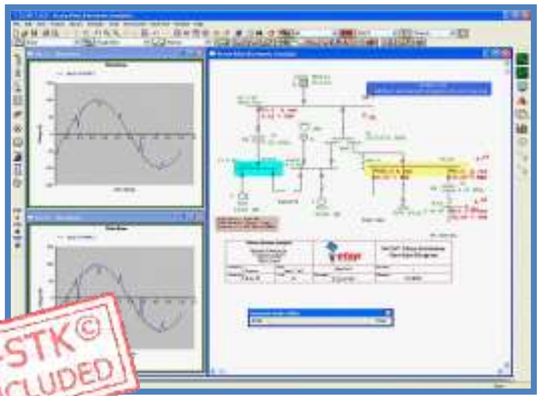
COURSE OVERVIEW EE0835
Electrical Power System Analysis (ETAP)

Course Title
Electrical Power System Analysis (ETAP)



Course Date/Venue
February 08-12, 2026/Boardroom 2, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE

Course Reference
EE0835

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 Electrical Transient Analysis Programme (ETAP). It covers the electrical transient analysis, ETAP software environment and power system single-line diagram (SLD) development; the system base values and per unit system, modeling of power system components and transient stability concepts; the short-circuit analysis, short-circuit modeling in ETAP and analysis of fault transients; the switching transients in power systems, circuit breaker switching analysis and mitigation of switching transients; and the motor starting transient phenomena, motor modeling in ETAP, motor acceleration and stability analysis.

During this interactive course, participants will learn the load transient behavior, harmonic transients and harmonic analysis integration with transients; the transient stability theory, generator dynamic modeling in ETAP and disturbance scenarios for stability studies; the protection system impact on transients, transient stability simulation in ETAP and interpretation of stability results; the lightning, surge transient analysis, grounding and earthing transients, insulation coordination and overvoltage protection; and the controlled switching applications, auto-reclosing transient effects, synchronization and out-of-phase switching and grid-code compliance considerations.

Course Objectives

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

- Apply and gain an in-depth knowledge on electrical transient analysis programme (ETAP)
- Discuss electrical transient analysis, ETAP software environment and power system single-line diagram (SLD) development
- Explain system base values and per unit system, modeling of power system components and transient stability concepts
- Carryout short-circuit analysis, short-circuit modeling in ETAP and analysis of fault transients
- Recognize switching transients in power systems and apply circuit breaker switching analysis and mitigation of switching transients
- Discuss motor starting transient phenomena and illustrate motor modeling in ETAP and motor acceleration and stability analysis
- Describe load transient behavior, harmonic transients and harmonic analysis integration with transients
- Discuss transient stability theory, generator dynamic modeling in ETAP and disturbance scenarios for stability studies
- Identify protection system impact on transients and apply transient stability simulation in ETAP and interpretation of stability results
- Carryout lightning and surge transient analysis and discuss grounding and earthing transients, insulation coordination and overvoltage protection
- Recognize controlled switching applications, auto-reclosing transient effects, synchronization and out-of-phase switching and grid-code compliance considerations

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 electrical transient analysis for engineers, planners, supervisors and other technical staff interested in ETAP application.

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:

