COURSE OVERVIEW EE0081
Power System Planning & Economics

Course Title
Power System Planning & Economics

Course Date/Venue
Session 1: April 20-24, 2025/Business Meeting, Crowne Plaza Al Khobar, Al Khobar, KSA
Session 2: December 14-18, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE

Course Reference
EE0081

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.

The conventional method of power system planning relies on the minimization of system costs subject to meeting given levels of demand and reliability, as well as other constraints.

This course covers power system planning, economics, operation and management issues as well as reliability in a deregulated environment. It will give a comprehensive overview of power system reliability.

Evaluation of generation, transmission and distribution system reliability and their impacts on system planning will be covered. The course will address the factors affecting power system expansion planning, operation and management as well as reliability in an electricity market including system adequacy, security, ancillary services market, decision making and other management issues.

The course is designed to develop an in-depth understanding of key economic and other concepts related to electric utility planning and to expose the participants to modern approaches of electricity planning, electricity pricing and environmental implications of alternative power development plans.

The goal for this course is to give the participants knowledge on how to use economic and reliability analysis as a tool for decision support during planning, design, operation and maintenance of electric power systems.

Course Objectives

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

- Apply and gain an in-depth knowledge on power system planning and economics
- Discuss the nature of planning in electricity sector and the hierarchy of electricity planning models
- Illustrate electricity demand forecasting and review the load forecasting techniques and guidelines for selection.
- Describe the economic operation of power system and employ the planning methods properly
- Explain the economics of power system reliability by identifying the key indicators, performing calculations and dealing with uncertainties in capacity expansion planning
- Employ the various electricity pricing approaches
- Determine the value-based transmission expansion by quantifying the value of transmission
- Formulate power-flow problem covering techniques for power-flow studies
- Perform newton-raphson solution method and other power-flow methods
- Recognize the optimal transmission capacity
- Carryout demand side management as an strategic option in utility planning
- Discuss the deregulation of electrical utilities including the various issues and approaches as well as the open electrical energy markets

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 system planning and economics for all technical staff, engineers and managers from electric power utilities, independent generating companies including renewable sources, electricity regulators, system operators, industrial customers, manufacturing and consulting companies as well as educational and research institutions who deal with the planning and operation issues of modern power systems.

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.

Accommodation

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

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.

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 Program

The following program is planned for this course. However, the course instructor(s) may modify this program before or during the course 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	***Nature of Planning in Electricity Sector & the Hierarchy of Electricity Planning Models***
0930 – 0945	*Break*
0945 – 1030	***Electricity Demand Forecasting*** *Electric Power Transmission and Distribution Load Forecasting (How it is Done) ● Load Behavior and Load Growth Characteristics*
1030 – 1230	***Review of the Load Forecasting Techniques and Guidelines for Selection*** *Short Term Demand Forecasting Models ● Long Term Demand Forecasting Models*
1230 – 1245	*Break*
1245 – 1420	***Review of the Load Forecasting Techniques & Guidelines for Selection (cont'd)*** *Basic Theory & Mathematics of Modern Distribution Load Forecasting ● Load Curve End-User Modeling ● Examination of T&D Planning & Forecasting Needs*
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2

0730 – 0930	***Economic Operation of Power System*** *Economic Dispatch ● Unit Commitment ● Thermal Scheduling ● Conventional versus Decentralized Power System Operation*
0930 – 0945	*Break*
0945 – 1030	***Planning Methods*** *Integrated Resource Planning ● Value Based Planning ● Planning Capacity ● Needs of Power Delivery*
1030 – 1230	***Economics of Power System Reliability*** *Key Indices of Power System Reliability & Their Calculations*
1230 – 1235	*Break*
1235 – 1420	***Economics of Power System Reliability (cont'd)*** *Linkage Between Reliability & Capacity Planning*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3

0730 – 0930	***Economics of Power System Reliability (cont'd)*** *Dealing with Uncertainties in Capacity Expansion Planning*
0930 – 0945	*Break*
0945 – 1030	***Electricity Pricing Approaches*** *What is the Difference Between a Megawatt-Hour & a Barrel of Oil ● Short-Run versus Long-Run Marginal Cost Pricing ● Theory of Peak Load Pricing*
1030 – 1230	***Electricity Pricing Approaches (cont'd)*** *Theory of Spot Pricing ● Locational Pricing: Concepts & Approaches*
1230 – 1235	*Break*
1235 – 1420	***Electricity Pricing Approaches (cont'd)*** *Buyback Rates of Electricity Produced by Independent Producers ● Electricity Rate-Making in Practice ● Environmental Regulation & Electricity Pricing*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4

