# Electrical Systems in Manufacturing Training Course

Professional Development Training Course Outline

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|---|---|---|---|
| **Category** | Manufacturing | **Duration** | 10 Days |
| **Base Fee** | $3,000 USD | **Delivery Mode** | Online / On-site Hybrid |

## Course Introduction

Modern manufacturing environments rely heavily on robust, efficient, and intelligent electrical systems to ensure uninterrupted production, energy efficiency, and industrial safety. Electrical Systems in Manufacturing Training Course is designed to equip learners with advanced technical competencies in industrial power distribution, control systems, automation integration, and predictive maintenance practices. With the rapid rise of Industry 4.0, smart factories, and AI-driven automation, understanding electrical infrastructure has become a critical skill for engineers, technicians, and maintenance professionals.

This course provides a comprehensive blend of theoretical foundations and hands-on industrial applications covering electrical design, PLC systems, motor control, industrial wiring, safety compliance, and fault diagnostics. Learners will gain practical exposure to real-world manufacturing challenges, enabling them to optimize system performance, reduce downtime, and enhance operational efficiency. The training is aligned with global industry standards and incorporates trending technologies such as IoT-enabled monitoring, smart grids, and energy management systems.

## Programme Curriculum

**Electrical Systems in Manufacturing Training Course**

**Introduction**

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**Course Duration**

10 days

**Course Objectives**

1. Master industrial electrical systems design for smart manufacturing environments
2. Understand Industry 4.0-enabled automation and digital electrical infrastructure
3. Develop expertise in PLC programming and industrial control systems
4. Implement predictive maintenance strategies using IoT-based monitoring
5. Analyze and optimize power distribution systems in manufacturing plants
6. Apply electrical safety standards and global compliance regulations (IEC/ISO)
7. Troubleshoot industrial electrical faults using advanced diagnostic tools
8. Integrate SCADA systems for real-time manufacturing process control
9. Enhance energy efficiency using smart energy management systems
10. Design motor control systems for automated production lines
11. Implement industrial wiring standards for high-performance systems
12. Utilize smart sensors and edge computing in electrical networks
13. Improve operational reliability through condition-based monitoring systems

**Target Audience**

1. Electrical Engineers in manufacturing industries
2. Maintenance Technicians and Supervisors
3. Industrial Automation Specialists
4. Mechanical Engineers transitioning to electrical systems
5. Factory Operations Managers
6. Technical Diploma and Engineering Students
7. Energy Management Professionals
8. Industrial Safety and Compliance Officers

**Course Modules**

**Module 1: Industrial Electrical System Fundamentals**

- Basics of voltage, current, and resistance
- AC/DC power systems in manufacturing
- Electrical infrastructure overview
- Industrial load classification
- Power flow fundamentals
- **Case Study:** Electrical layout optimization in an automotive assembly plant

**Module 2: Power Distribution Systems**

- Substation design principles

- Transformers in manufacturing plants
- Distribution panel configurations
- Load balancing techniques
- Power factor correction
- **Case Study:** Reducing energy loss in a textile manufacturing facility

**Module 3: Electrical Safety Standards**

- OSHA & IEC safety regulations
- Lockout/Tagout procedures
- Hazard identification systems
- PPE for electrical work
- Arc flash protection
- **Case Study:** Preventing electrical accidents in a food processing plant

**Module 4: Industrial Wiring Systems**

- Cable selection and routing
- Conduit and trunking systems
- Wiring diagrams interpretation
- Grounding and earthing systems
- Cable management best practices
- **Case Study:** Wiring redesign in a pharmaceutical plant upgrade

**Module 5: Motor Control Systems**

- Types of industrial motors
- Star-delta starters
- VFD (Variable Frequency Drives)
- Servo motor control
- Overload protection systems
- **Case Study:** Energy savings in conveyor belt motor optimization

**Module 6: PLC Systems & Programming**

- PLC architecture and components
- Ladder logic programming
- Input/output modules
- Timer and counter functions
- PLC troubleshooting
- **Case Study:** Automated packaging line control system

