COURSE OVERVIEW EE1105
Power Generation & Gas Processing

Course Title
Power Generation & Gas Processing

Course Date/Venue
Session 1: August 04-08, 2025/Glasshouse Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
Session 2: December 08-12, 2025/Glasshouse Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

Course Reference
EE1105

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 Power Generation and Gas Processing. It covers the types of power plants, power generation components, efficiency and sustainability in power generation and role of power plants in the grid system; the fundamentals of gas turbines, power generation plant configuration, basic thermodynamics in power generation and fuel types and selection for power generation; the role of gas processing in power generation; the gas purification and conditioning and gas processing flow diagram; the natural gas composition and properties and gas compression and transport; and the dehydration and filtration processes.

Further, the course will also discuss the sulfur compounds from natural gas and combined cycle power plant, heat recovery and utilization and advanced control systems in power plants; the emissions control and environmental compliance, performance and reliability in power generation and cryogenic gas processing; the gas-to-liquid (GTL) technologies and gas field development and production including advanced gas cleaning and purification.

During this interactive course, participants will learn the proper methods of hydrogen production, storage and transportation; creating maintenance schedules and checklists and using proper tools for condition monitoring; the maintenance best practices for gas turbines and common problems in gas processing; the systematic troubleshooting approach and handling system failures and emergency response; the efficiency data from turbines and gas processing; the proper techniques for fuel and energy consumption reduction and operational adjustments for maximum efficiency; using SCADA for real-time diagnostics, alarm management and event logging, data analysis for predictive maintenance and integrating AI and machine learning for performance optimization; the safety standards and regulations and personal protective equipment (PPE) and its usage; and the lock-out/tag-out (LOTO) procedures and safety audits and incident reporting.

Course Objectives

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

- Apply and gain an in-depth knowledge on power generation and gas processing
- Identify the types of power plants, power generation components, efficiency and sustainability in power generation and role of power plants in the grid system
- Discuss the fundamentals of gas turbines, power generation plant configuration, basic thermodynamics in power generation and fuel types and selection for power generation
- Explain the role of gas processing in power generation and illustrate gas purification and conditioning and gas processing flow diagram
- Recognize natural gas composition and properties and gas compression and transport as well as apply dehydration and filtration processes
- Remove sulfur compounds from natural gas and discuss combined cycle power plant, heat recovery and utilization and advanced control systems in power plants
- Carryout emissions control and environmental compliance, performance and reliability in power generation as well as cryogenic gas processing
- Discuss gas-to-liquid (GTL) technologies and apply gas field development and production including advanced gas cleaning and purification
- Implement proper methods of hydrogen production, storage and transportation, create maintenance schedules and checklists, use proper tools for condition monitoring and apply maintenance best practices for gas turbines
- Identify common problems in gas processing, apply systematic troubleshooting approach and handle system failures and emergency response
- Analyze efficiency data from turbines and gas processing and carryout proper techniques for fuel and energy consumption reduction and operational adjustments for maximum efficiency
- Use SCADA for real-time diagnostics, alarm management and event logging, data analysis for predictive maintenance and integrating AI and machine learning for performance optimization
- Implement safety standards and regulations, personal protective equipment (PPE) and its usage, lock-out/tag-out (LOTO) procedures and safety audits and incident reporting

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 power generation and gas processing for project managers and technical supervisors, power plant engineers, instrumentation and control engineers, operations and maintenance (O&M) personnel, energy and utility sector professionals 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.

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.

Accommodation

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

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: -

- 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.

