

50% Special Discount on this course

COURSE OVERVIEW EE0081
Power System Planning & Economics

Course Title

Power System Planning & Economics

Course Date/Venue

September 20-24, 2020/Dukhan Hall 2,
 Concorde Hotel Doha, Doha, Qatar

Course Reference

EE0081

Course Duration/Credits

Five days/3.0 CEUs/30 PDHs



Course Description



This hands-on, 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

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.

Training Methodology

This interactive training course includes the following training methodologies as a percentage of the total tuition hours:-

- 30% Lectures
- 20% Workshops & Work Presentations
- 20% Case Studies & Practical Exercises
- 30% Videos, Software & Simulators


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

Course Certificate(s)

Internationally recognized certificates will be issued to all participants of the course.

Certificate Accreditations


Certificates are accredited by the following international accreditation organizations:-

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USA International Association for Continuing Education and Training (IACET)

Haward Technology is an Authorized Training Provider by the International Association for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, Virginia 20171, USA. In obtaining this authority, Haward Technology has demonstrated that it complies with the **ANSI/IACET 1-2013 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 1-2013 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 Association 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.

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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 Fee

US\$ 3,250 per Delegate. This fee is already discounted with **50% special discount** on the original course fees of US\$ 6,500 per Delegate. The rate includes Participants Pack (Folder, Manual, Hand-outs, etc.), 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 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:



Professor Mike Kanova is a Senior Electrical & Instrumentation Engineer with over 30 years of industrial experience. His expertise extends widely over the areas of National Electrical Code (NEC), National Electrical Safety Code (NESC), Security Systems Installation & Maintenance, Security Management, Protection Relay, Power Generation, Generator Excitation Systems, Circuit Breakers & Switchgears, Power Systems Control & Stability, Electrical Fault Analysis, Electric Distribution System Equipment, Electric Power System, Motors and VSDs as well as Gas Turbine, Flowmeter Technology, Industrial & Power Electronics, Process Control & Instrumentation, Fieldbus, Process Automation, Manufacturing Automation, High Speed Ethernet Network, HART, Digital Communication Networks, Power Factor Protection Technology, Electrical Control Systems, SIL, SIS, ESD, Distributed Control Systems (DCS) and Fibre Optics Technology. Further, his experience has proven him well in the practice and has given him the chance to work with **international organizations** such as the **Instrument Society of America (ISA)**, the **Institute of Measurements and Control**, the **United Nations Educational Scientific and Cultural Organization (UNESCO)** and the **International Electrical Testing Association (NETA)**.

During Professor Kanova's career life, he gained extensive experience in the electrical, instrumentation and control systems engineering field through various challenging **engineering & managerial** positions that he filled while working as the **Scientist/Inventor, Project Manager, Development Engineer, Electronics Engineer, Stream Leader, Co-leader, Supervisor, Researcher, Conference Organizer, External Examiner, Lecturer** in Electronics, Opto-electronics and Power Electronics, **Course Developer, Organizing & Editorial Committee Member, Part-time Consultant** and **Part-time Lecturer** from the **Cape Peninsula University of Technology, University of Cape Town, University of Western, University of Johannesburg Witwatersrand, Walter Sisulu University, ESKOM, NRF, SCINAC Tokai, Plessey Southern Africa Retreat, Peninsula Technikon, SA Nylon Spinners and R&B Electronics Rondebosch.**

With the knowledge and skills he gained herein, he has produced **over 100 publications and papers** that were presented to numerous gatherings like the **International Conference on System Modelling & Control; International Conference on Industrial and Commercial Use of Energy; International Conference of Control Signals and Systems; the UICEE Annual Conference on Engineering Education, the ETMSA (Energy Technology Modelling, Simulation and Applications), the Symposium on Energy Technology, Modelling, Simulation & Applications.** Those papers were also published in journals such as the **NETA Journal; the IEEE Aerospace and Electronic Systems Journal; the International Journal of Power and Energy Systems; the Journal of the Electricity Supply Industry; the International Journal of Computers and Applications; the Journal of the Electronics Technology and the Quantum Journal.**

Professor Kanova is a **Registered Professional Engineer** and has a **PhD, Master and Bachelor** degrees in **Electrical Engineering.** Further, he is a **Certified Instructor/Trainer, a Certified Internal Verifier/ Assessor/Trainer** by the **Institute of Leadership and Management (ILM)** and a well-respected member of the **IEEE** and is actively engaged with numerous projects in affiliation with the **Society for Photo-optical Instrumentation Engineers (SPIE), the Aerospace and Electronic Systems Society (AESS-IEEE), the Circuits and Systems Society (CSS-IEEE), the Lasers and Electro-optics Society (LES- IEEE) and the Power Electronic Society (PELS-IEEE).**

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: Sunday, 20th of September 2020

