

COURSE OVERVIEW IE0648

Maintenance of Telecommunication Systems

Course Title

Maintenance of Telecommunication Systems

Course Date/Venue

November 22-26, 2026/TBA Meeting Room,
Elite Byblos Hotel Al Barsha, Sheikh Zayed
Road, Dubai, UAE

Course Reference

IE0648

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 Maintenance of Telecommunication Systems. It covers the telecommunication network architecture and telecommunication equipment; the principles of maintenance, maintenance documentation and health, safety and standards; the copper transmission systems, FIBER optic communication systems and optical network maintenance; the microwave communication systems, satellite communication systems and transmission performance monitoring; the telephone switching systems and mobile communication systems; and the base transceiver station (BTS) maintenance, wireless network optimization, radio frequency (RF) maintenance and network synchronization systems.



During this interactive course, participants will learn the fault management, diagnostic instruments and network monitoring systems; the troubleshooting of communication networks, IP telecommunication maintenance and cybersecurity in maintenance; the power systems maintenance, environmental control systems and reliability and quality assurance; the internet of things (IoT), software defined networking (SDN), network function virtualization (NFV) and artificial intelligence in network maintenance; and the maintenance scheduling, spare parts management, lifecycle management and cost optimization.



Course Objectives/Outcomes & Benefits for the Participants

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

- Apply and gain an in-depth knowledge on maintenance of telecommunication systems
- Discuss telecommunication systems, telecommunication network architecture and telecommunication equipment
- Explain the principles of maintenance, maintenance documentation and health, safety and standards
- Identify copper transmission systems and FIBER optic communication systems and apply optical network maintenance
- Recognize microwave communication systems and satellite communication systems and carryout transmission performance monitoring
- Illustrate telephone switching systems and mobile communication systems
- Apply base transceiver station (BTS) maintenance, wireless network optimization, radio frequency (RF) maintenance and network synchronization systems
- Employ fault management and identify diagnostic instruments and network monitoring systems
- Troubleshoot communication networks and carryout IP telecommunication maintenance and cybersecurity in maintenance
- Apply power systems maintenance, environmental control systems and reliability and quality assurance
- Explain internet of things (IoT), software defined networking (SDN), network function virtualization (NFV) and artificial intelligence in network maintenance
- Employ maintenance scheduling, spare parts management, lifecycle management and cost optimization

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 maintenance of telecommunication systems for telecommunications engineers, electrical engineers, control engineers, instrumentation engineers, SCADA engineers, telemetry engineers, process control engineers, system engineers, network administrators, field technical support staff and project management staff.

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. Steve Mark, PE, MSc, BSc, is a Senior Electrical & Telecommunications Engineer with over **20 years** of extensive experience within the **Oil & Gas, Petrochemical** and **Power** industries specializing in **Telecommunications Engineering Technology, MSCP Telecommunications, Maintenance of Telecommunication Systems, Data Communications & Telecommunications, Designing Telecommunications Distribution System, Certified Electrical Safety Compliance Professional, Safety Instrumented Systems (SIS), Safety Integrity Level (SIL), Overhead Power Line Maintenance Patrolling & Washing, Energy Transmission & Distribution, Transmission Line Structures, Insulators & Accessories, Transmission Line Construction & Maintenance, Insulated Power Cables, High Voltage Applications, Transmission Line Parameters, Sag & Tension of Conductor, Geomagnetic Disturbances, Reactive Power Compensation, Overhead Line Troubleshooting, Patrolling, Troubleshooting Safety, HV/LV Equipment, High Voltage Electrical Safety, LV & HV Electrical System, HV Equipments Inspection & Maintenance, HV Switchgear Operation & Maintenance, LV Distribution Switchgear & Equipment, Basic Electricity, Electrical & Special Hazards, Personnel Protection, Motor Controllers, Electrical Switching Practices, Emergency Planning, Safety Management, Earthing & Bonding Installation, Energized & De-Energized Work, Protection Relays, Testing & Commissioning, Lock & Tag Out, Circuit Breakers & Switchgears, Portable Cables, Transformers, Surge Arrestors, Isolators & Fuses, Capacitor Banks, Earth & Shunt Reactors, Gas Insulated Substations (GIS), HV Substation Inspection & Reporting, HV Cable Design, HV Electrical System Commissioning, HV Equipments Inspection & Maintenance, UPS & Generators, Electrical Installations Design & Construction, Electrical Mechanical Installations, GIS Substations, GE Turbine Power Plant and Steam Power Plants.** Further, he is also well-versed in **Network & System Administration, Data/Voice Networking, Network Capacity Calculations, VPN Connection Implementation, Structured Cabling Constructions, Engineering Design, Security Installations Design & Implementation, Logistics Management, IT Analysis, Business Continuity Plan Design, Disaster Recovery Simulations, Supply Chain System Design, Barcode Marking & RFID Applications.** He is currently the **Lead Electrical Engineer** of Public Power Corporation S.A wherein he is responsible for site manufacturing supervision of works and electrical maintenance support for the existing Steam Electrical Power Plant.