- 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. Ahmed Abozeid is a **Senior Electrical & Instrumentation Engineer** with over **30 years** of **Onshore** & **Offshore** experience within the **Oil** & **Gas** and **Power** industries. His wide expertise covers **HV Cable** Design, **Cable** Splicing & Termination, **Cable** Jointing Techniques, **High Voltage** Electrical Safety, **HV/MV Cable Splicing**, **High Voltage Circuit Breaker** Inspection & Repair, **High Voltage Power System** Safe Operation, High Voltage Safety, **High Voltage Transformers**, Safe Operation of **High Voltage & Low Voltage Power Systems**, **Electric Distribution System Equipment**, **ABB 11KV Distribution Switchgear**, **Rotork Operation & Maintenance**, **Power System Protection and Relaying**, **Electrical Motors & Variable Speed Drives**, **Motor** Speed Control, Power Electronic Converters, Control Valve, **Flowmetering & Custody Transfer**, **Meters Calibration**, Installation & Inspection, **Crude Metering & Measurement Systems**, **Flow Meter Maintenance Troubleshooting**, AC Converters Section, Electromagnetic Compatibility (**EMC**), **Motor** Failure Analysis & Testing, **Machinery** Fault Diagnosis, **Bearing** Failure Analysis **Process Control & Instrumentation**, **Process Control Measurements**, **Control System Commissioning & Start-Up**, **Control System & Monitoring**, **Power Station Control System**, **Instrumentation Devices**, **Process Control & Automation**, **PID Controller**, Distributed Control Systems (**DCS**), Programmable Logic Controllers (**PLC**), **ABB PLC & DCS System**, **Gas Analyzers**, **Simulation Testing**, **Load Flow**, **Short Circuit**, **Smart Grid**, **Vibration Sensors**, **Cable Installation & Commissioning**, **Calibration Commissioning** and **Site Filter Controller**. Further, he is also well-versed in **Fundamentals of Electricity**, **Electrical Standards**, **Electrical Power**, **PLC**, **Electrical Wiring**, Machines, **Transformers**, **Motors**, **Power Stations**, **Electro-Mechanical Systems**, **Automation & Control Systems**, **Voltage Distribution**, **Power Distribution**, **Filters**, **Automation System**, **Electrical Variable Speed Drives**, **Power Systems**, **Power Generation**, **Power Transformers**, **Diesel Generators**, **Power Stations**, **Uninterruptible Power Systems** (**UPS**), **Battery Chargers** and **AC** & **DC Transmission**. He is currently the **Project Manager** wherein he manages, plans and implements projects across different lines of business.

Mr. Ahmed worked as the **Electrical Manager**, **Electrical Power & Machine Expert**, **Electrical Process Leader**, **Team Leader**, **Electrical Team Leader**, **Technical Instructor**, and **Instructor/Trainer** from various companies such as the Lafarge Nigeria, Egyptian Cement Company, ECC Training Center, Alrajhi Construction & Building Company and Ameria Cement Company, just to name a few.

Mr. Ahmed has a **Bachelor's** degree in **Electrical Engineering**. Further, he is a **Certified Instructor/Trainer, Certified TQUK Level 3 Vocational Achievement (RQF) Assessor** and has delivered numerous trainings, seminars, courses, workshops 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

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Overview of Power Generation*** *Types of Power Plants (Thermal, Hydro, Renewable, Nuclear) • Power Generation Components: Turbines, Generators, Transformers • Efficiency & Sustainability in Power Generation • Role of Power Plants in Grid System*
0930 – 0945	*Break*
0945 – 1030	***Fundamentals of Gas Turbines*** *Working Principle of Gas Turbines • Key Components: Compressor, Combustion Chamber, Turbine • Operating Cycles of Gas Turbines • Performance Characteristics & Parameters*
1030 – 1130	***Power Generation Plant Configuration*** *Layout of a Typical Power Plant • Integration of Gas Turbines with Steam Turbines (Combined Cycle) • Control Systems & Monitoring • Safety Considerations in Plant Design*
1130 – 1215	***Basic Thermodynamics in Power Generation*** *First & Second Laws of Thermodynamics • Rankine & Brayton Cycles • Heat Recovery & Efficiency Improvements • Thermodynamic Calculations for Plant Performance*
1215 – 1230	*Break*
1230 – 1330	***Fuel Types & Selection for Power Generation*** *Types of Fuels Used in Power Plants (Natural Gas, Coal, Oil) • Fuel Properties & their Impact on Power Generation • Environmental Impact of Different Fuels • Strategies for Fuel Optimization*
1330 – 1420	***Hands-On: Gas Turbine Operation & Maintenance*** *Starting, Operating, & Shutting Down a Gas Turbine • Troubleshooting Common Issues • Monitoring Key Parameters During Operation • Preventive Maintenance Techniques*
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