Dr. Ahmed El-Sayed, PhD, MSc, BSc, is a **Senior Electrical & Instrumentation Engineer** with over **30 years** of extensive experience in the **Oil**, **Gas**, **Power**, **Petroleum**, **Petrochemical** and **Utilities**. He specializes in **P&ID** Reading & Interpretation, **Engineering Drawings**, **Electrical Drawing & Schematics, Electrical Drawing & Wiring,** Developing & Revising **Engineering Drawing**, **Piping & Instrument Drawing** Reading, **Electrical & Instrument Drawings**, **Relay** Design & Maintenance, **Relay** Programming, **Relay** Construction & Functions, **Protective Relaying**, **Relay** Coordination, **Siemens Protection Relays**, **Power System Protection Relays & Hardware**, **Electrical Power System Protection Relays**, **Electrical Faults & Relay** Protection, **ABB Relay** REG 216, **Fault Calculation Relay**, Modern **Power System Protective Relaying**, **Power System Study on ETAP**, **ETAP-Power System Analysis**, **Flow Measurement** Foundation, **Hydrocarbon** Measurement & Sampling, **Gas Dosiers** Preparation, **Gas/Liquid Fuel** Measurement, **Instrumentation Measurement & Control System**, **Flow** Measurement, **Pressure** Measurement, **Level & Temperature** Measurement, **Measurement Devices & Control System**, **Instrumentation & Control** Systems, **Control System** Orientation, Uninterruptible Power Supply (**UPS**) **Battery Charger**, **Industrial UPS Systems Construction & Operation**, **Test Lead-Acid & Ni-cad Battery Systems**, **Hazards & Safe Work Practice**s, **Transformer** Operational Principles, Selection & Troubleshooting; **HV & LV Transformers**, **Control Valves & Actuators**, **Electrical Safety**, **Protection Relay Application**, **Maintenance & Testing**, **NEC** (National Electrical Code), **NESC** (National Electrical Safety Code), **Electrical Safety**, **Electrical Hazards Assessment**, **Electrical Equipment**, **Personal Protective Equipment**, Lock-Out & Tag-Out (**LOTO**), Confined Workspaces, Alerting Techniques, Electrical Transient Analysis Program (**ETAP**), Power **Quality**, Power **Network**, Power **Distribution**, **Distribution Systems**, **Power Systems Control**, **Power Systems Security**, Power **Electronics**, Electrical **Substations**, **UPS** & **Battery System**, **Earthing & Grounding**, Power **Generation**, **Protective Systems**, **Electrical Generators**, **Power** & **Distribution Transformers**, **Electrical Motors**, **Switchgears**, **Transformers**, **AC** & **DC Drives**, **Variable Speed Drives** & **Generators**, **Generator Protection**, **GE Gas Turbines**, PLC, SCADA, DCS, Process Control, Control Systems & Data Communications, Instrumentation, Automation, Valve Tuning, SIS, SIL, ESD, Alarm Management Systems, Engine Management System, Bearing & Rotating Machine, Fieldbus Systems and Fiber Optics Technology. He is currently the **Systems Control Manager** of **Siemens** where he is in-charge of Security & Control of Power **Transmission Distribution** & **High Voltage** Systems and he further takes part in the Load Records Evaluation & Transmission Services Pricing.

During his career life, Dr. Ahmed has been actively involved in different Power System Activities including Roles in Power System Planning, Analysis, Engineering, **HV Substation** Design, Electrical Service Pricing, Evaluations & Tariffs, Project Management, Teaching and Consulting. His vast industrial experience was honed greatly when he joined many International and National Companies such as **Siemens**, **Electricity Authority** and **ACETO** industries as the **Instrumentation & Electrical Service Project Manager**, **Instrumentation & Control Engineer**, **Energy Management Engineer**, **Department Head**, **Assistant Professor**, **Instrumentation & Control Instructor**, **Project Coordinator**, **Project Assistant and Managing Board Member** where he focused more on dealing with Technology Transfer, System Integration Process and Improving Localization. He was further greatly involved in manufacturing some of **Power System** and **Control & Instrumentation Components** such as Series of Digital Protection **Relays**, MV **VFD**, **PLC** and **SCADA** System with intelligent features.

Dr. Ahmed is well-versed in different electrical and instrumentation fields like **ETAP**, Load Management Concepts, **PLC** Programming, Installation, Operation and Troubleshooting, **AC Drives** Theory, Application and Troubleshooting, Industrial Power Systems Analysis, AC & DC **Motors**, Electric Motor **Protection**, **DCS SCADA**, **Control** and Maintenance Techniques, Industrial Intelligent Control System, **Power Quality** Standards, Power Generators and Voltage Regulators, Circuit Breaker and Switchgear Application and Testing Techniques, **Transformer** and **Switchgear** Application, Grounding for Industrial and Commercial Assets, Power Quality and **Harmonics**, **Protective Relays** (O/C Protection, Line Differential, Bus Bar Protection and **Breaker Failure Relay**) and Project Management Basics (PMB).

Dr. Ahmed has **PhD**, **Master's** & **Bachelor's** degree in **Electrical Engineering** from the **University of Wisconsin Madison**, **USA** and **Ain Shams University**, respectively. Further, he is a **Certified Instructor/Trainer**, a **Certified Internal Verifier/ Assessor/Trainer** by the **Institute of Leadership and Management** (**ILM**), an active member of IEEE and ISA as well as numerous technical and scientific papers published internationally in the areas of Power Quality, Superconductive Magnetic Energy Storage, SMES role in Power Systems, Power System **Blackout** Analysis, and Intelligent Load Shedding Techniques for preventing Power System Blackouts, HV **Substation Automation** and Power System Stability. He has further 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 workshop for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

