COURSE OVERVIEW EE1143
Technology Installation in the Power Sector

Course Title
Technology Installation in the Power Sector

Course Date/Venue
August 11-15, 2025/Glasshouse Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

Course Reference
EE1143

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 Technology Installation in the Power Sector. It covers the technology systems in power utilities; reading and interpreting technical drawings and schematics; the basic tools and equipment for installation and material inspection and handling; the site preparation, safety compliance and standards, codes and manufacturer guidelines; the cable tray and conduit systems installation, power cable installation and termination; and the panel and switchgear installation, grounding and bonding systems and lighting and small power systems.

Further, the course will also discuss the testing and pre-commissioning of electrical installations and installation of field instruments; the tubing and impulse line work, DCS and SCADA cabinet installation, control cable laying and termination and installation of junction boxes and marshaling panels; the loop checking, signal verification and telecommunication system components; the fiber optic cable installation and splicing, installation of intelligent electronic devices (IEDs) and control and relay panel installation; and the time synchronization systems (GPS/NTP) and testing and certification of communication systems.

During this interactive course, participants will learn the pre-commissioning and system integration as well as functional testing and FAT/SAT support; the common installation defects and troubleshooting techniques; the documentation and as-built drawings; generating and addressing punch list and the warranty and support conditions; the team communication during fieldwork; and the safety culture during installation.

Course Objectives

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

- Apply and gain an in-depth knowledge on technology installation in the power sector
- Discuss technology systems in power utilities as well as read and interpret technical drawings and schematics
- Identify the basic tools and equipment for installation and carryout material inspection and handling
- Apply site preparation and safety compliance and review standards, codes and manufacturer guidelines
- Employ cable tray and conduit systems installation including power cable installation and termination
- Illustrate panel and switchgear installation and recognize grounding and bonding systems and lighting and small power systems
- Employ testing and pre-commissioning of electrical installations and installation of field instruments
- Describe tubing and impulse line work and apply DCS and SCADA cabinet installation, control cable laying and termination and installation of junction boxes and marshaling panels
- Apply loop checking and signal verification and identify telecommunication system components
- Carryout fiber optic cable installation and splicing, installation of intelligent electronic devices (IEDs) and control and relay panel installation
- Recognize time synchronization systems (GPS/NTP) and apply testing and certification of communication systems
- Employ pre-commissioning and system integration as well as functional testing and FAT/SAT support
- Identify common installation defects and troubleshooting techniques and apply documentation and as-built drawings
- Generate and address punch list, review warranty and support conditions and apply team communication during fieldwork and safety culture during installation

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 conveniently saved in a **Tablet PC**.*

Who Should Attend

This course provides an overview of all significant aspects and considerations of technology installation in the power sector for power plant engineers, electrical engineers, project managers, maintenance supervisors, renewable energy technicians, energy auditors and consultants 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

Haward's Certificates are accredited by the following international accreditation organizations:

- British Accreditation Council (BAC)

  Haward Technology is accredited by the **British Accreditation Council** for **Independent Further and Higher Education** as an **International Centre**. Haward's certificates are internationally recognized and accredited by the British Accreditation Council (BAC). 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.

- 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.

Course Instructor(s)