0730 – 0830	***Basics of Gas Processing*** *Role of Gas Processing in Power Generation • Overview of Gas Purification & Conditioning • Gas Processing Flow Diagram • Key Equipment Involved in Gas Processing*
0830 – 0930	***Natural Gas Composition & Properties*** *Overview of Natural Gas Components (Methane, Ethane, Propane, etc.) • Gas Impurities & their Impact on Turbine Performance • Gas Liquefaction & Storage • Calculations for Gas Flow Rates & Energy Content*
0930 – 0945	*Break*

0945 – 1100	***Gas Compression & Transport*** *Function of Compressors in Gas Processing • Types of Compressors: Centrifugal, Reciprocating • Pipeline Transportation of Processed Gas • Pressure & Temperature Regulation in Gas Transport*
1100 – 1215	***Dehydration & Filtration Processes*** *Methods for Removing Water & Particulates from Natural Gas • Common Dehydration Techniques: Glycol & Molecular Sieve • Filtration Systems & their Maintenance • Impacts of Impurities on Turbine & Power Plant Efficiency*
1215 – 1230	*Break*
1230 – 1330	***Sulfur Recovery & Gas Sweetening*** *Process for Removing Sulfur Compounds from Natural Gas • The Claus Process for Sulfur Recovery • Gas Sweetening Methods: Amine & Adsorption Processes • Environmental Regulations & Compliance*
1330 – 1420	***Hands-On: Gas Processing System Setup & Operation*** *Operating Filtration & Dehydration Systems • Configuring Compressors & Regulators • Monitoring Pressure & Temperature During Gas Flow • Identifying & Addressing System Leaks & Failures*
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

0730 – 0830	***Combined Cycle Power Plants*** *Overview of Combined Cycle Systems (Gas & Steam Turbines) • Benefits of Combined Cycle Over Simple Cycle • Heat Recovery Steam Generators (HRSG) • Performance Optimization & Operational Strategies*
0830 – 0930	***Heat Recovery & Utilization*** *Role of HRSG in Combined Cycle Plants • Integration of Heat Recovery Systems with Gas Turbines • Condensing versus Non-Condensing Steam Turbines • Efficiency Improvements Through Heat Recovery*
0930 – 0945	*Break*
0945 – 1100	***Advanced Control Systems in Power Plants*** *SCADA & DCS Systems in Power Generation • Monitoring & Control of Turbine & Gas Processing Parameters • Integration of Plant Data for Predictive Maintenance • System Security & Data Integrity*
1100 – 1215	***Emissions Control & Environmental Compliance*** *Air Quality Standards & Regulations • Emission Control Technologies: SCR, FGD, & Carbon Capture • Waste Management Strategies in Power Plants • Monitoring & Reporting of Emissions*
1215 – 1230	*Break*
1230 – 1330	***Performance & Reliability in Power Generation*** *Key Performance Indicators (KPIs) for Power Plants • Failure Modes & Reliability Analysis • Root Cause Analysis of Performance Degradation • Performance Benchmarking & Improvement Strategies*

1330 – 1420	***Hands-On: Combined Cycle Power Plant Simulation*** *Operating a Combined Cycle Power Plant Simulation • Adjusting Operational Parameters for Optimization • Troubleshooting Issues in Combined Cycle • Hands-On with SCADA & DCS Systems*
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

0730 – 0830	***Cryogenic Gas Processing*** *Principles of Cryogenic Gas Separation • Liquefaction & Storage of Natural Gas • Key Equipment: Cryogenic Heat Exchangers, Distillation Columns • Applications of Cryogenic Gas Processing in LNG*
0830 – 0930	***Gas-to-Liquid (GTL) Technologies*** *Overview of GTL Processes • Fischer-Tropsch Synthesis for Liquid Fuels • GTL versus LNG: Advantages & Challenges • Economic & Environmental Considerations*
0930 – 0945	*Break*
0945 – 1100	***Gas Field Development & Production*** *Exploration & Production of Natural Gas Fields • Well Stimulation Techniques: Fracking & Horizontal Drilling • Production Forecasting & Reservoir Management • Gas Field Management Strategies*
1100 – 1215	***Advanced Gas Cleaning & Purification*** *Removal of CO2, H2S & Other Contaminants • Membrane Separation Technology • Cryogenic & Absorption Processes • Monitoring & Control of Purification Systems*
1215 – 1230	*Break*
1230 – 1330	***Hydrogen Production from Natural Gas*** *Methods for Hydrogen Production: Steam Methane Reforming (SMR) • Role of Hydrogen in Future Power Generation • Hydrogen Storage & Transportation Challenges • Environmental Implications of Hydrogen Production*
1330 – 1420	***Hands-On: Gas Purification & GTL Unit Operation*** *Operating & Troubleshooting Gas Purification Systems • Setting Up & Maintaining a GTL Unit • Managing Hydrogen Production Process • Real-Time Monitoring & Adjustments*
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*