During his career life, Mr. Mark has gained his expertise and thorough practical experience through handling challenging positions such as being the **IT & Telecommunications Manager, IT & Organization Manager, Logistics Manager, Electrical Engineer, Safety Engineer, Public Works Contractor, IT Support Analyst, Project Supervisor, Systems & Network Administrator, Data Protection Officer, Shop Auditor** and **Amateur Radio Operator** for various multi-national companies and institutes.

Mr. Mark is a **Registered Professional Engineer** and holds a **Master's degree in Quality Management & Technology** from the **Hellenic Open University** as well as a **Bachelor's degree in Electrical Engineering** from the **Technical University of Halkida, Euboea, Greece.** Further, he is a **Certified Instructor/Trainer, a Certified Safety Engineer** and a **Certified Data Protection Officer (DPO).** Moreover, he is a member of Scientific Society of Technological Education of Engineers (EETEM) and has delivered numerous trainings, courses, seminars, 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.

Learning Design & Customization

This course can be customized to the exact requirements of clients. Haward Technology is so proud of our huge capabilities in tailoring our courses to the training needs of our valued clients.

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: Sunday, 22nd of November 2026

0730 – 0800	Registration & Coffee
0800 – 0815	Welcome & Introduction
0815 – 0830	PRE-TEST
0830 – 0930	Introduction to Telecommunication Systems Evolution of Telecommunication Technologies • Components of Modern Telecom Networks • Types of Communication Systems • Roles of Maintenance Personnel
0930 – 0945	Break
0945 – 1030	Telecommunication Network Architecture Core, Access & Backbone Networks • PSTN, IP & Mobile Network Architecture • Transmission Paths & Network Topology • Network Elements & Interfaces
1030 – 1130	Telecommunication Equipment Switching Systems • Transmission Equipment • Power Supply Systems • Customer Premises Equipment (CPE)
1130 – 1215	Principles of Maintenance Preventive Maintenance • Corrective Maintenance • Predictive Maintenance • Reliability-Centered Maintenance

1215 – 1230	Break
1230 – 1330	Maintenance Documentation Equipment Manuals • Maintenance Logs • Fault Reporting Procedures • Asset Management Records
1330 – 1420	Health, Safety & Standards Electrical Safety • RF Radiation Safety • Personal Protective Equipment (PPE) • ITU, IEEE & ISO Standards
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, 23rd of November 2026

0730 – 0830	Copper Transmission Systems Twisted Pair Cable Maintenance • Coaxial Cable Inspection • Cable Testing Techniques • Fault Localization
0830 – 0930	Fiber Optic Communication Systems Fiber Optic Components • Fiber Inspection Procedures • Connector Cleaning Methods • Fiber Fault Identification
0930 – 0945	Break
0945 – 1100	Optical Network Maintenance Optical Power Measurements • OTDR Testing • Optical Attenuation Analysis • Fiber Restoration Procedures
1100 – 1215	Microwave Communication Systems Microwave Radio Components • Antenna Alignment • Waveguide Maintenance • Signal Performance Monitoring
1215 – 1230	Break
1230 – 1330	Satellite Communication Systems Earth Station Maintenance • Antenna Calibration • RF Equipment Inspection • Link Performance Verification
1330 – 1420	Transmission Performance Monitoring Bit Error Rate (BER) Testing • Signal Quality Analysis • Performance Indicators • Service Availability Monitoring
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, 24th of November 2026

0730 – 0830	Telephone Switching Systems Circuit Switching • Packet Switching • Softswitch Maintenance • Exchange Diagnostics
0830 – 0930	Mobile Communication Systems GSM Architecture • LTE & 5G Overview • Base Station Maintenance • Mobile Core Network Components
0930 – 0945	Break
0945 – 1100	Base Transceiver Station (BTS) Maintenance Hardware Inspection • Alarm Monitoring • RF Module Maintenance • Environmental Monitoring

