COURSE OVERVIEW IE0172

Building Management System (BMS) - Principles & Practices

Course Title

Building Management System (BMS) - Principles & Practices

Course Date/Venue

Session 1: May 04-08, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE

Session 2: October 13-17, 2025/Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

Course Reference

IE0172

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.

This course is designed to provide participants with a detailed and up-to-date overview of Building Management System (BMS) - Principles & Practices. It covers the components and architecture of BMS and its role in energy efficiency and sustainability; the sensors, controllers and processors, actuators and user interface for monitoring and control; the BMS communication protocols and functions and automated processes; the basics of heating, ventilation, and air conditioning (HVAC), smart lighting technologies and fire detection and alarm integration; managing building access, CCTV monitoring and integration, intrusion detection and alarm systems; monitoring power consumption in real-time; and the load management and peak shaving techniques.

Further, the course will also discuss the water consumption and leak detection, control pumps and irrigation systems, rainwater harvesting integration and optimizing water usage for sustainability; the BMS installation, system architecture design and setting up sensors, controllers, and actuators; the communication network setup and testing; the HVAC, lighting, and security systems and ensuring compatibility across communication protocols; creating automation sequences for building operations, configuring alarms and notifications and developing schedules for lighting and HVAC systems; and testing and troubleshooting automation scripts.

During this interactive course, participants will learn the monitoring and analysis of data and preventive maintenance; the system troubleshooting and system optimization; the potential security threats and network security measures; conducting regulatory compliance and audits; the role of IoT in enhancing including artificial intelligence in BMS; incorporating solar panels and wind turbines; managing battery storage and energy distribution and net metering and grid integration; setting benchmarks for energy and operational efficiency; and comparing performance across buildings and identifying areas for improvement.

Course Objectives

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

- Apply and gain in-depth knowledge on the principles and practices of building management system (BMS)
- Discuss the components and architecture of BMS and its role in energy efficiency and sustainability
- Identify sensors, controllers and processors, actuators and user interface for monitoring and control
- Recognize BMS communication protocols, functions and automated processes
- Discuss BMS standards and regulations covering ISO standards, energy performance standards and health and safety regulations in building automation
- Explain the basics of heating, ventilation, and air conditioning (HVAC), smart lighting technologies and fire detection and alarm integration
- Manage building access, CCTV monitoring and integration, intrusion detection and alarm systems
- Monitor power consumption in real-time and apply load management and peak shaving techniques
- Monitor water consumption and leak detection, control pumps and irrigation systems, apply rainwater harvesting integration and optimize water usage for sustainability
- Plan a BMS installation, illustrate system architecture design, set up sensors, controllers, and actuators and apply communication network setup and testing
- Integrate HVAC, lighting, and security systems and ensure compatibility across communication protocols
- Create automation sequences for building operations, configure alarms and notifications, develop schedules for lighting and HVAC systems and test and troubleshoot automation scripts
- Monitor and analyze data and apply preventive maintenance, system troubleshooting, and system optimization
- Identify potential security threats and implement network security measures
- Conduct regulatory compliance and audits and discuss the role of IoT in enhancing including artificial intelligence in BMS

- Incorporate solar panels and wind turbines, manage battery storage and energy distribution and apply net metering and grid integration
- Set benchmarks for energy and operational efficiency, compare performance across buildings and identify areas for improvement

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 The Principles & Practices of Building Management System (BMS) for facility managers, building engineers, BMS technicians/operators, design engineers, energy managers, consultants, project managers, safety and security personnel, students and recent graduates, building owners and developers and those who involved in the design, operation, or maintenance of building systems.

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 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: -

- 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.