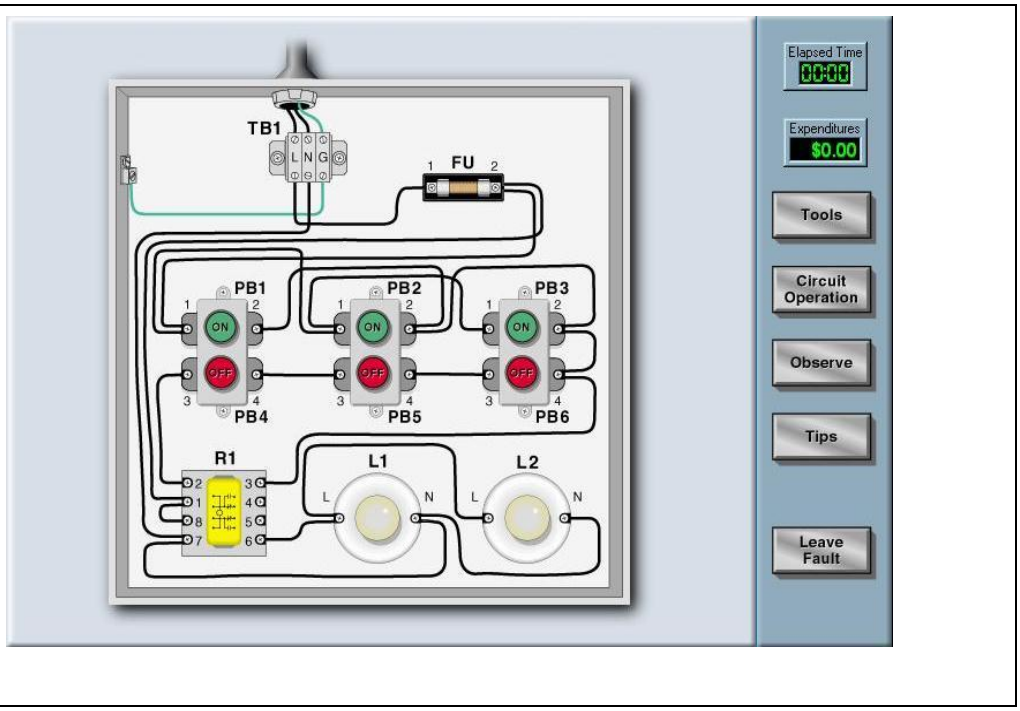
Day 5

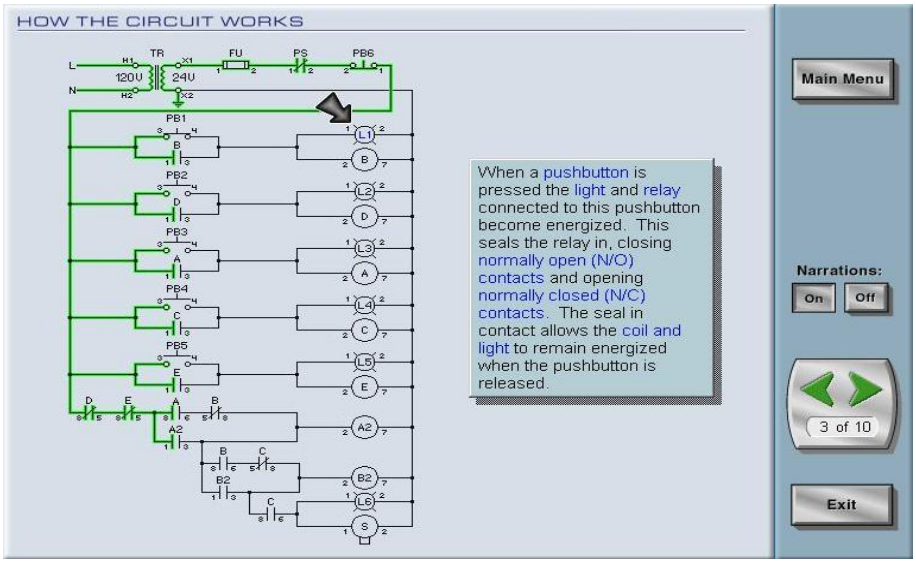
0730 – 0830	***Maintenance Strategies in Power Generation*** *Types of Maintenance: Preventive, Predictive, Corrective • Creating Maintenance Schedules & Checklists • Tools for Condition Monitoring • Maintenance Best Practices for Gas Turbines*
0830 – 0930	***Troubleshooting Gas Processing Systems*** *Identifying Common Problems in Gas Processing • Systematic Troubleshooting Approach • Handling System Failures & Emergency Response • Case Studies of Past Issues & Resolutions*
0930 – 0945	*Break*

