# COURSE OVERVIEW EE0203

# Electrical Control Circuits & Equipment

*Applications & Troubleshooting (Practical Approach)*

**Course Title**

Electrical Control Circuits & Equipment: *Applications & Troubleshooting (Practical Approach)*


**Course Date/Venue**

June 23-27, 2019/Bateen Meeting Room, Crowne Plaza Abu Dhabi Hotel, Abu Dhabi, UAE

**Course Reference**

EE0203

**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.***

This course is designed to provide delegates with detailed and up-to-date overview of electrical control circuit and equipment including its practical approach and proper application and troubleshooting. It covers the electrical and control symbols, schematics, wiring diagrams, system design and documentation. The course will also discuss earthing and bonding; relay logic circuits 1 & 2; operation of electromagnetic relays; and PLC hardware components.

The course will further cover the PLC programming; electrical motor control circuits; control panels and MCC; electrical control applications; the importance of protection; zones of protection; and the various types of relays.

At the completion of the course, participants will be able to troubleshoot electrical control circuits and equipment as well as use safety procedures and practices in a professional manner.

## Course Objectives

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

- Apply and gain a basic knowledge on the application and troubleshooting of electrical control circuits, design and equipment
- Identify electrical and control symbols as well as discuss schematics, wiring diagrams, system design and documentation
- Define earthing and bonding and explain relay logic circuits 1 & 2
- Carryout operation of electromagnetic relays and list PLC hardware components
- Discuss introduction to PLC programming and recognize electrical motor control circuits, control panels and MCC and explain electrical control applications
- Recognize the importance of protection and get a handle on a fault
- List the zones of protection and identify the types of relays
- Troubleshoot electrical control circuits and equipment in a professional manner
- Use safety procedures and practices

## 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, sample video clips of the instructor's actual lectures & practical sessions during the course conveniently saved in a **Tablet PC**.*

## Who Should Attend

This course provides an overview of all significant aspects and considerations of electrical control circuits and equipment for electrical, instrumentation and control engineers and other technical staff who are involved in the design, engineering, operation, maintenance and control of the electric power system and for those interested in obtaining a working knowledge and skill on troubleshooting electrical equipment and control circuits.

## 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:-

- 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.

- 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 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 Engineer** with over **25 years** of **Onshore** & **Offshore** experience within the **Oil** & **Gas** and **Power** industries. His wide expertise covers **Electrical Motors & Variable Speed Drives**, **Motor** Speed Control, Power Electronic Converters, 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** and has delivered numerous trainings, seminars, courses, workshops and conferences internationally.

## Course Fee

US$ 5,500 per Delegate + **5% 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:*** ***Sunday, 23rd of June 2019***

| | |
|---|---|
| *0730 – 0800* | *Registration & Coffee* |
| *0800 – 0815* | *Welcome & Introduction* |
| *0815 – 0830* | ***PRE-TEST*** |
| *0830 – 0930* | ***Identification of Electrical and Control Symbols***<br>*Elementary Diagrams ● Phasing ● Polarity* |
| *0930 - 0945* | *Break* |
| *0945 – 1100* | ***Schematics and Wiring Diagrams*** |
| *1100 – 1215* | ***System Design and Documentation***<br>*Wiring Regulations* |
| *1215 – 1230* | *Break* |
| *1230 - 1420* | ***Earthing and Bonding*** |
| *1420 - 1430* | ***Recap*** |
| *1430* | *Lunch & End of Day One* |

***Day 2:*** ***Monday, 24th of June 2019***

| | |
|---|---|
| *0730 – 0930* | ***Relay Logic Circuit – 1***<br>*Timing Relays ● Line Ladder Diagrams* |
| *0930 - 0945* | *Break* |
| *0945 – 1100* | ***Relay Logic Circuit – 2***<br>*Operation of Various Contacting Devices ● Operation of Solenoids Relating to Switch Devices* |
| *1100 – 1215* | ***Operation of Electromagnetic Relays*** |
| *1215 – 1230* | *Break* |
| *1230 - 1420* | ***PLC Hardware Components*** |
| *1420 - 1430* | ***Recap*** |
| *1430* | *Lunch & End of Day Two* |

***Day 3:*** ***Tuesday, 25th of June 2019***

| | |
|---|---|
| *0730 – 0930* | ***Introduction to PLC Programming*** |
| *0930 - 0945* | *Break* |
| *0945 – 1100* | ***Electrical Motor Control Circuits*** |
| *1100 – 1215* | ***Control Panels and MCC*** |
| *1215 – 1230* | *Break* |
| *1230 - 1420* | ***Electrical Control Applications*** |
| *1420 - 1430* | ***Recap*** |
| *1430* | *Lunch & End of Day Three* |