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. Barry Pretorius is a **Senior Instrumentation Engineer** with over **30** years of extensive experience within the **Oil**, **Gas**, **Petrochemical**, **Refinery** & **Power** industries. His expertise widely covers in the areas of Distributed Control System (**DCS**), **DCS** Operations & Techniques, **Plant Control** and Protection Systems, **Process Control & Instrumentation**, **Cascade Control Loops**, **Split-Range Control Loops**, **Capacity Control** & Other Advanced Control Schemes, **Safety Instrumented Systems**, **Plant Automation** Operations & Maintenance, Programmable Logic Controller (**PLC**), **Siemens PLC** Simatic S7-400/S7-300/S7-200, **PLC & SCADA** for Automation & Process Control, **Artificial Intelligence**, **Allen Bradley PLC** Programing and Hardware Trouble Shooting, Schneider **SCADA System**, **Wonder Ware**, **Emerson**, **Honeywell**, **Honeywell** Safety Manager PLC, **Yokogawa**, Advanced **DCS Yokogawa**, **Endress & Hauser**, Field Commissioning and Start up Testing Pre Operations, System Factory Acceptance Test (**FAT**), FactoryLink ECS, Modicon 484, Rockwell Automation, System Site Acceptance Test (**SAT**), **SCADA HMI & PLC** Control Logic, **Cyber Security** Practitioner, **Cyber Security** of Industrial Control System, **IT Cyber Security** Best Practices, **Cybersecurity** Fundamentals, **Ethical Hacking & Penetration Testing**, **Cybersecurity** Risk Management, **Cybersecurity** Threat Intelligence, **OT Whitelisting** for Better Industrial Control System Defense, **NESA** Standard and Compliance Workshop, **OT**, **Cyber Attacks** Awareness - Malware/Ransom Ware / Virus /Trojan/ Philsing, **Information Security Manager**, **Security System** Installation and Maintenance, Implementation, Systems Testing, Commissioning and Startup, **Foxboro DCS & Triconics**, **SIS** Systems, Advanced **DC Drives**, Motion Control, **Hydraulics**, **Pneumatics and Control Systems** Engineering, **Electrical & Automation Control Systems**, **HV/MV Switchgear**, **LV & MV** Switchgears & Circuit Breakers, **High Voltage Electrical Safety**, **LV & HV Electrical System**, **HV Equipment** Inspection & Maintenance, **LV Distribution Switchgear & Equipment**, **Electrical Safety**, **Electrical** Maintenance, **Transformers**, **Medium & High Voltage Equipment**, **Circuit Breakers**, **Cable & Overhead Line** Troubleshooting & Maintenance, **Electrical Drawing & Schematics**, **Voltage Distribution**, **Power Distribution**, **Filters**, **Automation System**, **Electrical Variable Speed Drives**, **Power** Systems, **Power Generation**, **Diesel Generators**, **Power Stations**, Uninterruptible Power Systems (**UPS**), **Battery Chargers**, **AC & DC Transmission**, **CCTV** Installation, **Data & Fire Alarm** System, **Evacuation** Systems and **Electrical Motors & Variable Speed Drives**, & Control of Electrical and Electronic devices.

During Mr. Pretorius's career life, he has gained his practical experience through several significant positions and dedication as the **Senior Technical Analyst, Team Leader, Pre-operations Startup Engineer, Automation System's Software Manager, Automation System's Senior Project Engineer, PLC Specialist, Site Manager, Senior Project & Commissioning Engineer, Technical Director, Project Engineer, Radio Technician**, **A T E Technician** and **Senior Instructor/Trainer** from various companies like the ADNOC Sour Gas, Ras Al Khair Aluminum Smelter, Johnson Matthey Pty. Ltd, Craigcor Engineering, Unitronics South Africa Pty (Ltd), Bridgestone/Firestone South Africa Pty (Ltd) and South African Defense Force.

Mr. Pretorius's has a Higher Diploma in **Electrical Engineering Heavy Current**. Further, he is a **Certified Instructor/Trainer** and delivered numerous trainings, courses, workshops, seminars and conferences internationally.

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, 11th of August 2025

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Overview of Technology Systems in Power Utilities*** *Role of Installation in Project Lifecycle • Key Systems: Electrical, Telecom, SCADA, Metering • Typical Installation Sequence and Integration • Importance of Compliance and Standards*
0930 – 0945	*Break*
0945 – 1030	***Reading & Interpreting Technical Drawings & Schematics*** *Electrical and Control Diagrams • Cable Routing Plans • Panel Layout Drawings • Site Plan versus Schematic Understanding*
1030 – 1130	***Basic Tools & Equipment for Installation*** *Cable Pulling and Laying Tools • Electrical and Mechanical Hand Tools • Crimping, Cutting, Torqueing Equipment • Personal Protective Equipment (PPE)*
1130 – 1215	***Material Inspection & Handling*** *Receiving Inspection Procedures • Material Storage and Preservation • Damage Reporting and Traceability • Handling Sensitive Electronic Components*
1215 – 1230	*Break*
1230 – 1330	***Site Preparation & Safety Compliance*** *Site Readiness Checklist • Barricading, Signage and Permit Requirements • Safe Use of Ladders and Scaffolding • Emergency Procedures and Hazard Reporting*
1330 – 1420	***Standards, Codes & Manufacturer Guidelines*** *IEC, NEC and TRANSCO-Specific Codes • Manufacturer Installation Manuals • Installation Tolerances and Inspection Points • Importance of Updates and Revisions*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day One*

Day 2: Tuesday, 12th of August 2025

0730 – 0830	***Cable Tray & Conduit Systems Installation*** *Types: Ladder, Perforated, Trunking • Cable Tray Routing and Support • Conduit Sizing and Bending Techniques • Earthing of Metallic Support Systems*
0830 – 0930	***Power Cable Installation & Termination*** *Cable Pulling Techniques and Tensions • Bending Radius and Separation Requirements • Termination Types and Methods (Heat Shrink, Cold Shrink) • Cable Identification and Tagging*
0930 – 0945	*Break*

