

Robotics & Embedded Systems (Winter Training Program) 4 Weeks/30 Days

“PRESENTED BY”



Accredited by:



**INTERNATIONAL
ACCREDITATION
ORGANIZATION
HOUSTON U.S.A.**

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WINTER TRAINING PROGRAM

Robotics & Embedded Systems

Course Name	: Robotics & Embedded Systems
Certification	: By RoboSpecies Technologies Pvt. Ltd. Accredited by International Accreditation Organization, Houston, U.S.A.
Study Material	: Books & CDs Free to each participant
Robotics Toolkit	: Free to Each Participant

Projects: 40 Projects Covered in 30 Days

Fees & Duration

- For Robotics & Embedded Systems (**Basic**)
Fees : ₹ 7990/- per candidate
Duration : 30 Days/4 Weeks

BASIC MODULE – Robotics & Embedded Systems	
DAYS	TOPICS
Day 1	Theory Introduction to Robotics <ul style="list-style-type: none">• Introduction to Extensive Field of ROBOTICS• Application of Robotics: Industrial, Medical, Entertainment.• Introduction to Embedded System• Basics of hardware and software• New and Upcoming Technologies
Day 2	Theory Introduction to Manual Robotics <ul style="list-style-type: none">• Different types of Manual Robots.• Motor Principle explanation.• DPDT connections demystified.• Gear assembly and calculations.• Different types of chassis designing.• Controlling Motors using DPDT.• Concept of different types of competitions, events. Practical <ul style="list-style-type: none">• Manual Robotics practical session• Assembling of a robotic car

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Day 3	<p>Theory</p> <ul style="list-style-type: none">• Introduction to electronics• Applications of electronics• Electronics components explanation• Voltage divider rule• Introduction to analog Circuits.• Introduction to breadboard. <p>Practical</p> <ul style="list-style-type: none">• Interfacing components like LED, Resistor etc• Generating different colors from RGB LED• LDR based Automatic light control.• Transistor as an amplifier.• Transistor as a NOT gate.
Day 4	<p>Theory</p> <ul style="list-style-type: none">• Basic Circuit Development• Input output processing in electronic circuits• Operation of Active and Passive components <p>Practical</p> <ul style="list-style-type: none">• Transistor as a Touch Switch.• Controlling brightness of LED using potentiometer.• Interfacing 555IC for LED blink.• Interfacing 555IC for buzzer beep.
Day 5	<p>Theory</p> <ul style="list-style-type: none">• Introduction to Autonomous Robots.• Tangible and Non-tangible interfacing.• Interaction between real and digital world.• Concepts of artificial intelligence.• Introduction to Infrared light.• Introduction to IR Sensors.• Op-amp operation.• Op-amp as a Comparator. <p>Practical</p> <ul style="list-style-type: none">• Testing of IR sensors.• Detecting white and black surface with digital IR sensors.• IR range detection.• Monitoring analog and digital sensors.
Day 6	PROJECT
Day 7	PROJECT

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DAYS	TOPICS
Day 8	<p>Theory</p> <ul style="list-style-type: none"> • L293D IC Explanation. • Core of L293D vis-s-vis H- BRIDGE concept . • Concept of Embedding L293D IC in MOTOR DRIVER shield. <p>Practical</p> <ul style="list-style-type: none"> • Making Connections of L293D IC on BREAD BOARD. <p>Driving Motors with L293D on Bread Board.</p>
Day 9	<p>Theory</p> <ul style="list-style-type: none"> • Welcoming LINE FOLLOWER CONCEPT. • Interface Motor Driver with IR sensor. • Calibration of IR sensors <ul style="list-style-type: none"> • What is it? • Why is it Required? <p>Practical</p> <ul style="list-style-type: none"> • Calibrating IR sensors. • Make your Own LINE FOLLOWER. • Make your Own OBSTACLE DETECTOR. • Make your Own EDGE AVOIDER.
Day 10	<p>Theory</p> <ul style="list-style-type: none"> • Microcontrollers and Microprocessor difference • Introduction to embedded system • Video sessions on advancements in Technology • Concepts of hardware and software interface • Introduction to Arduino • Arduino IDE and Overview. • Introduction to different Arduino boards and shields. • Working on digital and analog signal. • What is Future Technology Devices International Ltd.(FTDI) • Microcontroller ATMEGA 328. <p>Practical</p> <ul style="list-style-type: none"> • Introduction to BASIC PROGRAMMING. • Driver and software installation. • Better understanding using the 13th pin internal Connection.
Day 11	<p>Theory</p> <ul style="list-style-type: none"> • Introduction to Basic Shield. • What is the requirement of Basic Shield? • Operation of Analog and Digital Signals. • 8 Bit and 10 Bit Concept. <p>Practical</p> <ul style="list-style-type: none"> • Interfacing Basic Shield with Arduino. • Lighting up several LED's in a Wishful Pattern. • Working on Switch, BUZZER and implementing with Arduino for better grasping of concepts.

