

COURSE OVERVIEW EE0416
Induction Motors - Basics

Course Title

Induction Motors – Basics

Course Date/Venue

Session 1: July 13-17, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE

Session 2: December 15-19, 2025/Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE



Course Reference

EE0416



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 AC Induction Motor Troubleshooting. It covers the basic principles of AC induction motors and the common problems that occur with AC induction motors; the troubleshooting techniques and overvoltage and undervoltage protection; the power supply issues, power quality issues, voltage drops and phase imbalances; the motor circuit issues, motor circuit faults, protection systems for motor circuits and motor starter failures; and the mechanical issues, bearing failures, shaft misalignment and excessive vibration.

During this course, participants will learn the rotor bar and end-ring failures, rotor eccentricity and broken rotor bars; the stator winding failures, insulation breakdown and core failures; the control system issues and faults in the motor control system; the control system troubleshooting techniques; the thermal issues covering overheating, insufficient cooling and thermal overload protection; the miscellaneous issues comprising of environmental factors, electrical noise and load-related issues; and the common AC induction motor problems and solutions.

Course Objectives

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

- Apply and gain an in-depth knowledge on AC induction motor troubleshooting
- Discuss the basic principles of AC induction motors and the common problems that occur with AC induction motors
- Carryout troubleshooting techniques and overvoltage and undervoltage protection
- Identify power supply issues, power quality issues, voltage drops and phase imbalances
- Recognize motor circuit issues, motor circuit faults, protection systems for motor circuits and motor starter failures
- Determine mechanical issues, bearing failures, shaft misalignment and excessive vibration
- Identify rotor bar and end-ring failures, rotor eccentricity broken rotor bars, stator winding failures, insulation breakdown and core failures
- Recognize control system issues and faults in the motor control system as well as apply control system troubleshooting
- Explain thermal issues covering overheating, insufficient cooling and thermal overload protection
- Discuss miscellaneous issues comprising of environmental factors, electrical noise and load-related issues
- Identify the common AC induction motor problems and solutions

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 AC induction motor troubleshooting for all managers, supervisors, electrical engineers, automation or controls technicians, industrial maintenance technicians, motor technicians and electricians.

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: -

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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.

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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 **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.

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. However, we have the right to change the course instructor prior to the course date and inform participants accordingly:



Mr. Grant Stead, is a **Senior Electromechanical Engineer** with over **35 years** of integrated industrial experience and academic experience within **Power & Water Utilities** and Other **Energy Sectors**. His wide expertise includes **Power System Equipment, Electric Power System Operation, Fundamentals of Power System Equipments & Stability, Power System Planning & Economics, Electrical Power Instruments & Control System, Power Flow Analysis** of Electrical Power Systems, **Power System Generation and Distribution, UPS & Battery Operation & Maintenance, UPS Classification, Online & Off-line UPS Operation, UPS Battery Features, Battery Charger, UPS System Application, UPS Parallel Operation & Strategies, UPS System Performance Evaluation, Control Loop Strategies, UPS Converters & Inverters, UPS & Battery Charger Systems, Battery Chargers Construction & Troubleshooting, Battery Design & Operation, Battery Charger & UPS System Prevention Maintenance, Circuit Breakers & Switchgears, Electricity & Electrical Codes, Electrical Installations, Electric Motors, Maintenance, Grounding and Safety** for Electrical Power Substation, **Electrical Generator & Power Transformer, Electrical Power System Protection Relays, Hydraulics & Fluid Mechanics, Engineering Services, Electrotechnology, Fitting & Machining, Airconditioning Repair & Maintenance, Trenching Machines, Compressors and Diesel Engines**. He is also well-versed in Occupational Safety, Coaching & Mentoring, Project Management, Human Resources Management, Procurement Skills, Finance & Infrastructure Maintenance, Health & Safety and Quality Control, Time Management, Leadership and Management Skills, Supervising & Treambuilding Skills, Seven Habits of Highly Effective People, MS Office, Performance Manager, Budgeting & Financial Control and Presentation Skills. Currently, he is the **Operations Manager** of Damelin College wherein he manages the accredited learnership courses as per the required standards by the Sector Education and Training Authority (SETA) ensuring the proper assessment and moderation of all assessments.

During his career life, Mr. Stead worked with several prestigious companies and institutions occupying numerous challenging management and technical positions such as being the **Engineering Manager, Plant Maintenance Engineer, Operations Manager, Maintenance Planner, Maintenance Manager, Reliability Engineer** and **Maintenance Supervisor** for various international companies and institution.