- 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 **35 years** of extensive experience in the **Oil**, **Gas**, **Power**, **Petroleum**, **Petrochemical** and **Water** & **Utilities**. He specializes in **Building Management System**, **Energy Management Systems**, **Water Management Systems**, **Fire Alarm & Safety Systems**, **Fire Fighting** System Instrumentations, **Fire Protection** System, **Fire & Gas Detection** & Alarm System, **Instrumentation Protection Devices** Maintenance & Testing, **Protection Devices** Troubleshooting, Water **Meter Calibration**, Liquid & Gas Flowmetering & **Meter Calibration**, **Testing & Calibration of Energy Meters**, **DCS & ESD** System Architecture, **Distributed Control System**, **DCS** & **SCADA**, Distributed Control System (**DCS**) Selection & Troubleshooting, Advanced **DCS Yokogawa**, **Yokogawa CENTUM VP DCS**, **Modern Distributed Control System** (**DCS**) **& Process Instrumentation**, **Cyber Security** of Industrial System, **DCS System** (**Honeywell**), **DCS Experion** System, **DCS Siemens Telepherm XP**, **Relay Coordination Using ETAP Software**, **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 Practices**, **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**, **Load Forecasting**, 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, **Energy** Management System, 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**, **Fire Protection 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.

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 – 0900	***Overview of Building Management Systems*** *Definition & Purpose of BMS • Components & Architecture of BMS • Advantages of Implementing BMS in Modern Buildings • Role of BMS in Energy Efficiency & Sustainability*
0900 - 0930	***BMS Core Components*** *Sensors & their Role in Data Collection • Controllers & Processors in BMS • Actuators & their Functions • User Interface (HMI/SCADA) for Monitoring & Control*
0930 – 0945	*Break*
0945 – 1130	***BMS Communication Protocols*** *BACnet: Overview & Applications • Modbus: Basics & Integration with BMS • KNX: Benefits & Limitations • LonWorks: Features & Use Cases*
1130 – 1230	***Functions of BMS*** *HVAC System Monitoring & Control • Lighting Management & Automation • Fire & Safety System Integration • Energy Monitoring & Reporting*
1230 – 1245	*Break*
1245 – 1345	***Basics of Automation in BMS*** *Understanding Automated Processes • Role of Artificial Intelligence in BMS • Real-Time Monitoring & Decision-Making • Enhancing Occupant Comfort & Operational Efficiency*
1345 – 1420	***BMS Standards & Regulations*** *ISO Standards Related to BMS • Energy Performance Standards • Health & Safety Regulations in Building Automation • Compliance with Green Building Certifications (LEED, BREEAM)*
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

0730 – 0900	***HVAC Systems in BMS*** *Basics of Heating, Ventilation, & Air Conditioning • Integration of HVAC with BMS • Temperature & Humidity Control Strategies • Maintenance of HVAC Systems through BMS*
0900 – 0930	***Lighting Control Systems*** *Smart Lighting Technologies • Automated Dimming & Daylight Harvesting • Motion Sensors & Occupancy Detection • Scheduling & Energy Optimization*
0930 – 0945	*Break*

0945– 1130	***Fire Alarm & Safety Systems*** *Fire Detection & Alarm Integration • Monitoring Fire Suppression Systems • Emergency Lighting & Evacuation Control • Real-Time Alerts & Response Coordination*
1130 – 1230	***Access Control & Security*** *Role of BMS in Managing Building Access • CCTV Monitoring & Integration • Intrusion Detection & Alarm Systems • Visitor Management & Reporting*
1230 – 1245	*Break*
1245 – 1345	***Energy Management Systems*** *Monitoring Power Consumption in Real-Time • Load Management & Peak Shaving Techniques • Integration of Renewable Energy Sources • Reporting & Analytics for Energy Performance*
1345 – 1420	***Water Management Systems*** *Monitoring Water Consumption & Leak Detection • Control of Pumps & Irrigation Systems • Rainwater Harvesting Integration • Optimizing Water Usage for Sustainability*
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

