



COURSE OVERVIEW RE0019
Certified Maintenance & Reliability Technician (CMRT)
(SMRP Exam Preparation Training)

Course Title

Certified Maintenance & Reliability Technician (CMRT) (SMRP Exam Preparation Training)

Course Date/Venue

November 03-07, 2024/Club B Meeting Room, Ramada Plaza by Wyndham Istanbul City Center, Istanbul, Turkey

Course Reference

RE0019



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 Certified Maintenance & Reliability Technician (SMRP-CMRT). It covers the safety, health and environmental standards and policies to prevent injury or illness from exposure to hazards; the maintenance activity required in accordance with company protocol in order to adjust the operations schedules; the proper lockout/tagout procedures on equipment in accordance with applicable standards; the pre-use inspection on maintenance tools and equipment using established standards and guidelines; and the maintenance tools and equipment in accordance with manufacturers' specifications.



Further, the course will also discuss the measuring tools and equipment in a manner that will ensure accurate measurements in order to perform maintenance tasks properly; handling all maintenance materials and parts in accordance with established standards and procedures; and maintaining housekeeping by adhering to established site standards and by removing all maintenance-related parts and waste in order to ensure a safe and orderly job site.

Moreover the course will also cover the documentation of maintenance activities using the facility's maintenance management system; the preventive and/or predictive maintenance according to the work plan in order to maximize mean time between failures; performing of predictive maintenance techniques by observing equipment performance and collecting ongoing performance data in order to maximize mean time between failures; the lubrication of equipment in accordance with the lubrication schedule and equipment specifications in order to ensure reliable performance and prevent damage; performing alignment checks on rotating equipment in accordance with equipment specifications in order to ensure reliable performance and prevent damage as well as checks on safety systems and devices in accordance with equipment design specifications in order to ensure reliable operation and protect employees; and gathering information relating to a maintenance request by reviewing the work order and/or interviewing operations personnel in order to determine the general nature of the problem.

During this interactive course, participants will learn to verify that the problem is valid by systematically testing and/or observing the equipment's performance; obtain appropriate technical documentation using facility resources; investigate previous maintenance activities; identify the cause of the problem using a systematic process of elimination in order to determine what is causing the malfunction; verify troubleshooting analysis by disassembling and inspecting components using established procedures in accordance with applicable standards and guidelines; repair the malfunction by performing required corrective maintenance tasks in accordance with best maintenance practices; monitor the equipment after it has been repaired while operating it under normal conditions in order to determine whether or not the repair was successful; and release repaired equipment for return to service using standard operating procedures in order to resume normal operations

Course Objectives

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

- Get prepared for the next CMRT exam and have enough knowledge and skills to pass such exam in order to get the CMRT certification from SMRP
- Adhere to safety, health and environmental standards and policies by taking personal responsibility in order to prevent injury or illness from exposure to hazards
- Inform production control personnel about the maintenance activity required in accordance with company protocol in order to adjust the operations schedules
- Perform proper lockout/tagout procedures on equipment in accordance with applicable standards in order to ensure zero energy state prior to commencing maintenance work and minimize health, safety, and environmental hazards to employees and the community
- Perform a pre-use inspection on maintenance tools and equipment using established standards and guidelines in order to ensure safe operation and to extend the life of the tools and equipment
- Use maintenance tools and equipment in accordance with manufacturers' specifications and established safety policies in order to ensure safety and efficiency



- Use measuring tools and equipment in a manner that will ensure accurate measurements in order to perform maintenance tasks properly
- Handle all maintenance materials and parts in accordance with established standards and procedures in order to prevent damage to the parts and equipment
- Maintain housekeeping by adhering to established site standards and by removing all maintenance-related parts and waste in order to ensure a safe and orderly job site
- Document maintenance activities using the facility's maintenance management system in order to record history, assist with planning and scheduling, and support root-cause failure analysis
- Perform preventive and/or predictive maintenance according to the work plan in order to maximize mean time between failures
- Apply predictive maintenance techniques by observing equipment performance and collecting ongoing performance data in order to maximize mean time between failures
- Lubricate equipment in accordance with the lubrication schedule and equipment specifications in order to ensure reliable performance and prevent damage
- Perform alignment checks on rotating equipment in accordance with equipment specifications in order to ensure reliable performance and prevent damage
- Perform checks on safety systems and devices in accordance with equipment design specifications in order to ensure reliable operation and protect employees
- Gather information relating to a maintenance request by reviewing the work order and/or interviewing operations personnel in order to determine the general nature of the problem
- Verify that the problem is valid by systematically testing and/or observing the equipment's performance, as conditions permit, in order to determine if a problem actually exists
- Obtain appropriate technical documentation using facility resources in order to gain full understanding of designed operating parameters and/or sequences
- Investigate previous maintenance activities, as conditions require, by reviewing equipment history in order to identify information that will facilitate troubleshooting
- Identify the cause of the problem using a systematic process of elimination in order to determine what is causing the malfunction
- Verify troubleshooting analysis by disassembling and inspecting components using established procedures in accordance with applicable standards and guidelines in order to confirm that the identified corrective action is appropriate
- Repair the malfunction by performing required corrective maintenance tasks in accordance with best maintenance practices in order to return the equipment to the desired operating condition
- Monitor the equipment after it has been repaired while operating it under normal conditions in order to determine whether or not the repair was successful
- Release repaired equipment for return to service using standard operating procedures in order to resume normal operations