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DAYS	TOPICS
Day 12	<p>Theory</p> <ul style="list-style-type: none"> • How to integrate motors through sensors. • Why Arduino required interfacing Motors through Sensors. <p>Practical</p> <ul style="list-style-type: none"> • Interfacing Motors through sensors via Arduino. • Making your own INTELLIGENT LINE FOLLOWER using ARDUINO. • Proper Calibration for efficient line following.
Day 13	Completion of line follower, obstacle detector, edge avoider
Day 14	Competition, Doubts & Practical Session
Day 15	PROJECT
Day 16	<p>Theory</p> <ul style="list-style-type: none"> • Serial and Parallel Communication. • Hello to Analog I/P and O/P. • Introduction to ADC. <p>Practical</p> <ul style="list-style-type: none"> • Interfacing Potentiometer and LDR with ARDUINO. • Interfacing Motor Driver with ARDUINO. • Speed Control of Motors using PWM.
Day 17	<p>Theory</p> <ul style="list-style-type: none"> • Introduction to DTMF Technology. • Effectiveness of This Technology. • Several Mobile controlled applications. <p>Practical</p> <ul style="list-style-type: none"> • Testing of DTMF • Integrating DTMF with Basic Shield
Day 18	<p>Theory</p> <ul style="list-style-type: none"> • Introduction to GSM based technology • Effectiveness of This Technology. • 8870 Decoder IC <p>Practical</p> <ul style="list-style-type: none"> • Integrating DTMF with motors. • Remotely controlling of robots.
Day 19	<p>Theory</p> <ul style="list-style-type: none"> • Introduction to LCD. • Pin Description of LCD's. • How to interface LCD with ARDUINO. <p>Practical</p> <ul style="list-style-type: none"> • Creating simple animations on LCD. • Scrolling texts on LCD. • Integrating Digital Signals

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DAYS	TOPICS
Day 20	<p>Theory</p> <ul style="list-style-type: none"> • Advance LCD Display Patterns • Detailed Explanation of LCD • Different LCD Display <p>Practical</p> <ul style="list-style-type: none"> • Robot Movement Display • Designing Counter on LCD
Day 21	PROJECT
Day 22	PROJECT
Day 23	<p>Theory</p> <ul style="list-style-type: none"> • Seven Segment Display. <p>Practical</p> <ul style="list-style-type: none"> • Making Connections of SSD with Arduino. • Integration of SSD with analog and digital signals. • Digital Clock Designing. • Making Own pattern of Displaying numbers on SSD.
Day 24	<p>Theory</p> <ul style="list-style-type: none"> • Integrating Keypad Matrix with motors • Keypad interfacing with ATMEGA 328 • ON/OFF LED/Motor/Buzzer using linear keypad <p>Practical</p> <ul style="list-style-type: none"> • Password Controlled application – ATM prototype
Day 25	<p>Theory</p> <ul style="list-style-type: none"> • Understanding Ultrasonic sensor. • Utilising to detect range or distance. • Range or distance calculations. <p>Practical</p> <ul style="list-style-type: none"> • interfacing with ARDUINO. • Reading values of Ultrasonic sensor at several points in SERIAL MONITOR.
Day 26	<p>Theory</p> <ul style="list-style-type: none"> • Advance Concepts of ULTRASONIC SENSOR. • Ultrasonic sensor as a range finder <p>Practical</p> <ul style="list-style-type: none"> • Utilizing the readings for RADAR applications. • Concept of integrating with actuators.