1100 – 1215	Wireless Network Optimization Coverage Analysis • Capacity Monitoring • Interference Management • Performance Optimization
1215 – 1230	Break
1230 – 1330	Radio Frequency (RF) Maintenance RF Cable Testing • Antenna Maintenance • VSWR Measurement • RF Safety Practices
1330 – 1420	Network Synchronization Systems Clock Synchronization • GPS Timing Systems • Synchronization Faults • Performance Verification
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, 25th of November 2026

0730 – 0830	Fault Management Fault Detection Methods • Alarm Classification • Root Cause Analysis • Incident Management
0830 – 0930	Diagnostic Instruments Digital Multimeters • Spectrum Analyzers • Network Analyzers • Cable Testers
0930 – 0945	Break
0945 – 1100	Network Monitoring Systems SNMP Monitoring • Network Management Systems (NMS) • Performance Dashboards • Event Logging
1100 – 1215	Troubleshooting Communication Networks Structured Troubleshooting Methodology • Layer-by-Layer Diagnosis • Traffic Analysis • Service Restoration
1215 – 1230	Break
1230 – 1330	IP Telecommunication Maintenance Router Maintenance • Switch Maintenance • VoIP System Maintenance • IP Addressing Verification
1330 – 1420	Cybersecurity in Maintenance Secure Maintenance Procedures • Firmware Updates • Access Control • Network Security Monitoring
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, 26th of November 2026

0730 – 0830	Power Systems Maintenance UPS Maintenance • Battery Inspection • Generator Maintenance • Grounding Systems
0830 – 0930	Environmental Control Systems HVAC Maintenance • Temperature Monitoring • Humidity Control • Fire Protection Systems
0930 – 0945	Break

0945 – 1030	Reliability & Quality Assurance Mean Time Between Failures (MTBF) • Mean Time to Repair (MTTR) • Service Level Agreements (SLAs) • Reliability Improvement Strategies
1030 – 1130	Emerging Telecommunication Technologies Internet of Things (IoT) • Software Defined Networking (SDN) • Network Function Virtualization (NFV) • Artificial Intelligence in Network Maintenance
1130 – 1230	Maintenance Planning & Asset Management Maintenance Scheduling • Spare Parts Management • Lifecycle Management • Cost Optimization
1230 – 1245	Break
1245 – 1345	Practical Case Studies Real-World Maintenance Case Studies • Team-Based Troubleshooting Exercises • Best Practices & Lessons Learned
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

Course Assessment

- Daily knowledge checks
- Practical troubleshooting exercises
- Group case study presentations
- Final assessment (written and practical)
- Participant feedback and course evaluation

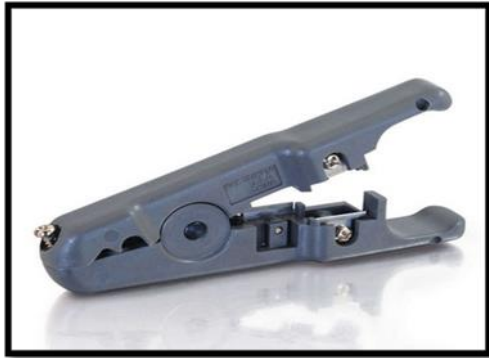
Expected Learning Outcomes

Upon successful completion of the course, participants will be able to:

- Explain the operation of major telecommunication systems and network architectures
- Perform preventive, predictive, and corrective maintenance on telecom equipment
- Diagnose and resolve faults in transmission, switching, wireless, and IP-based communication systems
- Use industry-standard testing and diagnostic instruments effectively
- Apply international safety standards and maintenance best practices
- Develop maintenance plans that improve system reliability, minimize downtime, and optimize asset

Tools & 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 various networking tools and equipment including the “Wireshark” software.