0730 – 0800	Registration & Coffee
0800 – 0815	Welcome & Introduction
0815 – 0830	PRE-TEST
0830 – 0930	Nature of Planning in Electricity Sector and the Hierarchy of Electricity Planning Models
0930 – 0945	Break
0945 – 1100	Electricity Demand Forecasting Electric Power Transmission and Distribution Load Forecasting (How it is Done) • Load Behavior and Load Growth Characteristics
1100 – 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 and Guidelines for Selection (cont'd) Basic Theory and Mathematics of Modern Distribution Load Forecasting • Load Curve End-User Modeling • Examination of T&D Planning and Forecasting Needs
1420 – 1430	Recap
1430	Lunch & End of Day One

Day 2: Monday, 21st of September 2020

0730 – 0900	Economic Operation of Power System Economic Dispatch • Unit Commitment • Thermal Scheduling • Conventional versus Decentralized Power System Operation
0900 – 0915	Break
0915 – 1100	Planning Methods Integrated Resource Planning • Value Based Planning • Planning Capacity • Needs of Power Delivery
1100 – 1230	Economics of Power System Reliability Key Indices of Power System Reliability and Their Calculations
1230 – 1245	Break
1245 – 1420	Economics of Power System Reliability (cont'd) Linkage Between Reliability and Capacity Planning
1420 – 1430	Recap
1430	Lunch & End of Day Two

Day 3: Tuesday, 22nd of September 2020

0730 – 0930	Economics of Power System Reliability (cont'd) <i>Dealing with Uncertainties in Capacity Expansion Planning</i>
0930 – 0945	Break
0945 – 1100	Electricity Pricing Approaches <i>What is the Difference Between a Megawatt-Hour and a Barrel of Oil • Short-Run versus Long-Run Marginal Cost Pricing • Theory of Peak Load Pricing</i>
1100 – 1215	Electricity Pricing Approaches (cont'd) <i>Theory of Spot Pricing • Locational Pricing: Concepts and Approaches</i>
1215 – 1230	Break
1230 – 1420	Electricity Pricing Approaches (cont'd) <i>Buyback Rates of Electricity Produced by Independent Producers • Electricity Rate-Making in Practice • Environmental Regulation and Electricity Pricing</i>
1420 – 1430	Recap
1430	Lunch & End of Day Three

