COURSE OVERVIEW EE0893
Engineering Excellence in Electrical Equipment

Course Title
Engineering Excellence in Electrical Equipment

Course Date/Venue
October 21-25, 2024/Tamra Meeting Room,
Al Bandar Rotana - Creek, Dubai, UAE

Course Reference
EE0893

Course Duration/Credits
Five days/3.0 CEUs/30 PDHs

Course Description

This practical and highly-interactive course includes various practical sessions and exercises. Theory learnt will be applied using our state-of-the-art simulators.

This course is designed to provide participants with a detailed and up-to-date overview of Engineering Excellence in Electrical Equipment. It covers the electrical power systems, distribution and control; as the various types of electrical equipment covering generators, transformers, switchgear, motors and protective devices; the electrical standards and regulations, electrical hazards, lockout/tagout (LOTO) procedures and safety regulations; the classification of hazardous zones, explosion proof equipment and design consideration; the critical role of electrical reliability in operational continuity and safety; and the on-site power generation options comprising of gas turbines, diesel generators and renewables integration.

Further, the course will also discuss the motor control centers (MCC) and the role of variable frequency drives (VFD) in controlling electrical motors; the protection schemes, types of circuit breakers and relay coordination in electrical systems; designing and maintaining backup systems to ensure uninterrupted power supply; the maintenance schedules and preventive maintenance techniques; and the use of thermography, insulation resistance testing and vibration analysis.

During this interactive course, participants will learn the new trends in motor technology including smart motors and advanced protection systems; the high voltage (HV) and extra voltage (EHV) system; the strategies for improving the energy efficiency of electrical equipment and systems; mitigating issues like harmonics, transients and voltage dips; integrating solar, wind and other renewables, and digital transformation in electrical systems; the SCADA and smart grid technologies; the advanced control systems, PLCs and automation for enhanced operational performance; the electrical equipment for offshore and harsh environments; extending the life cycle of electrical equipment through strategic management; and the sustainable practices in design, operation and maintenance of electrical systems.

Course Objectives

Upon the successful completion of this course, each participant will be able to: -

- Apply and gain an in-depth knowledge on engineering excellence in electrical equipment
- Discuss electrical power systems, distribution and control as well as the various types of electrical equipment covering generators, transformers, switchgear, motors and protective devices
- Recognize electrical standards and regulations, electrical hazards, lockout/tagout (LOTO) procedures and safety regulations
- Classify hazardous zones, explosion proof equipment and design consideration and discuss the critical role of electrical reliability in operational continuity and safety
- Identify on-site power generation options comprising of gas turbines, diesel generators and renewables integration
- Discuss low voltage (LV) and high voltage (HV) distribution, substation design and layout
- List the types of transformers, operation, key maintenance practices and testing procedures
- Discuss motor control centers (MCC) and the role of variable frequency drives (VFD) in controlling electrical motors
- Recognize protection schemes, types of circuit breakers and relay coordination in electrical systems
- Design and maintain backup systems to ensure uninterrupted power supply
- Implement maintenance schedules and preventive maintenance techniques and use thermography, insulation resistance testing and vibration analysis
- Carryout condition monitoring of electrical equipment, troubleshooting electrical system and managing electrical system failures
- Apply spare parts management and inventory control for electrical equipment
- Recognize new trends in motor technology including smart motors and advanced protection systems

- Discuss high voltage (HV) and extra voltage (EHV) systems, calculate electrical loads and assess capacity and balance electrical systems
- Apply strategies for improving the energy efficiency of electrical equipment and systems
- Identify and mitigate issues like harmonics, transients and voltage dips as well as integrate solar, wind and other renewables
- Explain digital transformation in electrical systems, SCADA and smart grid technologies
- Recognize advanced control systems, PLCs and automation for enhanced operational performance
- Identify electrical equipment for offshore and harsh environments and extend the life cycle of electrical equipment through strategic management
- Apply the sustainable practices in design, operation and maintenance of electrical systems

Exclusive Smart Training Kit - H-STK®

*Participants of this course will receive the exclusive "Haward Smart Training Kit" (**H-STK®**). The **H-STK®** consists of a comprehensive set of technical content which includes **electronic version** of the course materials, sample video clips of the instructor's actual lectures & practical sessions during the course conveniently saved in a **Tablet PC**.*

Who Should Attend

This course provides an overview of all significant aspects and considerations of engineering excellence in electrical equipment for electrical engineers, maintenance engineers, project engineers, plant managers and supervisors, facilities managers, quality control engineers, safety engineers and other technical staff.

