# **C** Autodesk AutoCAD Electrical 2024



# **Course Objective**

The course on AutoCAD Electrical aims to equip participants with the essential skills and knowledge required to proficiently utilize the software for electrical design and drafting tasks. Through hands-on learning and guided instruction, students will master the fundamentals of creating and editing electrical schematic diagrams, panel layouts, and other related drawings.

# **Course Outcome**

Learner will be able to...

- Gain a comprehensive understanding of AutoCAD Electrical software, including its interface, tools, and functionalities.
- Develop proficiency in creating and editing electrical schematic diagrams, panel layouts, and other electrical design drawings using AutoCAD Electrical.
- Learn to efficiently generate and manage electrical symbols, components, and libraries within AutoCAD Electrical.
- Acquire skills in accurately annotating, dimensioning, and labeling electrical drawings to industry standards.

# **Course Outline**

The course comprises 40-hours of theory and labs and is divided into 12 different modules.

### **Chapter 1: Basics of Electrical Drawings**

- Need of Drawings
- Electrical Drawings
- Circuit Diagram
- Wiring Diagram
- Wiring Schedule
- Block Diagram
- Parts list
- Symbols in Electrical Drawings
- Conductors
- Connectors and terminals
- Inductors and transformers
- Resistors





- Capacitors
- Fuses
- Switch contacts
- Switch types
- Diodes and rectifiers
- Earthing
- Wire and Specifications
- Types of Wires
- Wire specifications
- Labeling
- Cable Markers

### **Chapter 2 Introduction to AutoCAD Electrical and Interface**

- Introduction to AutoCAD Electrical
- System requirements for AutoCAD Electrical 2024
- Installing AutoCAD Electrical
- Starting AutoCAD Electrical
- Creating a new drawing document
- Meaning of Default templates
- Title Bar
- Changing Color Scheme
- Application Menu
- New options
- Creating Drawings
- Creating Sheet Sets
- Open Options
- Opening Drawing File
- Opening Drawing from AutoCAD Web & Mobile
- Save
- Save As
- Import
- Export
- Publish
- Sending Part for 3D Printing
- Print
- File Tab Bar
- Drawing Area
- Command Window
- Bottom Bar
- Drafting Settings dialog box



# **Chapter 3: Project Management**

- Workflow in AutoCAD Electrical
- Initializing Project
- Project Properties
- Project Settings tab
- Components tab
- Wire Numbers tab
- Cross-References tab
- Styles tab
- Drawing Format tab
- Opening a Project File
- New Drawing in a Project
- Refresh
- Project Task List
- Project Wide Update or Retag
- Drawing List Display Configuration
- Plotting and Publishing
- Plot Project
- Publish to DWF/PDF/DWFx
- Zip Project
- Removing, Replacing, and Renaming Drawings in a Project
- Locations View in Project Manager
- Filter by Installation and Location
- Search box
- Details and Connections tabs
- Utilities
- Marking and Verifying DWGs
- Configuring Catalog Database
- Migrating Database to SQL Server
- Previous DWG and Next DWG
- Migration Data from Previous AutoCAD Electrical Version
- Language Conversion in Project
- Editing Language Database
- Title Block Setup
- Title Block Update
- Updating Component Based on Changes made in Catalog

### **Chapter 4: Inserting Components**

- Electrical Components
- Setting Symbol Library for Project
- Inserting Component Using Icon Menu
- Component Tag area





- Catalog Data area
- Description Area
- Cross-Reference Area
- Installation Code and Location Code
- Pins area
- Catalog Browser
- User Defined List
- Equipment List
- Panel List
- Pneumatic Components
- Hydraulic Components
- P&ID Components
- Symbol Builder
- Adding New Symbol in Icon Menu

# **Chapter 5: Wires, Circuits, and Ladders**

- Introduction
- Wires
- Wire
- 22.5 Degree, 45 Degree, and 67.5 Degree
- Interconnect Components
- Gap
- Multiple Bus
- Creating Multiple Wire Bus
- Ladders
- Insert Ladder
- XY Grid Setup
- X Zones Setup
- Wire Numbering
- Wire Numbers
- 3 Phase
- PLC I/O
- Wire Number Leaders and Labels
- Wire Number Leader
- Wire Color/Gauge Labels
- In-Line Wire Labels
- Markers
- Cable Markers
- Multiple Cable Markers
- Insert Dot Tee Markers
- Insert Angled Tee Markers
- Circuit Builder
- Recalculating Wire Size