Day 4: Wednesday, 23rd of September 2020

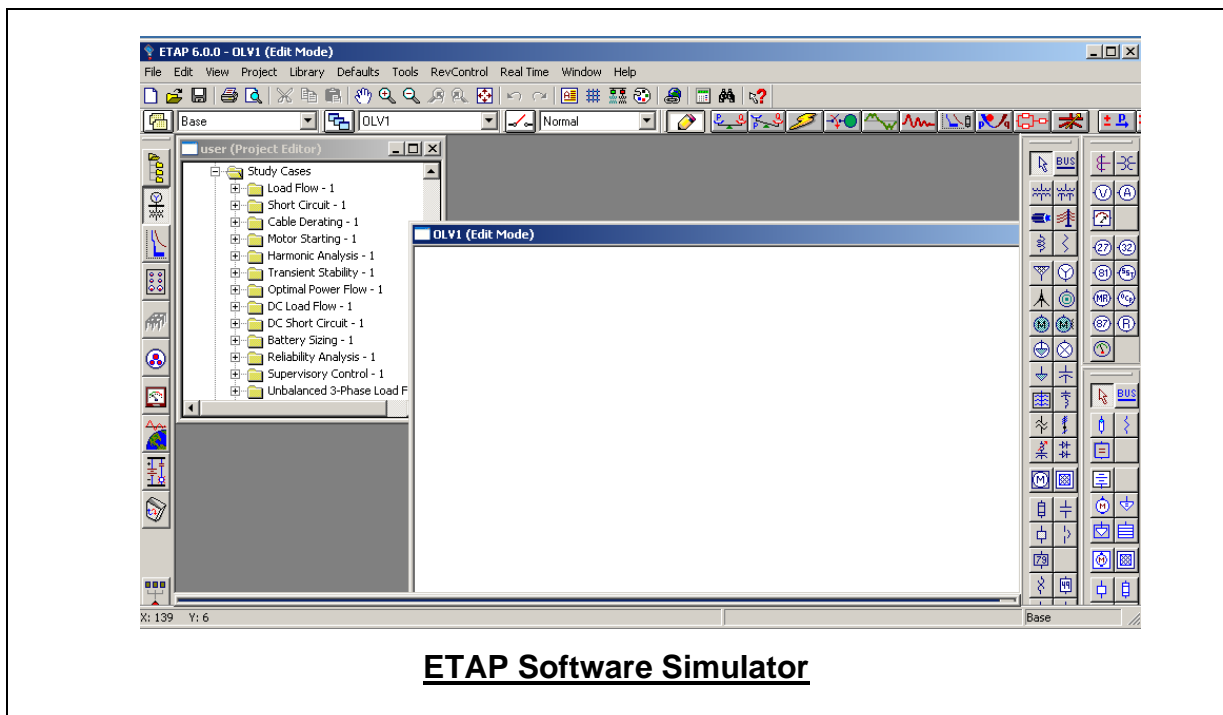
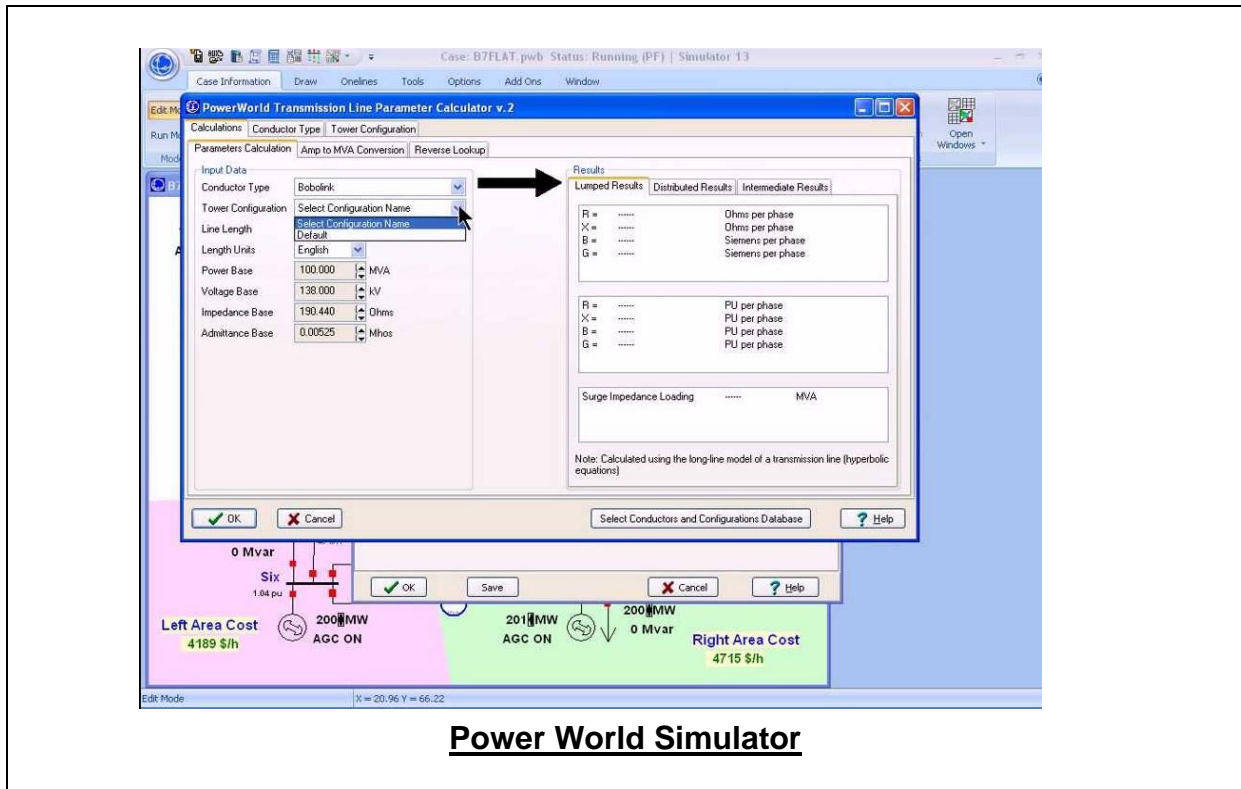
0730 – 0930	Value-Based Transmission Expansion <i>Quantifying the Value of Transmission</i>
0930 – 0945	Break
0945 – 1100	Power-Flow Problem Formulation <i>Techniques for Power-Flow Studies</i>
1100 – 1215	Newton-Raphson Solution Method <i>Other Power-Flow Methods</i>
1215 – 1230	Break
1230 – 1420	Optimal Transmission Capacity
1420 – 1430	Recap
1430	Lunch & End of Day Four

Day 5: Thursday, 24th of September 2020

0730 – 0930	Demand Side Management as an Strategic Option in Utility Planning
0930 – 0945	Break
0945 – 1100	Deregulation of Electric Utilities: Issues and Approaches
1100 – 1215	Open Electrical Energy Markets <i>Bilateral Trading • Electricity Pools</i>
1215 – 1230	Break
1230 – 1345	Open Electrical Energy Markets (cont'd) <i>Comparison of Pool and Bilateral Trading</i>
1345 – 1400	Course Conclusion
1400 – 1415	POST-TEST
1415 – 1430	<i>Presentation of Course Certificates</i>
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”.



Course Coordinator

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