Training Methodology

All our Courses are including **Hands-on Practical Sessions** using equipment, State-of-the-Art Simulators, Drawings, Case Studies, Videos and Exercises. The courses include the following training methodologies as a percentage of the total tuition hours:
30% Lectures
20% Practical Workshops & Work Presentations
30% Hands-on Practical Exercises & Case Studies
20% Simulators (Hardware & Software) & Videos

In an unlikely event, the course instructor may modify the above training methodology before or during the course for technical reasons.

Accommodation

Accommodation is not included in the course fees. However, any accommodation required can be arranged at the time of booking.

Course Fee

US$ 5,500 per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Course Certificate(s)

Internationally recognized certificates will be issued to all participants of the course who completed a minimum of 80% of the total tuition hours

Certificate Accreditations

Certificates are accredited by the following international accreditation organizations: -

- The International Accreditors for Continuing Education and Training (IACET - USA)

  Haward Technology is an Authorized Training Provider by the International Accreditors for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this authority, Haward Technology has demonstrated that it complies with the **ANSI/IACET 2018-1 Standard** which is widely recognized as the standard of good practice internationally. As a result of our Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for its programs that qualify under the **ANSI/IACET 2018-1 Standard**.

  Haward Technology's courses meet the professional certification and continuing education requirements for participants seeking **Continuing Education Units** (CEUs) in accordance with the rules & regulations of the International Accreditors for Continuing Education & Training (IACET). IACET is an international authority that evaluates programs according to strict, research-based criteria and guidelines. The CEU is an internationally accepted uniform unit of measurement in qualified courses of continuing education.

  Haward Technology Middle East will award **3.0 CEUs** (Continuing Education Units) or **30 PDHs** (Professional Development Hours) for participants who completed the total tuition hours of this program. One CEU is equivalent to ten Professional Development Hours (PDHs) or ten contact hours of the participation in and completion of Haward Technology programs. A permanent record of a participant's involvement and awarding of CEU will be maintained by Haward Technology. Haward Technology will provide a copy of the participant's CEU and PDH Transcript of Records upon request.

- British Accreditation Council (BAC)

  Haward Technology is accredited by the **British Accreditation Council** for **Independent Further and Higher Education** as an **International Centre**. BAC is the British accrediting body responsible for setting standards within independent further and higher education sector in the UK and overseas. As a BAC-accredited international centre, Haward Technology meets all of the international higher education criteria and standards set by BAC.

Course Instructor

This course will be conducted by the following instructor(s). However, we have the right to change the course instructor(s) prior to the course date and inform participants accordingly:

Mr. Taiseer Ali, MSc, BSc, is a **Senior Electrical & Telecommunications Engineer** with over **30 years** of extensive experience and academic experience as a **University Professor** specializing in **Power System Protection and Relaying**, **Power Distribution**, **Electrical** Safety, **Electrical** Drawing, **Power Generation & Transmission**, **Power Distribution & Network**, **Protection Relays**, **Electrical** Troubleshooting, **Earthing**, **Bonding**, **Lightning & Surge Protection**, **UPS & Battery**, **Instrumentation & Control**, **Process Control & Instrumentation**, **Industrial Communication**, **Flow** Measurement, **Level** Measurement, **Temperature & Vibration** Measurement, **Measurement** Instrumentation, **Pressure** Measurement, **Analytical** Instrumentation, **Calibration & Testing** Procedures, Final Control Elements, **Control Loops** Operation, **Control Panels**, **Power Generation**, **Power Transformers**, **Uninterruptible Power Systems** (**UPS**), **Battery Chargers**, **AC** & **DC Transmission**, **Distribution Network**, **Grid Input Assessment**, Load Flow, Short Circuit, Smart Grid, Grounding, **Electrical** Equipment, **Electrical Motors** & **Drives**, **Power System Harmonics**, Electrical Substation Design, **Power Cable** Testing & Fault Location, **Circuit Breakers & Switchgears**, **HV/LV Equipment**, **High Voltage** Electrical Safety, **LV & HV** Electrical System, **HV Equipments** Inspection & Maintenance, **HV Switchgear** Operation & Maintenance, **LV Distribution** Switchgear & Equipment, **Lock & Tag Out**, **Circuit Breakers & Switchgears**, Portable **Cables**, **Transformers**, Gas Insulated Substations (**GIS**), **HV Substation** Inspection & Reporting, **HV Cable** Design, **HV Electrical System Commissioning**, **HV Equipments** Inspection & Maintenance, Electrical Signal Analysis (**ESA**), **Electrical Equipment Circuits**, Wiring & Testing, **Electronic Circuits**, Electrostatic Discharge (**ESD**), Distributed Control System (**DCS**) Applications & Troubleshooting, **SCADA & Industrial Communication**, Process Logic Controller (**PLC**), **Load Flow** Calculation, **Cable** Installation, **Transformer** Maintenance, Electrical Distribution Design, Installation & Commissioning and **HVDC Transmission** & **Control**, Advanced Networking, Datron Maintenance, Cisco Internet, Data Base Access, Advanced Computer, AutoCAD, Standard Radio Devices, Advanced Calibration, Repair and Maintenance of VHF Portable Role, Combat Vehicle Reconnaissance 76mm and Target Engagement Using Simulaser.

During his career life, Mr. Taiseer has gained his expertise and thorough practical experience through handling challenging positions such as being the **Head of the Command Control & Communication Department**, **Head of the Academic and Technical Branch**, **Chief of the Frequency Branch**, **Commander**, **Electrical Engineer**, **Spectrum Management Engineer**, **Safety Engineer**, **Engineering Manager**, **Electrical Engineering Head**, **Quality Control Department Head**, **Engineering Supervisor** and **Lecturer/Instructor** for various companies and universities such as the Yarmouk University, C3 Directorate, JAF C3 Communication Workshops, Jordan Armed Forces Joint Officer and Military Communication College and multi-national companies and institutes.

Mr. Taiseer has a **Master's** degree in **Industrial Engineering/Engineering Management** and a **Bachelor** degree in **Electrical/Communication Engineering**. Further, he is a **Certified Instructor/Trainer** and delivered various trainings internally in his previous companies.

Course Program

The following program is planned for this course. However, the course instructor(s) may modify this program before or during the workshop for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

Day 1: ***Monday 21st of October 2024***

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Introduction to Electrical Systems:*** *Overview of Electrical Power Systems, Distribution and Control*
0930 – 0945	*Break*
0945 – 1030	***Types of Electrical Equipment:*** *Generators, Transformers, Switchgear, Motors, and Protective Devices*
1030 – 1130	***Electrical Standards & Regulations:*** *Understanding Global and Regional Standards (IEC, NEC) in Electrical Engineering*
1130 – 1215	***Basics of Electrical Safety:*** *Identifying Hazards, Lockout/Tagout (LOTO) Procedures, and Safety Regulations*
1215 – 1230	*Break*
1230 – 1330	***Design Principles of Electrical Systems in Hazardous Areas:*** *Classification of Hazardous Zones, Explosion-Proof Equipment, and Design Considerations*
1330 – 1420	***Importance of Electrical Equipment Reliability:*** *The Critical Role of Electrical Reliability in Operational Continuity and Safety*
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2 ***Tuesday 22nd of October 2024***