0730 – 0830	***Planning a BMS Installation*** *Assessing Building Requirements • Identifying System Goals & Key Performance Indicators • Stakeholder Involvement in the Planning Phase • Budgeting & Cost Considerations*
0830 - 0930	***System Architecture Design*** *Centralized versus Distributed BMS Architecture • Choosing Hardware & Software Components • Scalability & Flexibility of System Design • Integration with Existing Building Systems*
0930 – 0945	*Break*
0945 – 1130	***Installation & Commissioning*** *Setting up Sensors, Controllers, & Actuators • Communication Network Setup & Testing • Software Installation & Programming • Commissioning & Validation of the BMS*
1130 – 1230	***Integration of Subsystems*** *Integrating HVAC, Lighting, & Security Systems • Ensuring Compatibility Across Communication Protocols • Configuring Data Sharing Between Subsystems • Overcoming Challenges in Integration*
1230 – 1245	*Break*

1245 – 1345	***System Programming & Automation*** *Creating Automation Sequences for Building Operations • Configuring Alarms & Notifications • Developing Schedules for Lighting & HVAC Systems • Testing & Troubleshooting Automation Scripts*
1345 – 1420	***Training & Handover*** *Training Building Staff on BMS Usage • Documentation of System Operations • Handover of System Control & Responsibilities • Post-Installation Support & Maintenance*
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

0730 – 0830	***Monitoring & Analyzing Data*** *Real-Time Data Visualization on Dashboards • Trend Analysis & Performance Tracking • Identifying Anomalies & Inefficiencies • Generating Periodic Reports*
0830 – 0930	***Preventive Maintenance*** *Scheduling Regular Inspections for Sensors & Controllers • Ensuring Proper Calibration of Devices • Identifying Wear & Tear in Components • Avoiding Downtime through Predictive Maintenance*
0930 – 0945	*Break*
0945 – 1130	***System Troubleshooting*** *Common Issues in BMS Operations • Diagnosing Communication Errors • Resolving Actuator & Sensor Failures • Reprogramming Automation Sequences*
1130 – 1230	***System Optimization*** *Fine-Tuning Automation for Energy Savings • Updating Schedules Based on Building Occupancy • Using Analytics for Continuous Improvement • Upgrading Hardware & Software Components*
1230 – 1245	*Break*
1245 – 1345	***Cybersecurity in BMS*** *Identifying Potential Security Threats • Implementing Network Security Measures • Regularly Updating Firmware & Software • Training Staff on Cybersecurity Best Practices*
1345 – 1420	***Regulatory Compliance & Audits*** *Conducting Internal BMS Audits • Ensuring Compliance with Energy & Safety Regulations • Preparing for Third-Party Inspections • Documenting Improvements & Updates*
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

0730 – 0830	***Smart Buildings & IoT*** *Role of IoT in Enhancing BMS Capabilities • Integration with Smart Appliances & Devices • Predictive Analytics through IoT Sensors • Cloud-Based BMS Platforms*
0830 – 0930	***Artificial Intelligence in BMS*** *AI-Driven Predictive Maintenance • Smart Scheduling using Machine Learning • Energy Optimization through AI Algorithms • Enhancing Occupant Comfort with AI Insights*
0930 – 0945	*Break*
0945 – 1230	***Integration with Renewable Energy*** *Incorporating Solar Panels & Wind Turbines • Managing Battery Storage & Energy Distribution • Net Metering & Grid Integration • Benefits of Renewable Energy in BMS*
1230 – 1245	*Break*
1245 – 1315	***Building Performance Benchmarking*** *Setting Benchmarks for Energy & Operational Efficiency • Comparing Performance across Buildings • Identifying Areas for Improvement • Reporting Results to Stakeholders*
1315 - 1345	***Case Studies and Real-World Applications*** *Successful BMS Implementations in Commercial Buildings • Challenges Faced & Solutions Implemented • Lessons Learned from Real-World Projects • Discussion on Emerging Best Practices*
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*

Practical Sessions

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

Course Coordinator

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