0945 – 1100	***Optimization of Power Generation Efficiency*** *Analyzing Efficiency Data from Turbines & Gas Processing • Techniques for Fuel & Energy Consumption Reduction • Operational Adjustments for Maximum Efficiency • Impact of Maintenance on Performance Optimization*
1100 – 1230	***Advanced Troubleshooting with SCADA Systems*** *Using SCADA for Real-Time Diagnostics • Alarm Management & Event Logging • Data Analysis for Predictive Maintenance • Integrating AI & Machine Learning for Performance Optimization*
1230 – 1245	*Break*
1245 – 1300	***Safety Protocols in Power Generation & Gas Processing*** *Overview of Safety Standards & Regulations • Personal Protective Equipment (PPE) & Its Usage • Lock-Out/Tag-Out (LOTO) Procedures • Safety Audits & Incident Reporting*
1300 - 1345	***Hands-On: Troubleshooting & Maintenance Simulation*** *Identifying & Solving Issues in Gas Turbine Operation • Conducting Maintenance Tasks on Gas Processing Equipment • Optimizing System Performance During Troubleshooting • Final Review & Assessment of Maintenance Practices*
1345 – 1400	***Course Conclusion*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course*
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

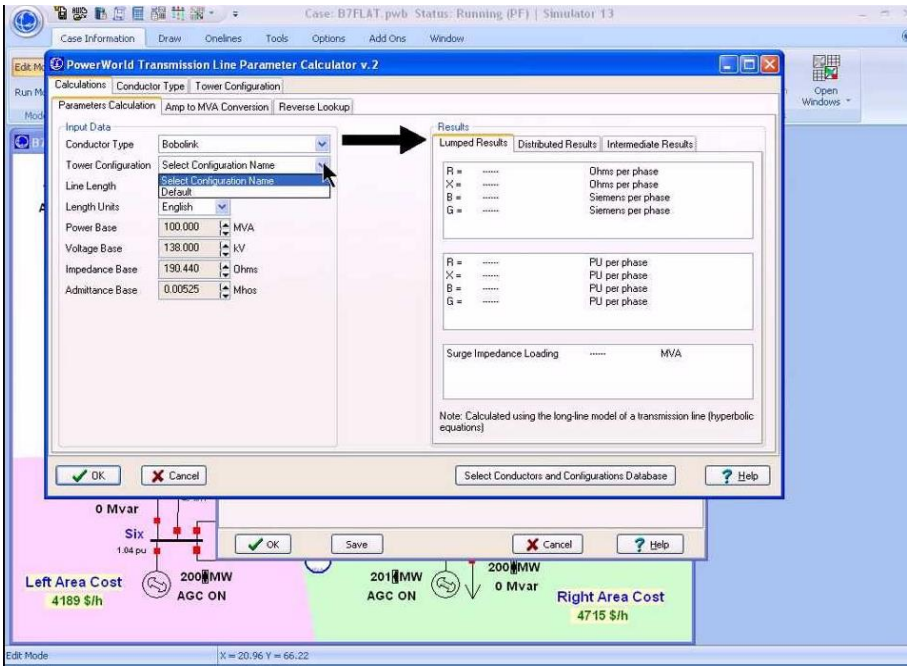
Simulator (Hands-on Practical Sessions)

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”, “ETAP software” , “Allen Bradley SLC 500”, “AB Micrologix 1000 (Digital or Analog)”, “AB SLC5/03”, “AB WS5610 PLC”, “Siemens S7-1200” and “HMI SCADA”.

