COURSE OVERVIEW EE0669
AVR Concept & Troubleshooting

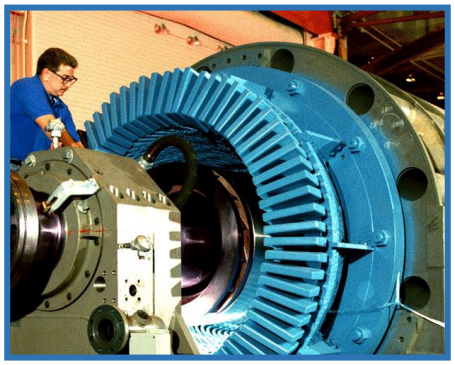
Course Title
AVR Concept & Troubleshooting

Course Date/Venue
July 14-18, 2025/Glasshouse Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

Course Reference
EE0669

Course Duration/Credits
Five days/3.0 CEUs/30 PDHs

Course Description



This practical and highly-interactive course includes real-life case studies and exercises where participants will be engaged in a series of interactive small groups and class workshops.

Utilities are required to provide power to their customers within a specific range of voltage. Voltages that are outside of that range may damage equipment or cause it to operate inefficiently. For example, voltage that is significantly lower than the desired range may cause lights to dim and motors to burn out.

Voltage that is significantly higher may cause lights or appliances to fail prematurely. In an ideal AC power system, the voltage and frequency at every supply point would be constant and free of harmonics, and the power factor would be unity. In particular, these parameters would be independent of the size and characteristics of consumers' load.

In an ideal system, each load could be designed for optimum performance at the given supply voltage, rather than for merely adequate performance over an unpredictable range of voltage.

Moreover, there could be no interference between different loads as a result of variations in the current taken by each one. During this course, participants will be able to describe why voltage regulation is needed in a transmission and distribution system, explain the effect of raising voltage at the substation bus, identify the main components of automatic voltage regulator, identify the principle of operation of the auto re-closure, explain the typical locations of auto-re-closure on the distribution system, identify the advantages of installing auto-re-closures on the distribution system, describe how a sectionalize operates in a re-closure circuit and describe how an automatic voltage regulator adjusts voltage.

This course is designed to provide participants with a detailed and up-to-date overview of automatic voltage regulator (AVR) operation and maintenance. It covers the AVR dynamics, AVR communication systems and interface-hardware and software, the construction and function; the auto reclosure and voltage regulators operation procedures; the circuit breakers gas turbine combustion; and the voltage regulators inspection and solid fuels control gasification.

During this interactive course, participants will learn the operating mechanisms for auto re-closers; the regulator replacement; the trouble analysis procedure, common trouble and remedial actions; the supervisory-local-remote control circuits of circuit breakers; the secondary wiring of control circuit; and the commissioning, operation, troubleshooting and maintenance of AVR.

Course Objectives

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

- Apply and gain an in-depth knowledge on automatic voltage regulator (AVR) operation and maintenance
- Discuss AVR dynamics, AVR communication systems and interface-hardware and software
- Identify construction and function and carryout operation procedures for auto re-closure and voltage regulators
- Recognize circuit breakers gas turbine combustion and employ voltage regulators inspection and control gasification of solid fuels
- Apply operating mechanisms for auto re-closures and regulator replacement
- Carryout trouble analysis procedure and identify common trouble and remedial actions
- Recognize supervisory-local-remote control circuits of circuit breakers and secondary wiring of control circuit
- Commission, operate, troubleshoot and maintain AVR in a professional manner

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 AVR operation and maintenance for electrical power engineers, supervisors and qualified distribution system technicians can which work in substation and operation and maintenance of distribution department take part in this course.