0945 – 1100	***Panel & Switchgear Installation*** *Panel Positioning and Anchoring • Busbar Connections and Clearances • Functional Component Checks • Thermal Imaging for Hot Spots (Pre-Power-Up)*
1100 – 1215	***Grounding & Bonding Systems*** *Ground Rod and Mesh Installation • Equipment Bonding and Interconnections • Ground Resistance Testing • Protection Against Ground Faults*
1215 – 1230	*Break*
1230 – 1330	***Lighting & Small Power Systems*** *Indoor and Outdoor Lighting Layout • Mounting of Fixtures and Supports • Socket Outlet Circuits and Load Balancing • Emergency Lighting Systems*
1330 – 1420	***Testing & Pre-Commissioning of Electrical Installations*** *Insulation Resistance and Continuity Tests • Loop Impedance and Earth Fault Tests • Visual Inspection and Punch List Creation • Documentation of Results and Issue Logs*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Two*

Day 3: Wednesday, 13th of August 2025

0730 – 0830	***Installation of Field Instruments*** *Pressure, Flow, Temperature and Level Sensors • Mounting Brackets and Impulse Lines • Instrument Cable Selection • Environmental Protection (IP/NEMA Ratings)*
0830 – 0930	***Tubing & Impulse Line Work*** *SS Tubing Bending and Routing • Manifold and Valve Connections • Leak Testing and Flushing • Tubing Support and Labeling*
0930 – 0945	*Break*
0945 – 1100	***DCS & SCADA Cabinet Installation*** *Racks and Enclosures • Power Supply and Grounding • Fiber Optic Cable Termination • Signal Integrity Considerations*
1100 – 1215	***Control Cable Laying & Termination*** *Signal Segregation Principles • Shielded Cable Termination and Grounding • Multicore Cable Identification • Cable Dressing and Routing*
1215 – 1230	*Break*
1230 – 1330	***Installation of Junction Boxes & Marshaling Panels*** *Selection and Mounting • Cable Gland and Lug Installation • Wiring to Terminal Blocks • Loop Integrity Checks*
1330 – 1420	***Loop Checking & Signal Verification*** *Loop Folder Documentation • Dry and Wet Loop Testing • Simulating Signals to Control Room • Calibration and Zero-Span Checks*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Three*

Day 4: Thursday, 14th of August 2025

0730 – 0830	***Telecommunication System Components*** *PABX, Fiber, Copper and Wireless Systems • Rack Assembly and Labeling • Patch Panels and Switch Connections • Equipment Grounding and Shielding*
0830 – 0930	***Fiber Optic Cable Installation & Splicing*** *Laying Methods and Bend Radius • Fusion Splicing and Mechanical Splicing • OTDR Testing and Insertion Loss Checks • Fiber Patch Panel Installation*
0930 – 0945	*Break*
0945 – 1100	***Installation of Intelligent Electronic Devices (IEDs)*** *Role in Protection and Automation • Mounting in Relaying Panels • Configuration Ports and Cabling • IED Testing Procedures*
1100 – 1215	***Control & Relay Panel Installation*** *Relay Mounting and Wiring • CT/VT Connection Points • Functional Verification of Logic • Interface with SCADA or PLC*
1215 – 1230	*Break*
1230 – 1330	***Time Synchronization Systems (GPS/NTP)*** *Clock Installation and Cabling • NTP Server Configuration • Time Stamping in Event Logs • Verification with IEDs and SCADA*
1330 – 1420	***Testing & Certification of Communication Systems*** *Bit Error Rate Testing (BERT) • Ping and Network Continuity Tests • IP Address Assignment and Verification • Documentation and Approvals*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Four*