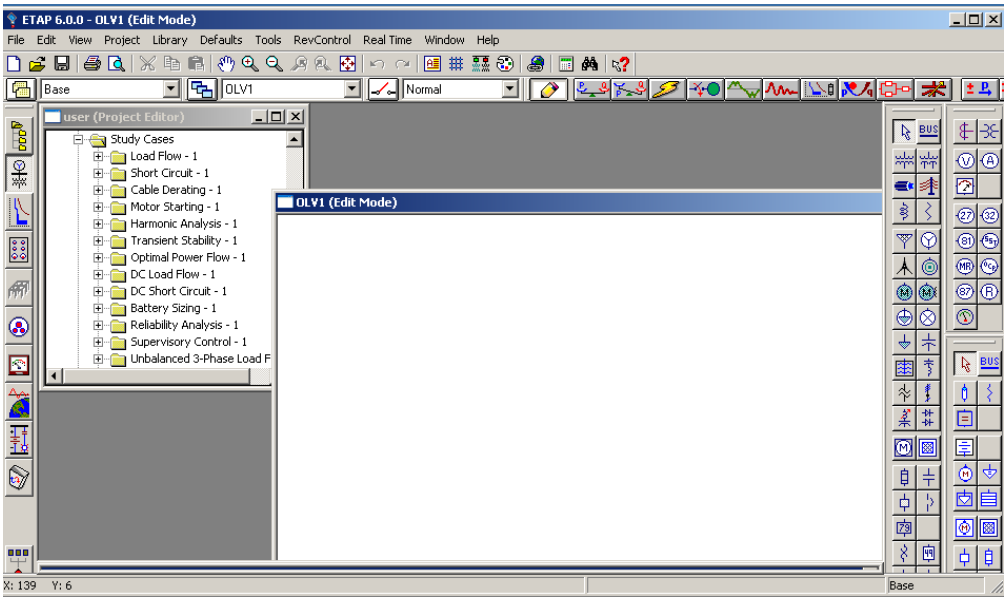




Simutech Troubleshooting Electrical Circuits V4.1



Power World Simulator



ETAP Software Simulator

Allen Bradley SLC 500 Simulator

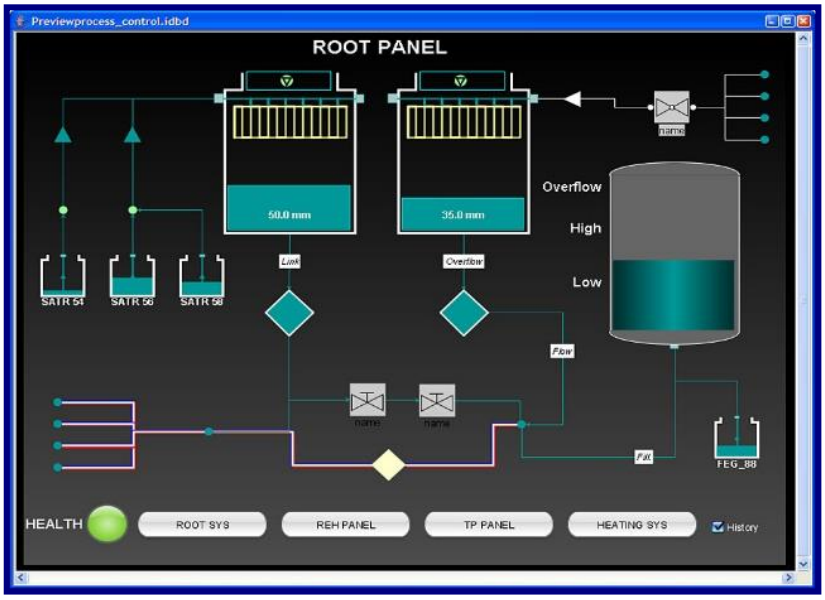
Allen Bradley Micrologix 1000 Simulator (Digital)

Allen Bradley Micrologix 1000 Simulator (Analog)

Allen Bradley SLC 5/03

Allen Bradley WS5610 PLC Simulator PLC5

Siemens S7-1200 Simulator



HMI SCADA

Course Coordinator

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