



CourseContents:

1.Introduction to MATLAB

- Historical Background
- Demo & Applications
- Scope of MATLAB
- Importance to Engineers
- Features
- Vectors & Arrays
- Accessing MATLAB Help
- MATLAB Environment
- Workspace & Managing Variables
- Operations with Variables

2. Handling data and data flow in MATLAB

- Data Types
- Operators & Precedence of Operators
- Matrix Operations
- Arithmetic Operations
- Algebraic Operations
- Symbolic Operations

3. Editing and Debugging M-FILES

- Writing Script Files
- Writing Functions
- Error Correction
- M-Lint Automatic Code Analyzer

4. Lets' start up Programming with MATLAB

- Flow Control
- Conditional Statements
- Error Handling
- Work with Multidimensional Array
- Cell Array & Characters
- Developing User Defined Function
- Scripts and Other Functions



5. MATLAB Graphics

- Simple Graphics
- Graphic Types
- Plotting Functions
- Creating Plot & Editing Plot(2D and 3D)

6. Graphical User Interface with MATLAB

- Introduction to GUI
- Push button
- Popup menu
- Toggle button
- Slider button

7. Interfacing of various kind of Display devices

- Displays
- LED
- LCD
- Making projects with LCD
- TIMER over Matlab

8. Interfacing various human interface devices

- Input Devices
- Switches

9. Getting Started: I/O Peripherals on board

- Type of Sensors.
- IR Sensor
- Working of IR Sensor.
- Sound Sensors
- Temperature Sensor

10. Digital Image Processing in MATLAB

- Introducing MATLAB
- Image acquisition Toolbox in MATLAB
- Image Processing Toolbox in MATLAB
- Tools of Image processing in MATLAB
- Programming paradigms in MATLAB
- Image acquisition in MATLAB



- Camera Selection
- Algorithm Designing

11.Embedded System Concept

- Introduction to micro controller
- What is a micro controller?
- Microprocessor Vs microcontroller
- RISC Vs CISC
- Why AVR is the most widely used micro controller family?

12.Introduction to Microcontrollers and AVR Family

- Introduction to Atmega 8 Microcontroller
- Introduction to ATmega8/ATmega16/Atmega32 features
- Input/ Output Ports of Atmega
- Data registers of Atmega Controller Interrupts
- Timer/Counter.
- Introduction of Analog to Digital Conversion

13.Embedded C Programming

- What is Embedded C
- Embedded C-Programming for AVR Microcontroller.
- Introduction to C, Statement, Function. Programmer Strategy
- Code structures and debugging.
- Code Flashing and execution

14.Image Acquisition and Processing

- Functions for Image acquisition
- Camera Adapter
- Functions and Keywords for image processing in MATLAB
- Hardware interfacing
- Accessing Parallel PORT using MATLAB

15.Interfacing of Devices with Microcontroller

- DC Motor
- AC Motor
- Stepper Motor
- Motor Driver IC



16. Introduction to LCD

- What is 16X2 LCD
- How to print Data on LCD
- Interfacing of LCD
- Coding For LCD
- Practical Use of LCD

17. Image Manipulation in MATLAB

- Image Manipulation
- Threshold adjustment
- Template matching
- Object Detection
- Motion Detection

18. Introduction to USART

- USART
- UART
- Difference Between USART & UART Register of USART
- What is Prescaler Serial communication Vs Parallel Communication
- Practical Application of Serial Communication
- Serial Communication between System & Microcontroller

18. Analysis of image processing toolbox

- Reading and Writing Image Data
- Displaying and Exploring Image
- Spatial Transformation
- Image Registration
- Designing and implementing 2D linear Filters for Image Data
- Morphological Operations
- Transforms
- Analyzing and Enhancing Images
- Project based on Tool Box

14. Project Building and implementation

- Designing
- Coding
- Development
- Testing



Projects

- Intelligent Line Follower Robot
- Cell phone Operated Robot
- Displaying Information on LCD
- Moving Message display
- Motion detection
- Serial communication with PC to Microcontroller
- Colour Detection robot
- Keyboard Control Robot
- GUI Based robot
- Bluetooth controlled Robot using MATLAB
- GUI Based Home Automation System
- Simulink & many more ...

ToolKitContent:

- MATLAB SOFTWARE
- Atmega Development Board
- USB Programmer
- 8 Pin Wire
- Screw Driver
- 16x 2 LCD
- Motors
- Wheels
- Caster Wheel
- Chassis
- IR Sensor Pair
- Sound sensor
- DTMF Module
- Software CD

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