Day 1: Sunday, 08th of February 2026

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Overview of Electrical Transient Analysis*** *Definition and Importance of Transient Analysis in Power Systems • Types of Transients: Electromagnetic versus Electromechanical • Impact of Transients on Equipment and System Reliability • Typical Industrial and Utility Transient Scenarios*
0930 – 0945	*Break*
0945 – 1030	***Introduction to ETAP Software Environment*** *ETAP Architecture and Modular Structure • Navigation of ETAP Interface and Project Environment • Understanding Toolbars, Libraries, and Workspaces • Data Management and Project Configuration Basics*
1030 – 1130	***Power System Single-Line Diagram (SLD) Development*** *Creating and Organizing Single-Line Diagrams • Best Practices for Diagram Clarity and Hierarchy • Linking SLD Components with Analysis Modules • Common Modeling Errors and How to Avoid Them*
1130 – 1215	***System Base Values & Per Unit System*** *Concept of Per-Unit System in Transient Studies • Selection of Voltage, Power, and Current Bases • Base Conversion Techniques Across Voltage Levels • Importance of Consistent Base Values in ETAP*
1215 – 1230	*Break*
1230 – 1330	***Modeling of Power System Components*** *Generators, Motors, Transformers, and Transmission Lines • Lumped versus Distributed Parameter Modeling • Representation of Loads for Transient Analysis • Data Accuracy Requirements for Dynamic Simulations*

1330 – 1420	***Basics of Transient Stability Concepts*** *System Equilibrium and Disturbance Response • Rotor Angle, Speed, and Power-Angle Relationship • Stability Limits and System Operating Margins • Overview of Transient Stability Study Objectives*
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: Monday, 09th of February 2026

0730 – 0830	***Fundamentals of Short-Circuit Analysis*** *Purpose and Classification of Fault Studies • Symmetrical and Unsymmetrical Fault Types • Fault Current Behavior During Transients • Standards and Guidelines (IEC, ANSI, IEEE)*
0830 – 0930	***Short-Circuit Modeling in ETAP*** *Input Data Requirements for Short-Circuit Studies • Selection of Calculation Standards in ETAP • Modeling Source Impedance and Fault Locations • Validation of Short-Circuit Models*
0930 – 0945	*Break*
0945 – 1100	***Analysis of Fault Transients*** *DC Offset and Asymmetrical Fault Currents • Subtransient, Transient, and Steady-State Periods • X/R Ratio Impact on Transient Currents • Interpretation of Time-Domain Fault Waveforms*
1100 – 1215	***Switching Transients in Power Systems*** *Nature and Causes of Switching Transients • Energization and De-Energization of Equipment • Capacitor Bank and Reactor Switching Phenomena • Effects on Insulation and Protection Systems*
1215 – 1230	*Break*
1230 – 1330	***Circuit Breaker Switching Analysis*** *Circuit Breaker Operating Characteristics • Pre-Strike and Re-Strike Phenomena • Modeling Breaker Timing and Pole Dispersion • Evaluation of Switching Overvoltages*
1330 – 1420	***Mitigation of Switching Transients*** *Use of Pre-Insertion Resistors and Reactors • Controlled Switching Strategies • Surge Arresters and Snubber Circuits • Practical Mitigation Design Considerations*
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: Tuesday, 10th of February 2026

0730 – 0830	***Motor Starting Transient Phenomena*** *Electrical and Mechanical Effects During Motor Start • Inrush Current and Voltage Dip Characteristics • Impact on Upstream Equipment • Standards and Limits for Motor Starting*
0830 – 0930	***Motor Modeling in ETAP*** *Static versus Dynamic Motor Models • Induction and Synchronous Motor Representation • Input Parameters and Validation Checks • Load Torque and Inertia Modeling*
0930 – 0945	*Break*
0945 – 1100	***Motor Acceleration & Stability Analysis*** *Speed, Torque, and Current Profiles • Voltage Sensitivity During Acceleration • Stalling and Re-Acceleration Scenarios • Multiple Motor Starting Simulations*
1100 – 1215	***Load Transient Behavior*** *Sudden Load Addition and Load Rejection • Voltage and Frequency Response Analysis • Interaction Between Generators and Loads • System Recovery and Damping Effects*
1215 – 1230	*Break*
1230 – 1330	***Harmonic Transients*** *Sources of Harmonic Distortion • Harmonics During Transient Conditions • Interaction of Harmonics with System Resonance • Effects on Equipment and Protection Devices*
1330 – 1420	***Harmonic Analysis Integration with Transients*** *Harmonic Modeling in ETAP • Frequency Scan and Resonance Identification • Transient-Harmonic Interaction Assessment • Harmonic Mitigation Techniques Overview*
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: Wednesday, 11th of February 2026