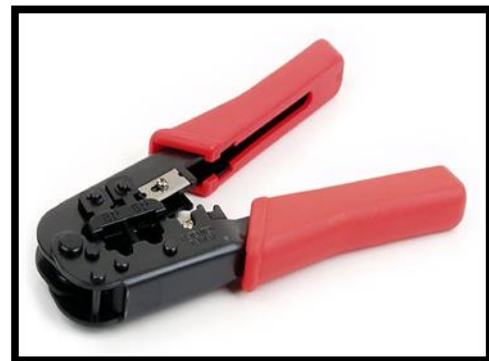
Round/flat Multi-Conductor Cutter



Face Plate



Cable Tester



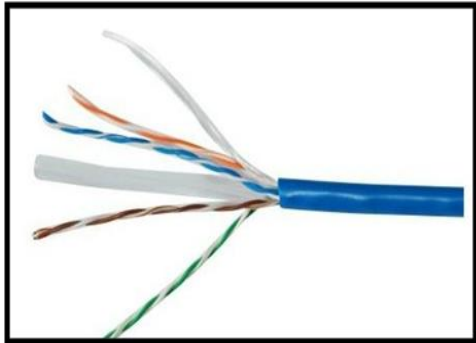
Crimping Tool



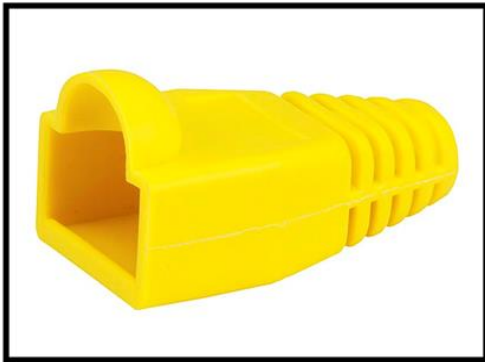
Keystone Jacks/Modular Connectors



RJ45



UTP Cable and Stripper



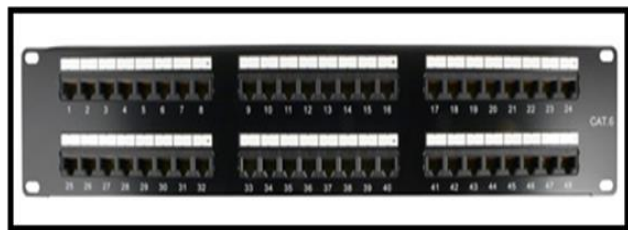
Rj-45 Color Coded Strain Relief Boots



Switch



Punchdown Tool



Patch Panel



The image shows a Wireshark network traffic capture. The main pane displays a list of captured packets with columns for No., Time, Source, Destination, Protocol, and Info. The packets include DNS standard query responses and an HTTP GET request. The packet list pane shows details for the selected packet (No. 75), including Ethernet II, Internet Protocol, Transmission Control Protocol, and Hypertext Transfer Protocol layers. The packet details pane shows the raw data of the selected packet, including the GET request body.

No.	Time	Source	Destination	Protocol	Info
64	6.437209	192.168.1.100	192.168.1.1	DNS	Standard query response CHAME
65	6.437436	192.168.1.1	192.168.1.100	DNS	Standard query & www.google.com
66	6.437436	192.168.1.1	192.168.1.100	DNS	Standard query & www.google.com
67	6.437881	192.168.1.1	192.168.1.100	DNS	Standard query response CHAME
68	6.437881	192.168.1.1	192.168.1.100	DNS	Standard query response CHAME
69	6.438295	192.168.1.1	192.168.1.100	DNS	Standard query response CHAME
70	6.438495	192.168.1.1	192.168.1.100	TCP	41578 > www [SYN] Seq=0 Len=0
71	6.440313	192.168.1.1	192.168.1.100	DNS	Standard query response CHAME
72	6.440590	192.168.1.1	192.168.1.100	TCP	57614 > www [SYN] Seq=0 Len=0
73	6.456314	192.168.1.1	192.168.1.100	TCP	www > 41578 [ACK] Seq=1
74	6.456352	192.168.1.1	192.168.1.100	TCP	41578 > www [ACK] Seq=1
75	6.456405	192.168.1.1	192.168.1.100	HTTP	GET /calendar/feeds/24vj3m5p1125bh2s-jbbneh253s%40group.calendar.google.com/public/basic HTTP/1.1
76	6.457981	192.168.1.1	192.168.1.100	TCP	www > 57614 [SYN, ACK] Seq=0
77	6.458011	192.168.1.1	192.168.1.100	TCP	57614 > www [ACK] Seq=1
78	6.458131	192.168.1.1	192.168.1.100	HTTP	GET /calendar/feeds/24vj3m5p1125bh2s-jbbneh253s%40group.calendar.google.com/public/basic HTTP/1.1
79	6.474721	192.168.1.1	192.168.1.100	TCP	www > 41578 [ACK] Seq=1
80	6.475098	192.168.1.1	192.168.1.100	TCP	www > 57614 [ACK] Seq=1
81	6.508503	192.168.1.1	192.168.1.100	HTTP	Hello (state Standby)
82	6.508529	192.168.1.1	192.168.1.100	TCP	[TCP segment of a reassembled P
83	6.508538	192.168.1.1	192.168.1.100	TCP	[TCP segment of a reassembled P

Wireshark Software

Course Coordinator

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