Who Should Attend

This course covers systematic techniques in maintenance and reliability for maintenance leaders, supervisors and technicians.

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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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.

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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.



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. Craig Nilsen, CMRP, CRCMP, is a Senior Maintenance & Reliability Engineer with over 25 years of extensive experience within the Oil & Gas, Refinery and Petrochemical industries. His wide expertise includes Maintenance Planning & Scheduling, Maintenance Planning Process, Maintenance Shutdown & Turnaround, Maintenance Audit Best Practices, Maintenance & Reliability Management, Reliability Engineering, Maintenance & Reliability Best Practices, Reliability, Availability & Maintainability (RAM), Root Cause Analysis, Maintenance Process, Reliability-Centered Maintenance (RCM), Reliability Engineering Analysis (RE), Root Cause Analysis (RCA), Asset Integrity Management (AIM), Reactive & Proactive Maintenance, Maintenance Process, Work Task Prioritization, Condition Monitoring, Mechanical Engineering, Mechanical Manufacturing Engineering, Mechanical Engineering Design, Electro Technology, Maintenance Planning, Spare Parts Planning & Inventory Management, Computerized Maintenance Management Systems (CMMS), Process Plant Shutdown & Turnaround, Maintenance Optimization & Best Practices, Reliability Centered Maintenance Principles & Application, Efficient Shutdowns, Turnaround & Outages, Process Plant Shutdown, Turnaround & Troubleshooting, Shutdown & Turnaround Management, Optimizing Equipment Maintenance & Replacement Decisions, Maintenance Management & Cost Control, Preventive & Predictive Maintenance, Effective Reliability Maintenance & Superior Maintenance Strategies, Integrity & Asset Management, Total Plant Reliability Maintenance, Vibration Measurement, Spare Parts & Materials Management, Mechanical & Rotating Equipment Troubleshooting & Maintenance, Rotating Equipment Reliability Optimization, Laser Alignment, Thermography, Risk Assessment, Legal Liability, Construction Regulations, Machine Vibration Analysis, Bag Filters Operation & Troubleshooting, Blower & Fan, Pumps, Valves, Bearings & Lubrication, Mechanical Seals, Mechanical Equipment Maintenance, Gearboxes, Shaft Alignment, Rotating Equipment, Preventive & Predictive Maintenance, Spare Management and Network Analysis.

During his career life, Mr. Nilsen gained his practical and field experience through his various significant positions and dedication as the **Maintenance Engineer, Repair Shop Supervisor, Maintenance & Reliability Specialist, Maintenance Planner/Reliability Specialist, Senior Maintenance Planner/Condition Monitoring Specialist, Supply Chain Maintenance Planner, Technical Advisor, Senior Trainer/Lecturer and Fitter & Turner** for Algorax (Pty) Limited.

Mr. Nilsen has a **National Higher Diploma in Mechanical Engineering**. Further, he is a **Certified Instructor/Trainer, a Certified Maintenance and Reliability Professional (CMRP)** from the Society of Maintenance & Reliability Professionals (**SMRP**), a **Certified Reliability Centered Management Professional (CRCMP)** from the International Organization of RCM Professionals (**IORCMP**) and a **Qualified Fitter & Turner**. Moreover, he is an active member of the Society of Maintenance and Reliability Professionals (**SMRP**) and the South African Asset Management Association (**SAMA**). He has further delivered numerous trainings, courses, seminars, workshops and conference 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 Fee

US\$ 6,500 per Delegate + **VAT**. This rate includes Participants Pack (Folder, Manual, Hand-outs, etc.), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Exam Fee

US\$ 400 per Delegate + **VAT**.

