Hands-On Fundamentals Matlab and Electrical Auto-CAD

Activity Report

Academic Year	2023-24
Program Driven by	Hands-On Fundamentals Mat lab and Electrical Auto-CAD
Quarter	IV
Program / Activity Name	Hands-On Fundamentals Mat lab and Electrical Auto-CAD
Program Type	Innovation
Program Theme	
Start Date	26-08-2024
End Date	31-08-2024
Duration of the Activity (in Hrs)	30
Number of Student Participant	45
Number of Faculty Participant	03
Number of external Participant	--
Expenditure Amount in Rs.	
Any Remark	--
Mode of Session Delivery	Offline
Objective	
Benefit in terms of Learning / Skills / Knowledge obtained	
Feedback	Nice Session
Video url (mp4)	
Photograph 1 (jpg)	Attached
Photograph 2 (jpg)	Attached
Overall report of the Activity (pdf)	As given below

Fundamentals of MATLAB

MATLAB (Matrix Laboratory) is a high-performance language and environment used for technical computing, particularly in engineering and scientific applications. Here are the key fundamentals of MATLAB:

1. Basic Operations

- **Variables and Arrays:** MATLAB is built around arrays. Simple variables (scalars) are treated as 1x1 arrays, and you can easily create vectors and matrices.
- **Arithmetic Operations:** Operations like addition, subtraction, multiplication, and division are straightforward, but pay attention to element-wise operations (e.g., `.*`, `./`) for arrays.
- **Built-in Functions:** MATLAB has numerous built-in functions for mathematical operations (e.g., `sin`, `cos`, `log`, etc.).

2. Programming Constructs

- **Scripts and Functions:** MATLAB scripts are files containing a sequence of MATLAB commands, while functions are defined using the `function` keyword and can accept input and output arguments.
- **Control Flow:** MATLAB supports standard programming constructs like `if`, `else`, `for`, `while`, and `switch` for controlling the flow of programs.
- **Plotting and Visualization:** MATLAB's powerful plotting functions (e.g., `plot`, `surf`, `contour`) allow you to visualize data in 2D and 3D.

3. Matrix Operations

- **Matrix Manipulation:** MATLAB excels at matrix operations, including multiplication, inversion, transposition, and solving systems of linear equations.
- **Indexing:** MATLAB uses 1-based indexing, and you can access subarrays and elements using indexing techniques like `A(2,3)` or `A(:,1)`.

4. Toolboxes

- **Specialized Libraries:** MATLAB has a wide range of toolboxes for specialized applications, such as signal processing, image processing, control systems, and machine learning.

5. Simulink

- **Graphical Programming:** Simulink, an extension of MATLAB, provides a graphical environment for modeling, simulating, and analyzing dynamic systems (e.g., control systems, signal processing).

Fundamentals of Electrical AutoCAD

AutoCAD is a widely used CAD software, and AutoCAD Electrical is a specialized version designed for electrical design and drafting. Here are the key fundamentals of Electrical AutoCAD:

1. User Interface and Navigation

- **Ribbon and Toolbars:** Familiarize yourself with the ribbon interface, where most of the tools are organized into tabs and panels.
- **Command Line:** The command line is essential for typing commands and accessing various tools quickly.
- **Zooming and Panning:** Use the mouse and keyboard shortcuts to navigate around your drawings efficiently.

2. Creating Electrical Schematics

- **Drawing Tools:** Basic drawing tools like lines, arcs, and circles form the foundation of your schematic designs.

- **Symbols and Libraries:** AutoCAD Electrical includes a library of standardized electrical symbols for components like resistors, capacitors, switches, and motors. You can insert these symbols into your drawings.
- **Wires and Connections:** Use the wire command to create electrical connections between components. AutoCAD Electrical automatically manages the wire numbers and connections.

3. Layers and Annotations

- **Layer Management:** Organize your drawing by placing different elements (e.g., wires, components, annotations) on different layers. This allows for better control and visibility.
- **Text and Dimensions:** Add annotations, such as component labels and dimensions, to your drawings using the text and dimension tools.

4. Panel Layouts and Wiring Diagrams

- **Panel Layout:** Design the layout of electrical panels, including the placement of components like circuit breakers and relays.
- **Ladder Diagrams:** AutoCAD Electrical supports the creation of ladder diagrams, a common method for representing electrical circuits in industrial control systems.

5. BOM (Bill of Materials) and Reports

- **Automatic BOM Generation:** AutoCAD Electrical can automatically generate a Bill of Materials (BOM) from your schematic. This includes part numbers, descriptions, and quantities of components.
- **Reports:** Generate various reports, such as wire lists, terminal plans, and component lists, to assist in the construction and maintenance of electrical systems.

6. Advanced Features

- **PLC (Programmable Logic Controller) Modules:** AutoCAD Electrical includes tools for designing and documenting PLC systems, including input/output (I/O) modules.
- **Circuit Simulation and Analysis:** Some versions of AutoCAD Electrical support basic simulation and analysis of electrical circuits, allowing you to verify the design before implementation.

7. Collaboration and Documentation

- **DWG Files:** AutoCAD Electrical uses the DWG format for its files, which is widely supported and allows for easy sharing and collaboration with other professionals.
- **Printing and Plotting:** Prepare your drawings for printing by setting up plot styles, scales, and layouts.

Both MATLAB and AutoCAD Electrical are powerful tools in their respective fields. Mastery of these fundamentals will enable you to create effective and efficient designs, simulations, and analyses.

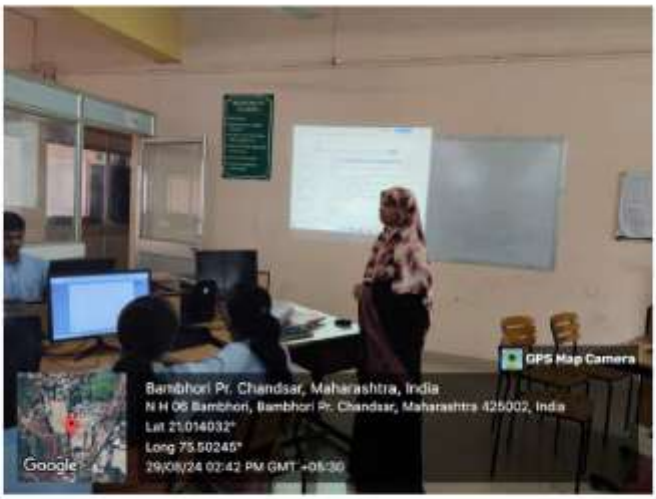
SE Electrical Engineering

Title of Program with Date

Add on Course "Hands-On Fundamentals Mat lab and Electrical Auto-CAD" 26th – 31st Aug. 2024.

Total No of Students 45

Total No of faculty 03




GPS Map Camera
Bambhori Pr. Chandsar, Maharashtra, India
2G72+GM4, Bambhori Pr. Chandsar, Maharashtra 425002, India
Lat 21.013793°
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Coordinator

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