**Module 7: SCADA Systems Integration**

- SCADA architecture
- Real-time monitoring systems
- Data acquisition techniques
- Human Machine Interface (HMI)
- Alarm and event handling
- **Case Study:** SCADA implementation in a power plant

**Module 8: Industrial Automation Systems**

- Automation system design
- Sensors and actuators
- Control loops
- Robotics integration
- Smart factory systems
- **Case Study:** Automated robotic welding system in automotive industry

**Module 9: Electrical Maintenance & Troubleshooting**

- Fault detection techniques
- Preventive maintenance schedules
- Diagnostic tools usage
- Root cause analysis
- Equipment lifecycle management
- **Case Study:** Reducing downtime in a cement manufacturing plant

**Module 10: Energy Management Systems**

- Energy auditing techniques
- Smart metering systems
- Renewable integration
- Load optimization
- Energy efficiency KPIs
- **Case Study:** Energy optimization in a steel manufacturing unit

**Module 11: Industrial Sensors & Instrumentation**

- Temperature, pressure, and proximity sensors
- Signal conditioning
- Calibration techniques
- Sensor networking
- IoT-based sensing
- **Case Study:** Smart monitoring in a beverage production line

**Module 12: Power Electronics in Manufacturing**

- Rectifiers and inverters
- Power conversion systems
- Harmonics reduction
- DC drives
- Semiconductor devices
- **Case Study:** Power stabilization in semiconductor manufacturing

**Module 13: Smart Manufacturing & Industry 4.0**

- IoT-enabled factories
- Cloud-based control systems
- Digital twins
- AI in manufacturing systems
- Cyber-physical systems
- **Case Study:** Digital twin deployment in an electronics factory

**Module 14: Electrical Design Software Tools**

- AutoCAD Electrical basics
- EPLAN design systems
- Simulation tools
- Circuit modeling
- Documentation standards
- **Case Study:** Electrical panel redesign using CAD tools in industrial plant

**Module 15: Advanced Industrial Problem Solving**

- Complex fault analysis
- System optimization strategies
- Reliability engineering
- Risk assessment models
- Continuous improvement techniques
- **Case Study:** Eliminating recurring electrical failures in packaging plant

## Training Methodology

This course employs a participatory and hands-on approach to ensure practical learning, including:

- Interactive lectures and presentations.
- Group discussions and brainstorming sessions.
- Hands-on exercises using real-world datasets.
- Role-playing and scenario-based simulations.
- Analysis of case studies to bridge theory and practice.
- Peer-to-peer learning and networking.
- Expert-led Q&A sessions.
- Continuous feedback and personalized guidance.

**Register as a group from 3 participants for a Discount**

**Send us an email: info@fineskilltrainingcenter.org or call** *+254769199797*

***Certification***

*Upon successful completion of this training, participants will be issued with a globally- recognized certificate.*

***Tailor-Made Course***

*We also offer tailor-made courses based on your needs.*

**Key Notes**

**a.** The participant must be conversant with English.

**b.** Upon completion of training the participant will be issued with an Authorized Training Certificate

**c.** Course duration is flexible and the contents can be modified to fit any number of days.

**d.** The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

**e.** One-year post-training support Consultation and Coaching provided after the course.

**f.** Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

## Upcoming Scheduled Sessions

| Start Date | End Date | Location | Price |
|---|---|---|---|
| **23 Nov 2026** | 04 Dec 2026 | Online | $2,000 |
| **23 Nov 2026** | 04 Dec 2026 | Physical | $3,000 |
| **23 Nov 2026** | 04 Dec 2026 | Physical | $6,000 |
| **23 Nov 2026** | 04 Dec 2026 | Physical | $6,000 |
| **23 Nov 2026** | 04 Dec 2026 | Physical | $12,000 |
| **23 Nov 2026** | 04 Dec 2026 | Physical | $9,000 |
| **23 Nov 2026** | 04 Dec 2026 | Physical | $12,000 |
| **23 Nov 2026** | 04 Dec 2026 | Physical | $12,000 |

Ready to enroll or request a customized program? Book online or contact us:

**Register Online Now**

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