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:

<i>Domain 1: Maintenance Practices</i>	
Task 1	<p><i>Adhere to Safety, Health & Environmental Standards & Policies by Taking Personal Responsibility in Order to Prevent Injury or Illness from Exposure to Hazards. The Candidate must Demonstrate Knowledge in the Following:-</i></p> <ul style="list-style-type: none"> - Blood Borne Pathogens - Confined Space Entry - Electrical Safety - Emergency Response (ER) & Evacuation - Environmental Compliance - Ergonomics - Eye Protection - Fall Protection - Fire Safety - HAZCOM/MSDS - Hearing Conservation - Ladder Safety - Lockout/Tagout Procedures - Personal Protective Equipment (PPE) - Process Safety Management (PSM) - Respiratory Protection - Rigging - Safety System & Devices - Scaffolding





<p>Task 2</p>	<p>Inform Production Control Personnel about the Maintenance Activity Required in Accordance with Company Protocol in Order to Adjust the Operations Schedules. The Candidate Must Demonstrate Knowledge in the Following:-</p> <ul style="list-style-type: none"> - Lockout/Tagout Procedures - Process Overview - Work Permits
<p>Task 3</p>	<p>Perform the Proper Lockout/Tagout Procedures on Equipment in Accordance with Applicable Standards in Order to Ensure Zero Energy State Prior to Commencing Maintenance Work & Minimize Health, Safety & Environmental Hazards to Employees & the Community. The Candidate Must Demonstrate Knowledge in the Following:-</p> <ul style="list-style-type: none"> - Lockout/Tagout Procedures - Multiple Energy Sources - Zero Energy States
<p>Task 4</p>	<p>Perform a Pre-Use Inspection on Maintenance Tools & Equipment Using Established Standards & Guidelines in Order to Ensure Safe Operation & to Extend the Life of the Tools & Equipment. The Candidate Must Demonstrate Knowledge in the Following:-</p> <ul style="list-style-type: none"> - Cranes & Hoists - Field Machinery & Tools - Ladder Safety - Rolling Stock/Mobile Equipment (e.g. Mobile Cranes, Man-Lift/Scissor Lift, Fork Lift) - Shop Machinery & Tools - Rigging Equipment (e.g. Slings, Shackles, Eyebolts, Chains, Hooks)
<p>Task 5</p>	<p>Use Maintenance Tools & Equipment in Accordance with Manufacturers' Specifications & Established Safety Policies in Order to Ensure Safety & Efficiency. The Candidate Must Demonstrate Knowledge in the Following:-</p> <ul style="list-style-type: none"> - Equipment & Tool Specifications - Established Equipment & Tool-Safety Policies & Procedures
<p>Task 6</p>	<p>Use Measuring Tools & Equipment in a Manner that will Ensure Accurate Measurements in Order to Perform Maintenance Tasks Properly. The Candidate Must Demonstrate Knowledge in the Following:-</p> <ul style="list-style-type: none"> - Application of Specific Tools - Basic Math (e.g Fractions, Addition, Subtraction, Multiplication, Division) - Calibration Requirements for Measurement Tools (e.g. Torque Wrench, Calipers, Alignment Tools) - Conversion of Appropriate Measurement & Engineering Units - Measurement Principles (e.g. Mass, Force, Motion, Distance, Acceleration, Power, Fluid, Bulk) - Measurement Tools (e.g. Rulers, Gauges, Tapes, Micrometer, Calipers, Lasers)
<p>Task 7</p>	<p>Handle All Maintenance Materials & Parts in Accordance with Established Standards & Procedures in Order to Prevent Damage to the Parts & Equipment. The Candidate Must Demonstrate Knowledge in the Following:-</p> <ul style="list-style-type: none"> - Company Safety Policies - Material Handling Techniques & Procedures - Material Storage Procedures - Original Equipment Manufacturers' (OEM) Instructions



Task 8	Maintain Housekeeping by Adhering to Established Site Standards & by Removing All Maintenance Related Parts & Waste in Order to Ensure a Safe & Orderly Job Site. The Candidate Must Demonstrate Knowledge in the Following:- <ul style="list-style-type: none"> - Facility & Regulatory Policies on Housekeeping - Hazards of Improper Housekeeping - Proper Organization & Cleaning of Job Site
Task 9	Document Maintenance Activities Using the Facility's Maintenance Management System in Order to Record History, Assist with Planning & Scheduling & Support Root-Cause Failure Analysis. The Candidate Must Demonstrate Knowledge in the Following:- <ul style="list-style-type: none"> - Documentation Systems (e.g. Paper Filing Systems, Computer Filing Systems, Email) - Maintenance Planning & Scheduling