# **Chapter 6: Editing Wires, Components, and Circuits**



- Introduction
- Edit Tool
- Internal Jumper
- Fix/UnFix Tag
- Copy Catalog Assignment
- User Table Data
- Delete Component
- Copy Component
- Edit Circuits drop-down
- Copying Circuit
- Moving Circuit
- Saving Circuit to Icon Menu
- Transforming Components drop-down
- Scooting
- Aligning Components
- Moving Component
- Reversing or Flipping Component
- Re-tagging Components
- Toggle NO/NC
- Swap/Update Block
- Swapping
- Updating
- Edit Attribute drop-down
- Moving/Showing Attributes
- Editing Selected Attribute
- Hiding Attribute (Single Pick)
- Hiding Multiple Attributes
- Unhiding Multiple Attributes
- Adding Attribute to Component
- Renaming Attribute
- Squeezing Attribute/Text
- Stretching Attribute/Text
- Changing Attribute Text Height and Width
- Rotating Attribute
- Changing Attribute/Text Justification
- Changing Attribute Layer
- Cross References Drop-down
- Component Cross-Reference
- Hide/Unhide Cross-Referencing
- Update Stand-Alone Cross-Referencing
- Changing Cross-Reference to Multiple Line Text





- Cross-Reference Check
- Child Location/Description Update
- Copying/Adding Component Override
- Removing Component Override
- Generating Cross-Reference Table
- Circuit Clipboard panel
- Editing Wires or Wire Numbers
- Edit Wire Number
- Fix
- Swap
- Find/Replace
- Hide and Unhide
- Trim Wire
- Delete Wire Numbers
- Move Wire Number
- Add Rung
- Revise Ladder
- Renumber Ladder Reference
- Wire Editing
- Stretch Wire tool
- Bend Wire tool
- Show Wires
- Check or Trace Wire tool
- Wire Type Editing drop-down
- Create/Edit Wire Type
- Change/Convert Wire Type
- Flip Wire Number
- Toggle Wire Number In-Line
- Advanced Wire and Wire Number Editing Tools
- Toggle Angled Tee Markers
- Flip Wire Gap
- Delete Wire Gap
- Check/Repair Gap Pointers
- Editing Wire Sequence
- Show Wire Sequence
- Update Signal References

### **Chapter 7: PLCs and Components**

- Introduction
- Specifications of PLCs
- Inserting PLCs (Parametric)
- Insert PLC (Full Units)
- Addressing Area



- Used Area
- Tag
- Options
- Line1/Line2
- Manufacturer
- Catalog
- Assembly
- Catalog Lookup
- Description
- I/O Point Description Area
- List descriptions
- Pins
- Show/Edit Miscellaneous
- Ratings
- Connectors
- Insert Connector
- Insert Connector (From List)
- Insert Splice
- Terminals
- Inserting Terminals from Catalog Browser
- Associate Terminals on the Same Drawing
- Break Apart Terminal Associations
- Show Terminal Associations
- Edit Jumper

# **Chapter 8: Practical and Practice**

- Introduction
- Practical 1
- Practical 2
- Practical 3
- Practice 1
- Practice 2
- Practice 3
- Practice 4
- Practice 5

# **Chapter 9: Panel Layout**

- Introduction
- Icon Menu
- Schematic List
- Manual
- Manufacturer Menu
- Balloon





- Wire Annotation
- Panel Assembly
- Editor
- Properties
- Terminal
- Spare
- Destinations, Jumper, and Multilevel
- Catalog Code Assignment
- Table Generator
- Insert Terminals
- Insert Terminals (Schematic List)
- Insert Terminals (Manual)
- Editing Footprints
- Edit
- Copy Footprint
- Delete Footprint
- Resequence Item Numbers
- Copy Codes drop-down
- Copy Assembly

# **Chapter 10: Reports**

- Introduction
- Reports (Schematic)
- Bill of Materials reports
- Component report
- Wire From/To report
- Component Wire List report
- Connector Plug report
- PLC I/O Address and Description report
- PLC I/O Component Connection report
- PLC Modules Used So Far report
- Terminal Numbers report
- Terminal Plan report
- Connector Summary report
- Connector Details report
- Cable Summary report
- Cable From/To report
- Wire Label report
- Missing Catalog Data
- Dynamic Editing of Reports in Drawing
- Modifying Tables
- Modifying Rows
- Modifying Columns



- Merge Cells
- Match Cells
- Table Cell Styles
- Edit Borders
- Text Alignment
- Locking
- Data Format
- Block
- Field
- Formula
- Manage Cell Content
- Link Cell
- Download from source
- Electrical Audit
- Drawing Audit
- Signal Error/List

# **Chapter 11: Project**

- Project
- Industrial Control Panel Design Guidelines
- Standard Code used for Industrial Control Panel Design
- Design Consideration for Industrial Control Panel

# **Chapter 12: AutoCAD Electrical with Autodesk Inventor**

- Introduction to Autodesk Inventor
- Creating Electro Mechanical Link
- Creating New Electromechanical link
- Using Existing Electromechanical Link in AutoCAD Electrical
- Linking Inventor Model with AutoCAD Electrical Drawing
- Electrical Harness in Autodesk Inventor for AutoCAD Electrical
- Creating Electrical components in Autodesk Inventor
- Placing Multiple pins on part
- Harness Properties of Part
- Creating Wiring in Harness Assembly
- Creating Cable
- Creating Ribbon Cable
- Creating Fold in Ribbon Cable
- Automatic Route
- Manual Routing
- Unrouting wires