

Control and Protection System Mastery

Course Outline:

Module 1: Fundamentals of Control and Protection Systems

- Definitions and key concepts (control systems vs protection systems)
- Components and architecture of control systems (PLC, DCS, SCADA)
- Principles of system protection and fault detection
- Role of sensors, actuators, and transducers
- Control strategies: open-loop, closed-loop, and feedback systems
- Introduction to standards (e.g., IEC, IEEE, ISA)

Module 2: Electrical Protection Systems

- Types of faults in electrical systems (short circuit, ground fault, etc.)
- Protection devices: relays, circuit breakers, fuses
- Protection schemes for:
 - ✓ Transformers
 - ✓ Generators
 - ✓ Transmission lines
 - ✓ Motors
- Relay coordination and selectivity principles
- IEC 61850 and intelligent electronic devices (IEDs)
- Testing and commissioning protection systems

Module 3: Automation and Control System Design

- Control system life cycle and project phases
- Selection of control architecture: PLC vs DCS vs SCADA

EXPERT

EXPERT & PROFESSIONAL EXCELLENCE FOR TRAINING & CONSULTATIONS

- Human-Machine Interface (HMI) and control room design
- Communication protocols (Modbus, Profibus, Ethernet/IP)
- Safety Instrumented Systems (SIS) and SIL levels
- Cybersecurity in control systems (OT security principles)

Module 4: Advanced Diagnostics and Troubleshooting

- Systematic troubleshooting approach and tools
- Analyzing protection relay logs and event records
- Root cause analysis (RCA) techniques
- Condition monitoring and predictive maintenance
- Software-based diagnostics (logic analyzers, protocol analyzers)
- Hands-on case studies and simulation exercises

Module 5: Integration, Testing, and Operational Excellence

- System integration and interoperability
- Factory and Site Acceptance Testing (FAT/SAT)
- Commissioning strategies and checklists
- Maintenance best practices and lifecycle management
- Performance optimization and reliability improvement
- Real-world case studies and failure analysis

Location	Cairo, London
Start Date	20 July 2025
End Date	24 July 2025