Mr. Stead has a **Bachelor's** degree in **Mechanical Engineering**. Further, he is a **Certified Instructor/Trainer**, a Registered in South African Council for Education (**SACE**) and a **Certified Assessor & Moderator** with the Education Training & Development Practices Sector Education & Training Authority (**ETDP SETA**). He has further delivered numerous trainings, courses, workshops, seminars 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	Introduction to AC Induction Motor Troubleshooting Basic Principles of AC Induction Motors • Common Problems that Occur with AC Induction Motors • Troubleshooting Techniques
0930 - 0945	Break
0945 – 1100	Power Supply Issues Power Quality Issues • Overvoltage & Undervoltage Protection • Voltage Drops & Phase Imbalances
1100 – 1215	Motor Circuit Issues Motor Circuit Faults • Protection Systems for Motor Circuits • Motor Starter Failures
1215 – 1230	Break
1230 – 1420	Mechanical Issues Bearing Failures • Shaft Misalignment •
1420 – 1430	Recap
1430	Lunch & End of Day One

Day 2

0730 - 0930	Mechanical Issues (cont'd) Excessive Vibration
0930 - 0945	Break
0945 – 1100	Rotor Issues Rotor Bar & End-Ring Failures • Rotor Eccentricity
1100 - 1215	Rotor Issues (cont'd) Broken Rotor Bars
1215 – 1230	Break
1230 - 1420	Stator Issues Stator Winding Failures • Insulation Breakdown •
1420 - 1430	Recap
1430	Lunch & End of Day Two



Day 3

0730 - 0930	Stator Issues (cont'd) Core Failures
0930 - 0945	Break
0945 - 1100	Control System Issues Faults in the Motor Control System •
1100 - 1215	Control System Issues (cont'd) Control System Troubleshooting Techniques
1215 - 1230	Break
1230 - 1420	Control System Issues (cont'd) Control System Protection Devices
1420 - 1430	Recap
1430	Lunch & End of Day Three

Day 4

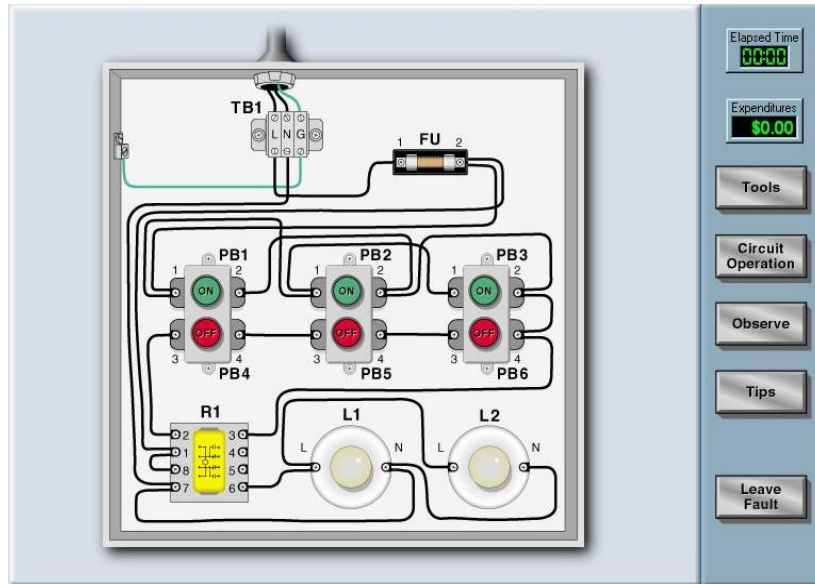
0730 - 0930	Thermal Issues Overheating
0930 - 0945	Break
0945 - 1100	Thermal Issues (cont'd) Insufficient Cooling
1100 - 1215	Thermal Issues (cont'd) Thermal Overload Protection
1215 - 1230	Break
1230 - 1420	Miscellaneous Issues Environmental Factors
1420 - 1430	Recap
1430	Lunch & End of Day Four

Day 5

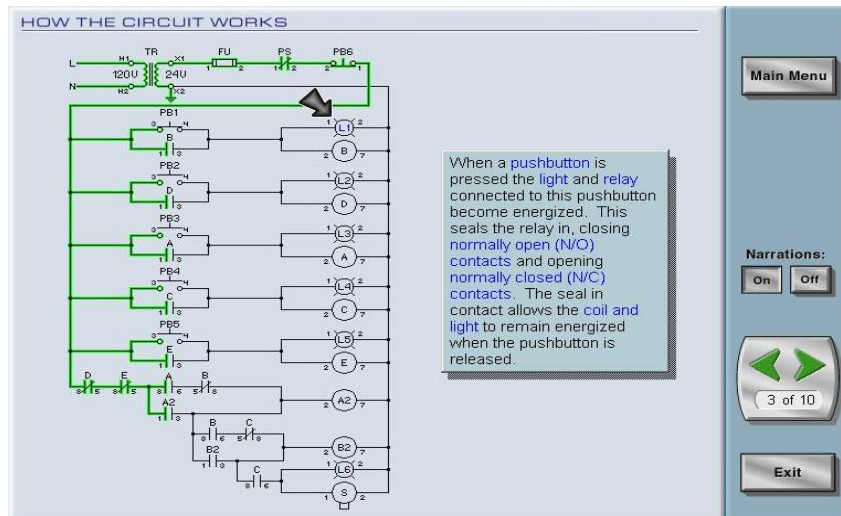
0730 - 0930	Miscellaneous Issues Electrical Noise
0930 - 0945	Break
0945 - 1045	Miscellaneous Issues (cont'd) Load-Related Issues
1045 - 1215	Wrap-Up & Review Review of Troubleshooting Techniques
1215 - 1230	Break
1230 - 1345	Wrap-Up & Review (cont'd) Common AC Induction Motor Problems & Solutions
1345 - 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 “Haward Troubleshooting”.



Basic Techniques



Basic Control Circuits



Motor Control Techniques

Course Coordinator

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