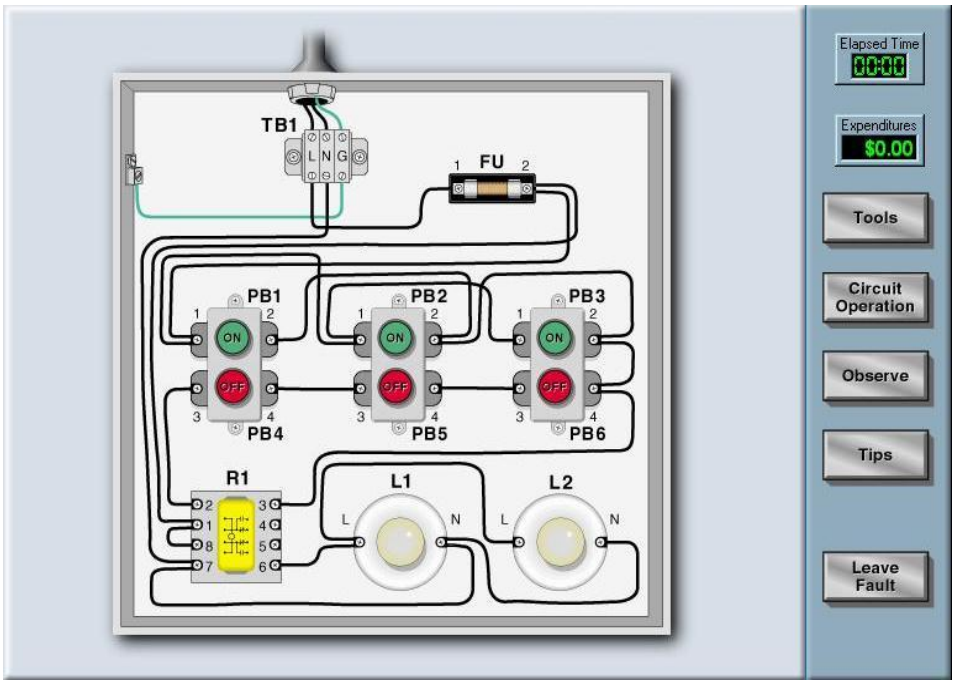
Day 5: Friday, 15th of August 2025

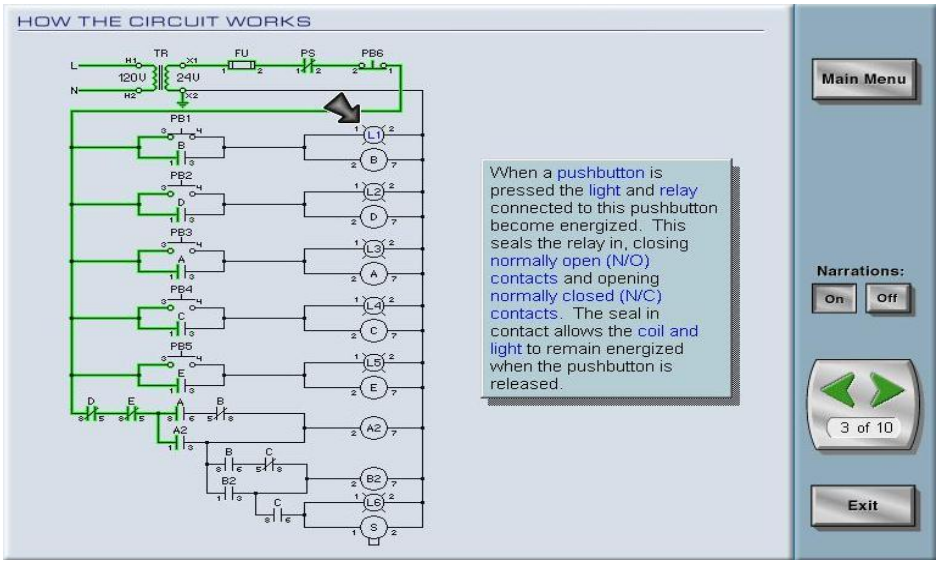
0730 – 0830	***Pre-Commissioning & System Integration*** *Final Visual Inspection • Energization Preparation • Coordination with Other Disciplines • Handover Readiness Checklist*
0830 – 0930	***Functional Testing & FAT/SAT Support*** *Functional Test Procedures • Witness Testing for FAT/SAT • System Validation and Proof-of-Concept • Troubleshooting During Test*
0930 – 0945	*Break*
0945 – 1100	***Common Installation Defects & Troubleshooting Techniques*** *Cable Damage and Insulation Failure • Grounding Issues • Intermittent Signals and Loose Terminals • Diagnostic Tool Use (Multimeter, IR Camera, etc.)*
1100 – 1215	***Documentation & As-Built Drawings*** *Mark-Up and Redlining • Updating Loop and Termination Diagrams • As-Built Verification Walkdowns • Final Documentation Submission*
1215 – 1230	*Break*
1230 – 1300	***Client Acceptance & Punch List Closure*** *Generating and Addressing Punch List • Client Inspection Walkthrough • Final Sign-Offs • Warranty and Support Conditions*