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DAYS	TOPICS
Day 27	Theory <ul style="list-style-type: none">• Integrating different Sensors and Actuators• Understanding designing of Advanced Robot Practical <ul style="list-style-type: none">• Integrating LCD and Robot Car• Integrating Seven Segment Display and Robot Car.
Day 28	PROJECT
Day 29	Competition, Doubts & Practical Session
Day 30	Certificate Distribution Cum Farewell Ceremony

Number of Projects Covered in BASIC MODULE

1. Blink a LED using a switch
2. Glowing LEDs in pattern of your own choice.
3. Designing of RGB color pattern
4. Automatic light control system
5. Transistor as a touch switch
6. Transistor as a NOT Gate
7. Transistor as an amplifier
8. Daily alarm clock
9. Flood control alarm system
10. Generation of MIDI tones
11. Intelligent blind stick
12. Manual robotic car
13. Automatic line follower Robot
14. Automatic obstacle detection System
15. LDR based Darkness activation system
16. LDR based Light activation system
17. Voltage divider system
18. Pulse generation using 555
19. Automatic blinking of light
20. LED Control through Switch

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21. Display digits on seven segment display
22. Automatic stop watch
23. Digital clock
24. Dc motor speed control using PWM
25. Automatic speed controlled BOT
26. Mobile switching device
27. Mobile (DTMF) controlled BOT
28. Digital display device
29. Automatic power control system
30. Automatic home sweeper device
31. Multiple device switching through mobile phone
32. Edge avoider BOT
33. Wall Follower BOT
34. Obstacle avoider BOT
35. Traffic control system
36. Keypad operated BOT
37. Mobile phone keypad prototype
38. Password controlled application
39. Scroll strings on LCD
40. Line follower BOT displaying the directions
41. Ultrasonic BOT
42. Radar using Ultrasonic sensor.

BASIC Module Robotics Kit Content

- RoboSpecies Chassis (1)
- BO Motors (2)
- Wheels (2)
- Caster Wheel (1)
- Screw packet (1)
- Screw driver (1)
- Remote Controller (1)
- Electronica Kit (1)
- Arduino Uno
- Basic Arduino Shield(1)
- IR Sensor Board (2)

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- Motor Shield(1)
- DTMF Board (1)
- DTMF Jack(1)
- LCD Shield (1)
- Seven Segment Display Shield (1)
- Ultrasonic (1)
- Keypad Matrix
- Robotics Made Easy- Robotic eBook CD(1)

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Why Robotics & Embedded Systems Training from RoboSpecies Technologies?

1. **Lot of Major Projects** will be covered in this training.
 - 20+20 Projects are covered in BASIC Module
 - 20+20+20 Project are covered in ADVANCE Module
 - 9 optional major projects.
2. Our syllabus is professionally designed to cover **Basic** as well as **Advance** aspects of Embedded Systems & Robotics
3. Each day of our training is well planned to provide you the **Theoretical** as well as **Practical** Knowledge of the module
4. Each day will come up with **New Practical's & Projects** which makes the training interesting and exciting.
5. Time to time **Practical Assignments** will be provided to the students, which will help them in doing practice at home.
6. **Revision Time & Query Sessions** are provided to the students which help them in clearing their all previous doubts.
7. **Exam** will be conducted at the end of **basic** as well as **Advance** module to test the knowledge level of the students.
8. Time for **Project Work** will be provided to the students, in which students will develop a project of their own choice. This will encourage **Innovative Ideas** among students.

Pre-Requisites

1. Basic knowledge of C\C++ Programming.
2. Basics of Electronics.
3. Eagerness to learn new innovative things.

Who Could Attend this Training?

- Students from B.E/B.Tech/M.Tech/Diploma (ECE/EEE/CSE/IT/MECH) can join this training.
- Anyone who have interest in this field and have pre-requisite knowledge