0730 – 0830	***Electric Power Generation:*** *On-site Power Generation Options (Gas Turbines, Diesel Generators, Renewables Integration)*
0830 – 0930	***Electrical Power Distribution:*** *Low Voltage (LV) and High Voltage (HV) Distribution, Substation Design, and Layout*
0930 – 0945	*Break*
0945 – 1100	***Transformer Operation & Maintenance:*** *Types of Transformers, Operation, Key Maintenance Practices, and Testing Procedures*
1100 – 1215	***Motor Control Centers (MCC) & Variable Frequency Drives (VFD)*** *Overview of MCCs and the Role of VFDs in Controlling Electrical Motors*
1215 – 1230	*Break*
1230 – 1330	***Circuit Breakers, Relays & Protective Devices:*** *Protection Schemes, Types of Circuit Breakers, and Relay Coordination in Electrical Systems*
1330 – 1420	***Emergency Power Systems & Uninterruptible Power Supplies (UPS)*** *Design and Maintenance of Backup Systems to Ensure Uninterrupted Power Supply*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3: ***Wednesday 23rd of October 2024***

0730 – 0830	***Preventive Maintenance of Electrical Equipment:*** *Implementing Maintenance Schedules and Preventive Maintenance Techniques*
0830 – 0930	***Predictive Maintenance Technologies:*** *Use of Thermography, Insulation Resistance Testing and Vibration Analysis*

0930 – 0945	Break
0945 – 1100	***Condition Monitoring of Electrical Equipment:*** Real-time Monitoring Systems, Sensors and IoT Applications in Predictive Maintenance
1100 – 1215	***Troubleshooting Electrical Systems:*** Fault Diagnosis Techniques and Common Troubleshooting Strategies
1215 – 1230	Break
1230 – 1330	***Managing Electrical System Failures:*** Risk Management, Root Cause Analysis (RCA), and Failure Mode Effects Analysis (FMEA)
1330 – 1420	***Spare Parts Management & Inventory Control for Electrical Equipment*** Best Practices in Managing Spare Parts for Critical Electrical Components
1420 – 1430	***Recap***
1430	Lunch & End of Day Three

Day 4: Thursday 24th of October 2024

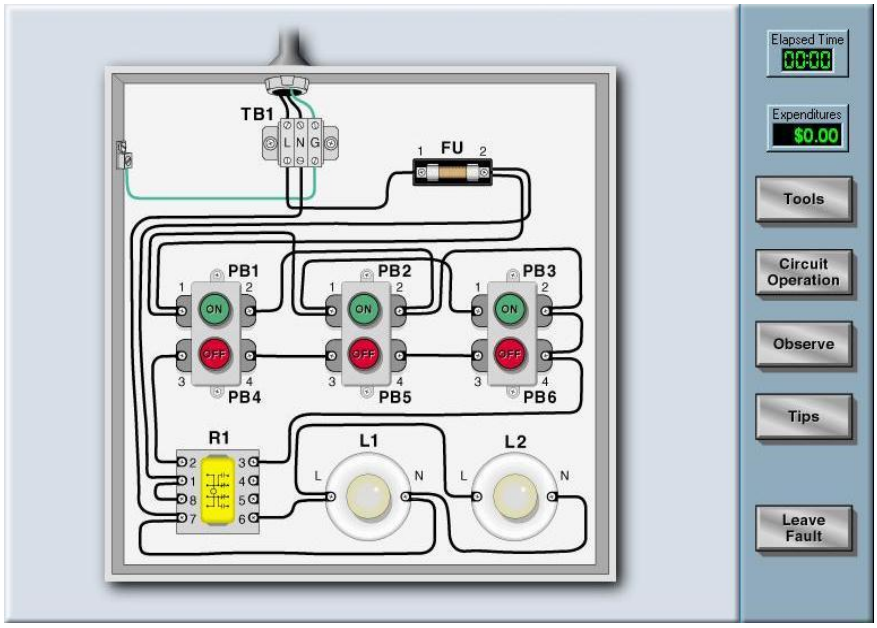
0730 – 0830	***Advanced Motor Technology & Motor Protection Systems:*** New Trends in Motor Technology, Including Smart Motors and Advanced Protection Systems
0830 – 0930	***High Voltage (HV) & Extra High Voltage (EHV) Systems:*** Design, Operation, and Safety Considerations in HV and EHV Installations
0930 – 0945	Break
0945 – 1100	***Electrical Load Calculations & Balancing:*** How to Calculate Electrical Loads, Assess Capacity, and Balance Electrical Systems
1100 – 1215	***Energy Efficiency in Electrical Systems:*** Strategies for Improving the Energy Efficiency of Electrical Equipment and Systems
1215 – 1230	Break
1230 – 1330	***Power Quality:*** Understanding and Mitigating Issues Like Harmonics, Transients, and Voltage Dips
1330 – 1420	***Integration of Renewable Energy:*** Challenges and Opportunities of Integrating Solar, Wind, and Other Renewables
1420 – 1430	***Recap***
1430	Lunch & End of Day Four

