

MATLAB & Image Processing

(Winter Training Program)

4 Weeks/ 30 Days

“PRESENTED BY”



An ISO 9001 : 2008 Certified Company

Accredited by:



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

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WINTER TRAINING PROGRAM

MATLAB & Image Processing

Course Name : MATLAB & Image Processing
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

1. For MATLAB & Image Processing (BASIC)

Fees : ₹ 7990/- per candidate

Duration : 30 Days/4 Weeks

BASIC MODULE – MATLAB & Image Processing	
DAYS	TOPICS
Day 1	<p>Theory</p> <ul style="list-style-type: none"> • Introduction to RoboSpecies & Robotics • Introduction to MATLAB • Basics of hardware and software
Day 2	<p>Theory</p> <ul style="list-style-type: none"> • Matrix laboratory • Basics of MATLAB Programming • Digital Laboratory Explanation <p>Practical</p> <ul style="list-style-type: none"> • Mathematical Calculations using MATLAB • Command window, Workspace, Command History
Day 3	<p>Theory</p> <ul style="list-style-type: none"> • 2D-3D plots • Explanation of sub-plotting function <p>Practical</p> <ul style="list-style-type: none"> • Sub plotting the matrix functions • Editing plots
Day 4	<p>Theory</p> <ul style="list-style-type: none"> • Introduction to Arduino • Driver and software installation • Microcontroller ATMEGA 328p <p>Practical</p> <ul style="list-style-type: none"> • Digital signaling in MATLAB • Integrating LED with Arduino
Day 5	<p>Theory</p> <ul style="list-style-type: none"> • Microcontroller ATMEGA 328p • Digital signaling in MATLAB <p>Practical</p> <ul style="list-style-type: none"> • Integrating analog signals in Arduino • Analog i/p and o/p signal • Traffic light control • Pattern of LEDs • Alarm Clock

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DAYS	TOPICS
Day 6	PROJECT
Day 7	PROJECT
Day 8	<p>Theory</p> <ul style="list-style-type: none"> • Introduction to Image Processing • Resolution and game of pixels • Image arithmetic <p>Practical</p> <ul style="list-style-type: none"> • Installing webcam with MATLAB • Conversion of color images
Day 9	<p>Theory</p> <ul style="list-style-type: none"> • Image acquisition toolbox <p>Practical</p> <ul style="list-style-type: none"> • Taking snapshots from live video • Conversion of image formats
Day 10	<p>Theory</p> <ul style="list-style-type: none"> • Introduction to IR Sensors • Working of Comparator • ADC Theory <p>Practical</p> <ul style="list-style-type: none"> • Detecting white and black surface with digital IR sensors • Monitoring analog and digital sensors
Day 11	<p>Theory</p> <ul style="list-style-type: none"> • Introduction to Motor Driver <p>Practical</p> <ul style="list-style-type: none"> • Controlling motors with these IR sensors • Integrating motors with ATMEGA 328
Day 12	<p>Theory</p> <ul style="list-style-type: none"> • Serial and Parallel communication • Explanation of serial library • Introduction to serial communication in MATLAB Working with COM ports in MATLAB <p>Practical</p> <ul style="list-style-type: none"> • Interfacing of MATLAB with Arduino • Serial and Parallel Interface • LED and switch interfacing in bread board with MATLAB
Day 13	PROJECT
Day 14	PROJECT
Day 15	Competition, Doubts & Practical Session

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DAYS	TOPICS
Day 16	<p>Theory</p> <ul style="list-style-type: none"> • Serial monitor and its functioning • Reading and writing of serial data in serial monitor <p>Practical</p> <ul style="list-style-type: none"> • LED interfacing with MATLAB
Day 17	<p>Theory</p> <ul style="list-style-type: none"> • Understanding Ultrasonic sensor. • Utilising to detect range or distance. • Range or distance calculations 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 18	<p>Theory</p> <ul style="list-style-type: none"> • Live Videography using MATLAB • Integrating Real world with digital world <p>Practical</p> <ul style="list-style-type: none"> • Color conversion in live video • Counting pixels in live image
Day 19	<p>Theory</p> <ul style="list-style-type: none"> • Explanation of different parameters in MATLAB • Identifying area of interest in the snapshot taken from the webcam <p>Practical</p> <ul style="list-style-type: none"> • Detection of edges using Image Processing • Color recognition/detection in live video • How to divide the screen resolution using MATLAB programming
Day 20	<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 21	PROJECT
Day 22	PROJECT
Day 23	<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.

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DAYS	TOPICS
Day 24	Theory <ul style="list-style-type: none">• Seven segment display device Practical <ul style="list-style-type: none">• Controlling the display devices using color detection• Seven segment counter device
Day 25	Theory <ul style="list-style-type: none">• Seven segment display device Practical <ul style="list-style-type: none">• Integrating SSD with Matlab Using serial communication• Seven segment controlled BOT
Day 26	Theory <ul style="list-style-type: none">• Theory of screen coordination system• How to divide the resolution of screen using programming Practical <ul style="list-style-type: none">• Automated control bot using hand gesture• Algorithm of line follower using image processing
Day 27	Theory <ul style="list-style-type: none">• Integrating MATLAB with Seven Segment Display Practical <ul style="list-style-type: none">• Interfacing MATLAB with Seven Segment Display• Controlling internet using Image processing
Day 28	PROJECT
Day 29	PROJECT
Day 30	Competition, Doubts & Practical Session

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. Color detection in still image
5. Edge detection in still image
6. Cam-shots
7. Serial communication in MATLAB
8. MATLAB interfaced manual BOT
9. Controlling power through MATLAB
10. Automatic light control system

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11. Flood control alarm system
12. Generation of MIDI tones
13. Intelligent blind stick
14. Manual robotic car
15. Automatic line follower Robot
16. Security system based module
17. Black and white surface detection using IR sensor
18. Automatic opening and closing of door
19. Automatic obstacle detection System
20. LDR based Darkness activation system
21. LDR based Light activation system
22. Pulse generation using 555
23. Daily Alarm Clock Color detection in live image
24. Converting the graphical format of live video
25. Gesture controlled device
26. Real time color absorption
27. Digital clock in MATLAB
28. Stop watch in MATLAB
29. Music player using color detection
30. Video player using color detection
31. Automatic gesture controlled BOT
32. Line follower BOT using image processing
33. Intelligent color follower BOT
34. Color differentiator software using MATLAB
35. Power control through gesture
36. Multiple switching device through gestures
37. Edge detector BOT
38. Gesture controlled web browsing
39. Mobile (DTMF) controlled BOT
40. Digital display device
41. Display digits on seven segment display
42. Automatic stop watch
43. Digital clock
44. Ultrasonic BOT

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Image Processing Using MATLAB Kit Content for Basic Module

- 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)
- Motor Shield(1)
- DTMF Board (1)
- DTMF Jack(1)
- LCD Shield (1)
- Seven Segment Display Shield (1)
- Ultrasonic (1)
- Zero PCB
- Soldering kit.
- Robotics Made Easy- Robotic eBook CD(1)

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Why MATLAB & Image Processing 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 with **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 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.

Recommendation

It is strongly recommended to bring your own LAPTOP during the training so that you can easily practice the exercises at home.

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