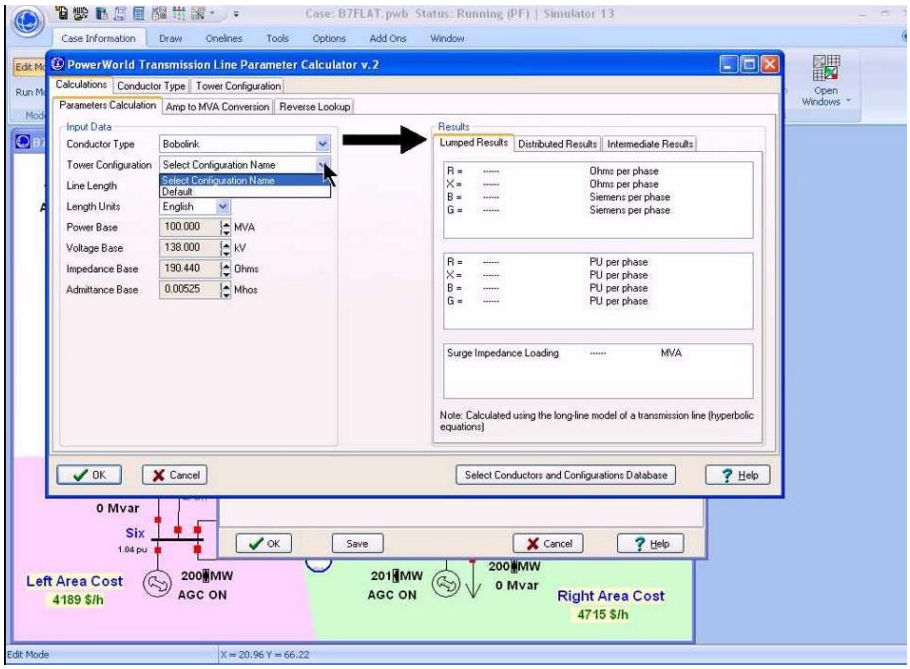
0730 – 0930	***Value-Based Transmission Expansion*** *Quantifying the Value of Transmission*
0930 – 0945	*Break*
0945 – 1135	***Power-Flow Problem Formulation*** *Techniques for Power-Flow Studies*
1135 – 1230	***Newton–Raphson Solution Method*** *Other Power-Flow Methods*
1230 – 1235	*Break*
1235 – 1420	***Optimal Transmission Capacity***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5

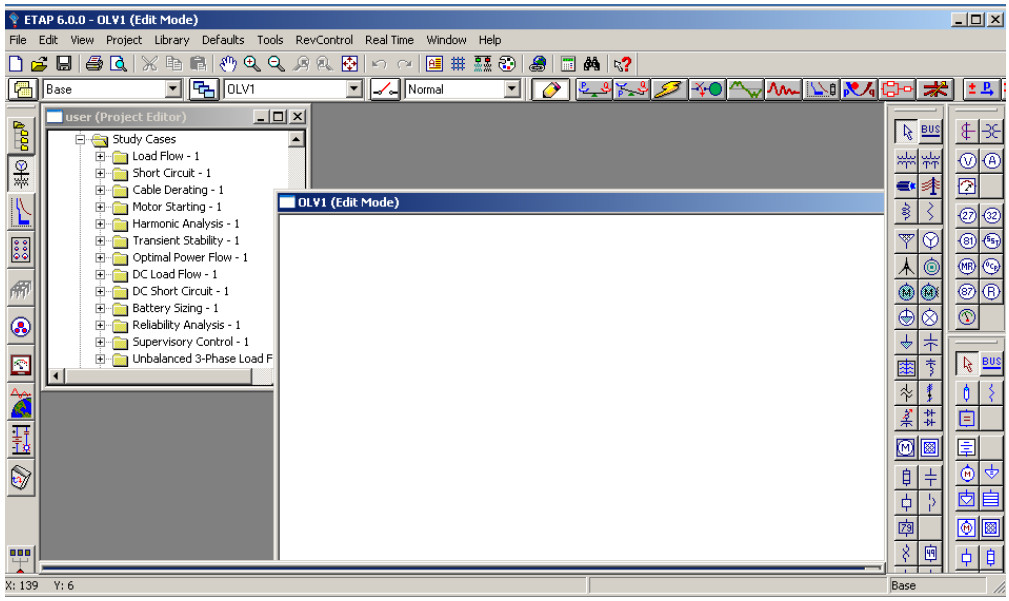
0730 – 0930	***Demand Side Management as a Strategic Option in Utility Planning***
0930 – 0945	*Break*
0945 – 1135	***Deregulation of Electric Utilities: Issues & Approaches***
1135 – 1230	***Open Electrical Energy Markets*** *Bilateral Trading ● Electricity Pools*
1230 – 1235	*Break*
1235 – 1345	***Open Electrical Energy Markets (cont'd)*** *Comparison of Pool & Bilateral Trading*
1345 – 1400	***Course Conclusion***
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Simulators (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 “Power World” and “ETAP software”.



Power World Simulator



ETAP Software Simulator

Course Coordinator

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