Day 5: Friday 25th of October 2024

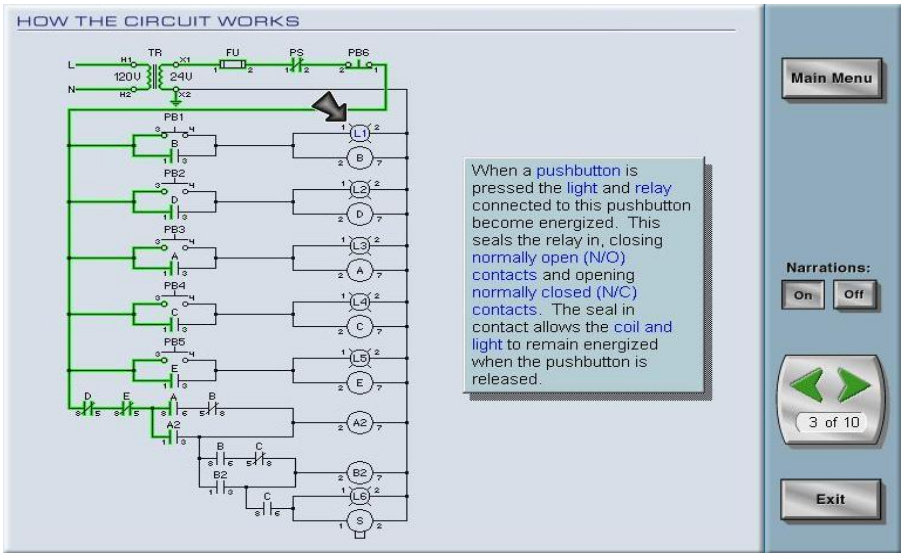
0730 – 0830	***Smart Electrical Grids & Digitalization:*** Digital Transformation in Electrical Systems, SCADA, and Smart Grid Technologies
0830 – 0930	***Automation & Control of Electrical Equipment:*** Advanced Control Systems, PLCs, and Automation for Enhanced Operational Performance
0930 – 0945	Break
0945 – 1100	***Electrical Equipment for Offshore & Harsh Environments:*** Specialized Equipment and Techniques for Offshore Platforms and Extreme Conditions
1100 – 1215	***Life Cycle Management of Electrical Equipment:*** Extending the life Cycle of Electrical Equipment Through Strategic Management
1215 – 1230	Break
1230 – 1245	***Sustainability in Electrical Engineering:*** Sustainable Practices in Design, Operation and Maintenance of Electrical Systems
1245 - 1300	***Case Studies: Best Practices in Electrical Engineering in Petroleum*** Analyzing Real-World Case Studies to Highlight Successful Electrical Engineering Projects
1300 – 1315	***Course Conclusion***
1315 – 1415	***POST-TEST***
1415 – 1430	Presentation of Course Certificates
1430	Lunch & End of Course

Simulator (Hands-on Practical Sessions)

Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using our state-of-the-art simulators "Troubleshooting Electrical Circuits V4.1", Power World" and "ETAP software".