**Day 4: Wednesday, 26th of June 2019**

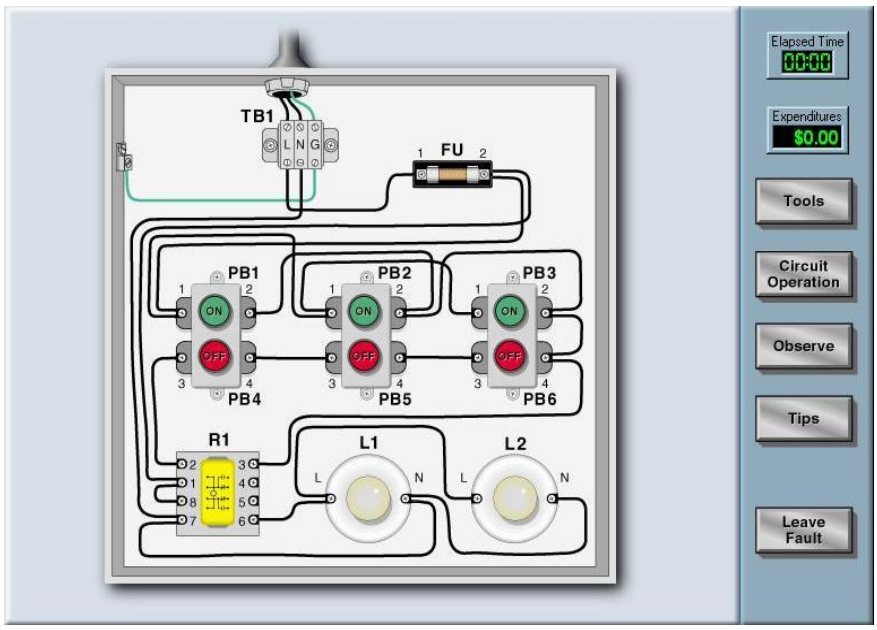
| | |
|---|---|
| 0730 – 0930 | ***Importance of Protection*** |
| 0930 - 0945 | *Break* |
| 0945 – 1100 | ***Getting a Handle on a Fault*** |
| 1100 – 1215 | ***Zones of Protection*** |
| 1215 – 1230 | *Break* |
| 1230 - 1420 | ***Types of Relays*** |
| 1420 - 1430 | ***Recap*** |
| 1430 | *Lunch & End of Day Four* |

**Day 5: Thursday, 27th of June 2019**

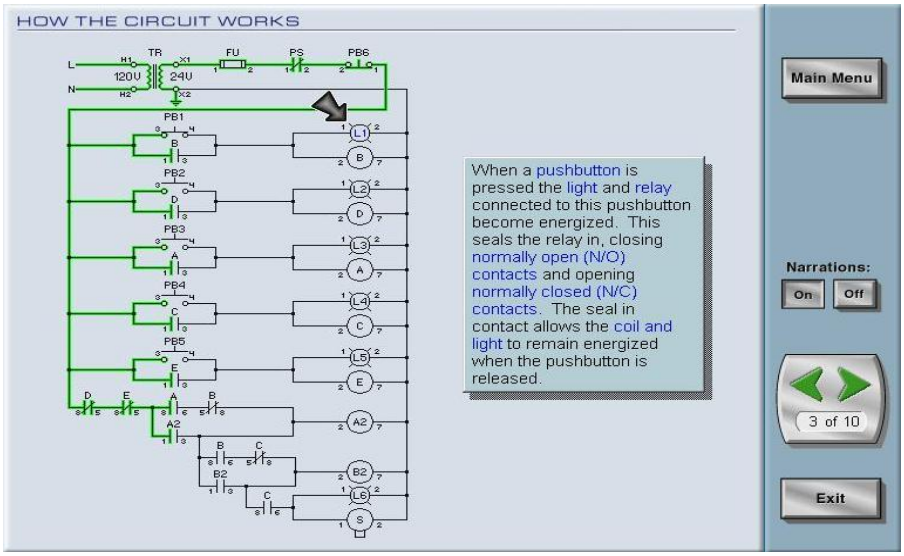
| | |
|---|---|
| 0730 – 0930 | ***Troubleshoot of Electrical Circuits*** |
| 0930 - 0945 | *Break* |
| 0945 – 1100 | ***Troubleshoot Control Circuits*** |
| 1100 – 1215 | ***Safety Procedures and Practices*** |
| 1215 – 1230 | *Break* |
| 1230 - 1345 | ***Safety Procedures and Practices (cont'd)*** |
| 1345 - 1400 | ***Course Conclusion*** |
| 1400 - 1415 | ***POST-TEST*** |
| 1415 - 1430 | *Presentation of Course Certificates* |
| 1430 | *Lunch & End of Course* |

## Simulator (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 simulator "Troubleshooting Electrical Circuits V4.1".




**Basic Techniques**




**Basic Control Circuits**


**Motor Control Techniques**

## Course Coordinator

Cristy Mamisay, Tel: +971 2 30 91 714, Fax: +971 2 30 91 716, Email: cristy@haward.org