0730 – 0830	***Transient Stability Theory*** *Power-Angle Curve and Equal Area Criterion • Critical Clearing Angle and Time • Generator Rotor Dynamics • Stability Classification: Stable versus Unstable*
0830 – 0930	***Generator Dynamic Modeling in ETAP*** *Synchronous Generator Models and Parameters • Excitation Systems and AVR Modeling • Turbine-Governor Representation • Impact of Controls on Transient Stability*
0930 – 0945	*Break*
0945 – 1100	***Disturbance Scenarios for Stability Studies*** *Three-Phase and Unbalanced Faults • Generator Tripping and Line Outages • Sudden Load Changes • Islanding and Re-Synchronization Events*
1100 – 1215	***Protection System Impact on Transients*** *Relay Operating Times and Coordination • Circuit Breaker Clearing Sequences • Protection Miscoordination Effects • Role of Fast Protection in System Stability*

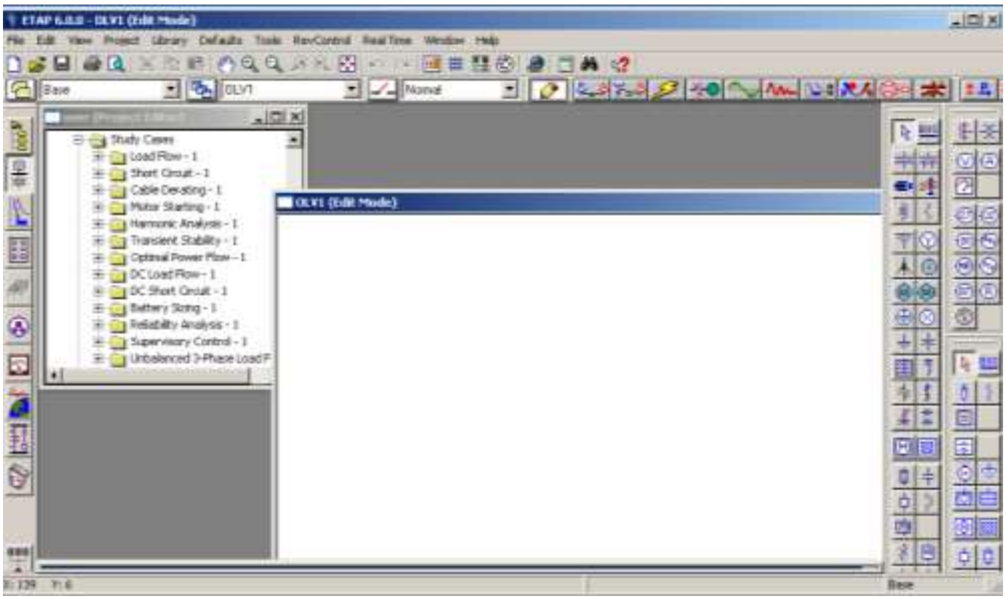
1215 – 1230	Break
1230 – 1330	***Transient Stability Simulation in ETAP*** *Setting Up Transient Stability Cases • Time-Step Selection and Simulation Duration • Monitoring System Variables • Result Visualization and Animation*
1330 – 1420	***Interpretation of Stability Results*** *Rotor Angle, Frequency, and Voltage Plots • Identification of Unstable Conditions • Sensitivity Analysis of Clearing Times • Engineering Judgment and Corrective Actions*
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: Thursday, 12th of February 2026

0730 – 0830	***Lightning & Surge Transient Analysis*** *Nature of Lightning-Induced Transients • Modeling Lightning Surges in ETAP • Traveling Waves and Reflection Phenomena • Equipment Insulation Coordination*
0830 – 0930	***Grounding & Earthing Transients*** *Ground Potential Rise (GPR) During Faults • Impact of Grounding on Transient Behavior • Modeling Grounding Systems in ETAP • Safety Considerations for Personnel and Equipment*
0930 – 0945	Break
0945 – 1100	***Insulation Coordination & Overvoltage Protection*** *Temporary versus Transient Overvoltages • Selection of Surge Arresters • Coordination Between Insulation Levels • Practical Design Guidelines*
1100 – 1215	***Advanced Switching & Control Scenarios*** *Controlled Switching Applications • Auto-Reclosing Transient Effects • Synchronization and Out-of-Phase Switching • Grid-Code Compliance Considerations*
1215 – 1230	Break
1230 – 1345	***Industrial Case Studies Using ETAP*** *Oil & Gas Plant Transient Scenarios • Utility Substation Switching Events • Motor Starting in Large Industrial Facilities • Lessons Learned from Real-World Failures*
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

Simulators (Hands-on Practical Sessions)

Practical session 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 the simulator ETAP Software.



ETAP Software Simulator

Course Coordinator

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