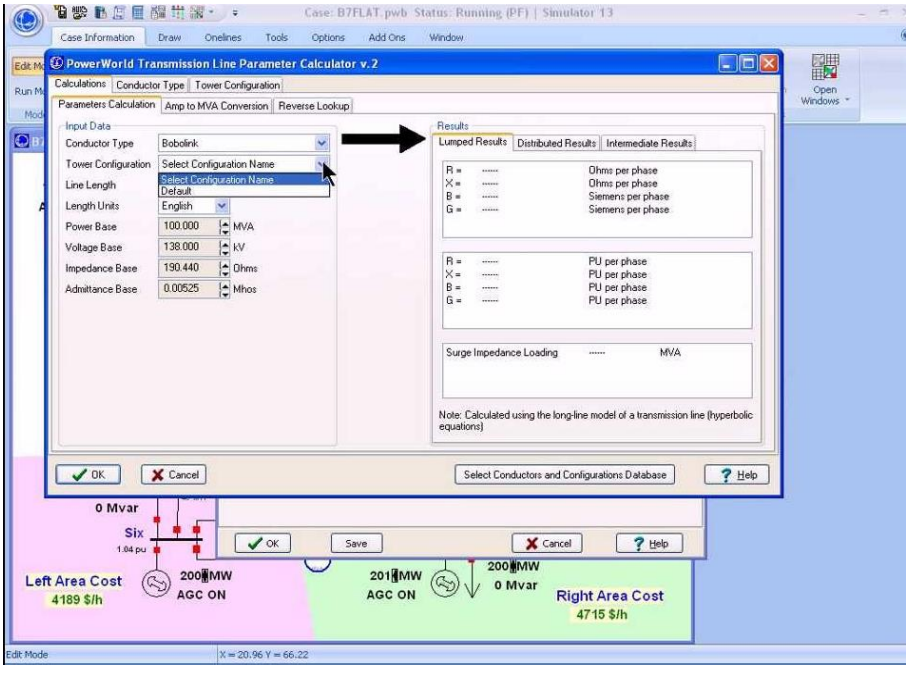


Basic Techniques

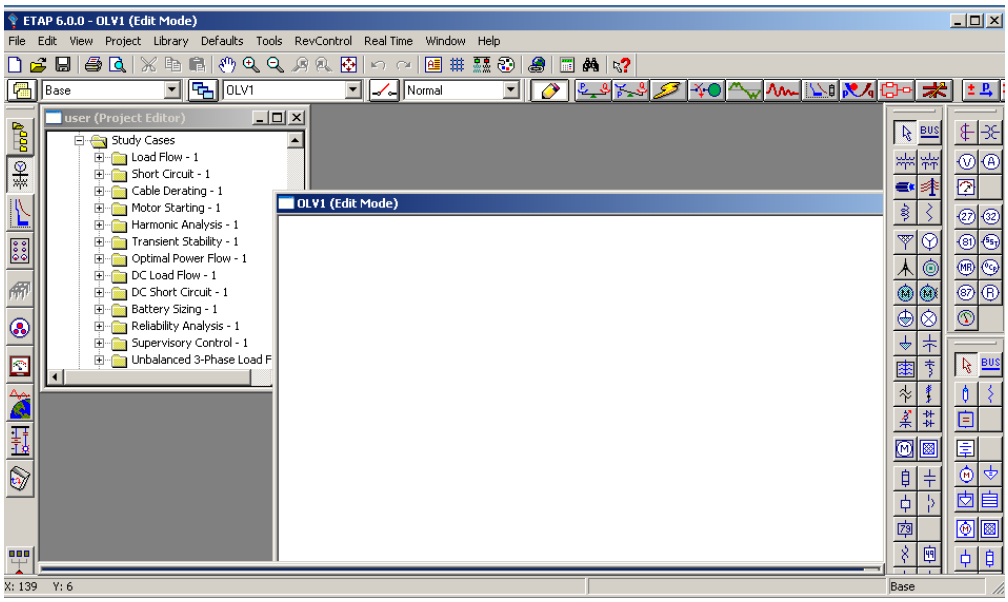


Basic Control Circuits

Motor Control Techniques



Power World Simulator



ETAP Software Simulator

Course Coordinator

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