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. Pan Marave, PE, MSc, BEng, is a **Senior Electrical & Instrumentation Engineer** with over **30 years** of extensive experience in **Oil**, **Gas**, **Petrochemical**, **Refinery** & **Power** industries. His expertise includes **Circuit Breaker**, **HV Switchgear Maintenance**, **HV/LV Electrical** Authorisation, Basic **Electricity**, **Electrical & Special Hazards**, **Personnel Protection**, **HV/LV Equipment**, **Motor Controllers**, **Electrical Switching** Practices, **Emergency Planning**, **Safety Management**, Safety Instrumented Systems (**SIS**), Safety Integrity Level (**SIL**), Emergency Shutdown (**ESD**); **DCS**, **SCADA** & **PLC**; **Measurement** (**Flow**, **Temperature**, **Pressure**); **Process Analyzers** & **Analytical Instrumentation**; **Process Control**, **Instrumentation** & **Safeguarding**; **Process Controller**, **Control Loop & Valve Tuning**; Industrial **Distribution Systems**; Industrial **Control & Control Systems**, Power Systems **Protection & Relaying**; **Earthing**, **Bonding**, **Grounding**, **Lightning & Surge Protection**; Electric Power **Substation** & **Systems**; Electrical Engineering Principles; **Motor Control Circuit**; **Electrical Fault Analysis**; Electrical Networks & Distribution **Cables**; **Circuit Breakers**, **Switchgears**, **Transformers**, **Hazardous Areas Classification** and **Detailed Engineering Drawings**, **Codes** & **Standards**. Furthermore, he is also well-versed in Microprocessors Structure, Lead Auditor (**ISO 9000:2000**), **ISO 9002**, Quality Assurance, and Projects & Contracts Management.

Presently, Mr. Marave is the **Technical Advisor** of **Chamber of Industry & Commerce** in Greece. Prior to this, he gained his thorough practical experience through several positions as the **Technical Instructor**, **Engineering Manager**, **Electronics & Instruments Head**, **Electrical**, **Electronics & Instruments Maintenance Superintendent**, **Assistant General Technical Manager** and **Engineering Supervisor** of various international companies such as the **Alumil** Mylonas, **Athens Papermill**, **Astropol** and the **Science Technical Education**.

Mr. Marave is a **Registered Professional Engineer** and has **Master** and **Bachelor** degrees in **Electrical Engineering** from the **Polytechnic Institute of New York** and **Pratt Institute of New York** (**USA**) respectively. Further, he is a **Certified Instructor/Trainer**, a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership & Management** (**ILM**) and an active member of the **Technical Chamber** and the Institute of Electrical and Electronics Engineer (**IEEE**) in Greece. He has presented and delivered **numerous international** courses, conferences, trainings and workshops worldwide.

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 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: ***Monday, 14th of July 2025***

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0915	***AVR Overview***
0915 – 0930	*Break*
0930 – 1100	***AVR Dynamics***
1100 – 1230	***AVR Communication Systems***
1230 – 1245	*Break*
1245 – 1420	***Interface-Hardware & Software***
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2: ***Tuesday, 15th of July 2025***

0730 – 0915	***Construction & Function***
0915 – 0930	*Break*
0930 – 1100	***Operation Procedures: Auto Re-Closure, Voltage Regulators***
1100 – 1230	***Circuit Breakers Gas Turbine Combustion***
1230 – 1245	*Break*
1245 – 1420	***Voltage Regulators Inspection & Control Gasification of Solid Fuels***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3:	Wednesday, 16th of July 2025
0730 – 0900	***Operating Mechanisms for Auto Re-Closers***
0900 – 0915	*Break*
0915 – 1100	***Regulator Replacement***
1100 – 1245	***The Procedure of Trouble Analysis***
1245 – 1300	*Break*
1300 – 1420	***Common Trouble & Remedial Actions***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4:	Thursday, 17th of July 2025
0730 – 0900	***Supervisory-Local-Remote Control Circuits of C.B.***
0900 – 0915	*Break*
0915 – 1100	***Secondary Wiring of Control Circuit***
1100 – 1230	***Commissioning***
1230 – 1245	*Break*
1245 – 1420	***Commissioning (cont'd)***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5:	Thursday, 18th of July 2025
0730 – 0900	***Operation***
0900 – 0915	*Break*
0915 – 1100	***Troubleshooting***
1100 – 1230	***Maintenance***
1230 – 1245	*Break*
1245 – 1345	***Maintenance (cont'd)***
1345 – 1400	***POST-TEST***
1400 – 1415	***Course Conclusion***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Practical Sessions

This practical and highly-interactive course includes real-life case studies and exercises:-

Course Coordinator

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