1300 - 1245	***Best Practices & Lessons Learned*** *Case Studies of Successful Installations • Team Communication During Fieldwork • Safety Culture During Installation • Lessons Learned Documentation*
1345 – 1400	***Course Conclusion*** *Using this Course Overview, the Instructor(s) will Brief Participants about t Topics that were Covered During the Course*
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

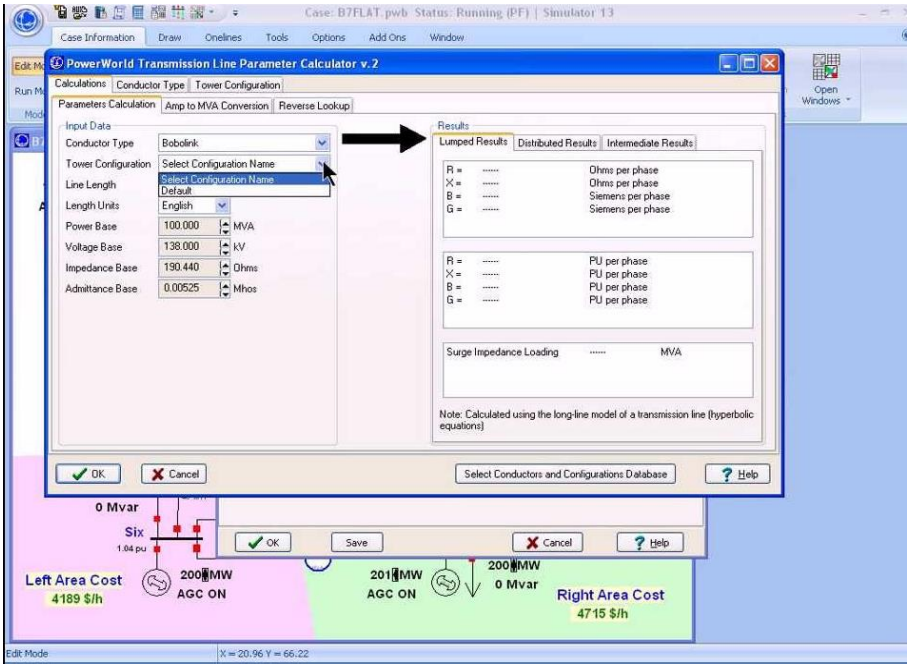
Simulator (Hands-on Practical Sessions)

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 simulator "Simutech Troubleshooting Electrical Circuits V4.1", Power World" and "ETAP software".

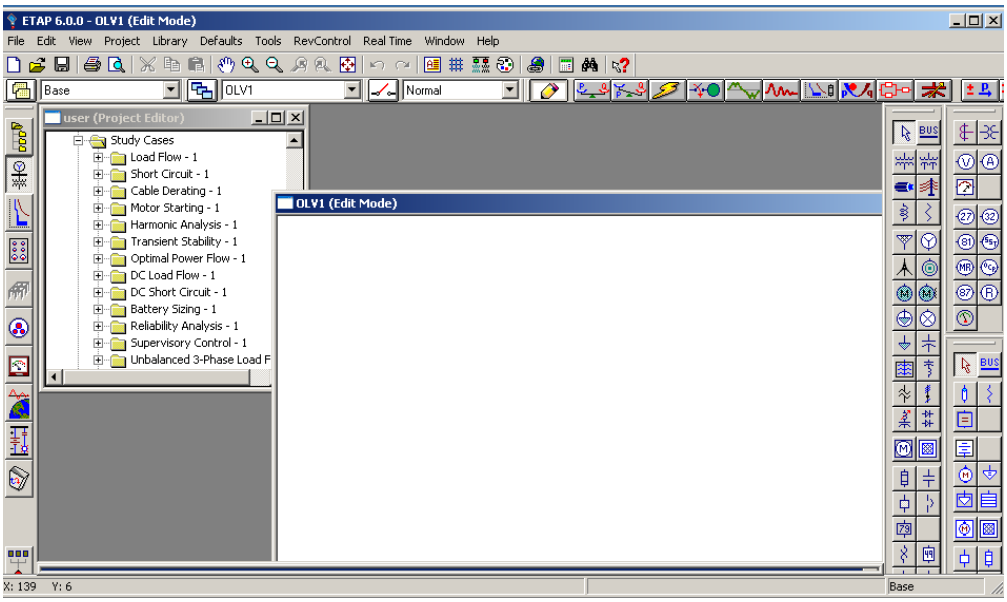




Simutech Troubleshooting Electrical Circuits V4.1



Power World Simulator



ETAP Software Simulator

Course Coordinator
Mari Nakintu, Tel: +971 2 30 91 714, Email: mari1@haward.org