating the use of above concepts

Session 19: Ball follower Robot

- Practical use of colour based image processing
- Finding centroid of ball
- Moving the robot towards centroid of ball

Hands On:

- Make your robot follow the movement of ball
- Making it light independent

Session 20: Webcam controlled Computer

- Making an IR led or laser pen
- Controlling mouse cursor according to movement of pen
- More features : right click, left click
- Completely controlling your laptop using a pen and a webcam

Hands On:

- Coding your computer so that it now treats an IR pen as your mouse

Session 21: PCB Designing

- Hand etched PCB's
- Software Designed PCB's
- PCB designing process
- Etching
- Masking
- Screening
- Tinning

Hands On:

- Making light sensor PCB and etching it.

Session 22: Final competition

- The problem statement to be revealed at the end of session 20.
- 4 hours to complete the robot.

Projects done during Training

- TG Proto(designing new communication protocol)
- SIRC(TV Remote) controlled Robot
- Tachometer
- Laptop control using laser/led and webcam
- Remote Crawler/VoIP Controlled(Internet controlled) Robot
- Computer controlled Robot
- Grid Follower
- Ball Tracker
- PCB Designing
- Frequency Counter
- Frequency Generator
- LCD Games
- Wall follower Robot
- Mobile controlled Robot
- Line follower Robot
- Edge avoider Robot
- Obstacle avoider Robot

Training Fees & Discounts

Basic Fees

RS.6900 per participant
(Inclusive all taxes)

Discounted Fees for Groups

Rs.6700 per participant	**Rs.6500 per participant**	**Rs. 6300 per participant**
(2-3 participant group)	(4-5 participant Group)	(6+ participant Group)

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Rs. 6200 per participant
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Contact Us

We ensure that you will find our training programs extremely beneficial for your students. If you have any queries kindly get back to us. We are looking forward to a quick and positive response from you and a long term association with your esteemed organization.

Thanks & Regards,

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