Domain 2: Preventive & Predictive Maintenance

Task 1	Perform Preventive and/or Predictive Maintenance According to the Work Plan in Order to Maximize Mean Time Between Failures. The Candidate Must Demonstrate Knowledge in the Following:- <ul style="list-style-type: none"> - Company Safety, Health, & Environmental Policies - Equipment Function & Use - Predictive Maintenance Procedures - Preventive Maintenance Procedures - Work Plan Requirements
Task 2	Apply Predictive Maintenance Techniques by Observing Performance & Collecting Ongoing Performance Data in Order to Maximize Mean Time Between Failures. The Candidate Must Demonstrate Knowledge in the Following:- <ul style="list-style-type: none"> - Company Safety, Health, & Environmental Policies - Function of Equipment - Operation Parameters for Equipment, Including Baseline Conditions - Predictive Maintenance Techniques & Technologies (e.g. Oil Samples, Vibration Readings, Thermographic Equipment, Ultrasonic Testing)
Task 3	Lubricate Equipment in Accordance with the Lubrication Schedule & Equipment Specifications in Order to Ensure Reliable Performance & Prevent Damage. The Candidate Must Demonstrate Knowledge in the Following:- <ul style="list-style-type: none"> - Company Safety, Health, & Environmental Policies - Equipment Specifications - Filtering Systems - Lubricant Specifications - Lubricating Systems - Lubrication Principles - Lubrication Route
Task 4	Perform Alignment Checks on Rotating Equipment (e.g., Pumps, Fans, Blowers, Turbines, Gear Boxes, Compressors) in Accordance with Equipment Specifications in Order to Ensure Reliable Performance & Prevent Damage. The Candidate Must Demonstrate Knowledge in the Following:- <ul style="list-style-type: none"> - Company Safety, Health, & Environmental Policies - Equipment Alignment Techniques (e.g. Laser, Reverse, Straight Edge, Rim & Face) - Equipment Functions - Thermal Growth - Operation Principles for Rotating Equipment





Task 5	<p>Perform Checks on Safety Systems & Devices in Accordance with Equipment Design Specifications in Order to Ensure Reliable Operation & Protect Employees. The Candidate Must Demonstrate Knowledge in the Following:-</p> <ul style="list-style-type: none"> - Company Safety, Health, & Environmental Policies - Consequences of Bypassing Safety Systems - Equipment Design Specifications - Equipment Functions (e.g. Limit Switches, Photoelectric Eyes) - Operation of Safety Systems
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Domain 3: Troubleshooting & Analysis

Task 1	<p>Gather Information Relating to a Maintenance Request by Reviewing the Work Order and/or Interviewing Operations Personnel in Order to Determine the General Nature of the Problem. The Candidate Must Demonstrate Knowledge in the Following:-</p> <ul style="list-style-type: none"> - Effective Interpersonal Relations - Equipment and/or Processes - Maintenance Work Order Systems
Task 2	<p>Verify that the Problem is Valid by Systematically Testing and/or Observing the Equipment's Performance, as Conditions Permit, in Order to Determine if a Problem Actually Exists. The Candidate Must Demonstrate Knowledge in the Following:-</p> <ul style="list-style-type: none"> - Function & Use of the Equipment - Process Indicators (e.g. Gauges, Annunciators, Human Machine Interface [HMI] Displays)
Task 3	<p>Obtain Appropriate Technical Documentation Using Facility Resources in Order to Gain Full Understanding of Designed Operating Parameters and/or Sequences. The Candidate Must Demonstrate Knowledge in the Following:-</p> <ul style="list-style-type: none"> - Facility Resources (e.g. CMMS, Technical Library, Engineering Files) - Operating Parameters & Sequences - Technical Documentation (e.g. Schematics, P&ID, Blueprints, O&M Manuals, SOP, MSDS)
Task 4	<p>Investigate Previous Maintenance Activities, as Conditions Require, by Reviewing Equipment History in Order to Identify Information that will Facilitate Troubleshooting. The Candidate Must Demonstrate Knowledge in the Following:-</p> <ul style="list-style-type: none"> - Facility Maintenance Record Systems - Facility Preventative Maintenance Scheduling Programs or Systems - Preventative Maintenance Techniques & Theories (e.g. Lubrication, Seals & Bearings, Alignments)
Task 5	<p>Identify the Cause of the Problem Using a Systematic Process of Elimination in Order to Determine what is Causing the Malfunction. The Candidate Must Demonstrate Knowledge in the Following:-</p> <ul style="list-style-type: none"> - Equipment and/or Process Design Parameters - Hazards Involved with Operating and/or Maintaining Specific Process Equipment - Systematic Troubleshooting & Analysis



Domain 4: Corrective Maintenance	
Task 1	<p>Verify Troubleshooting Analysis by Disassembling & Inspecting Components Using Established Procedures in Accordance with Applicable Standards & Guidelines in Order to Confirm that the Identified Corrective Action is Appropriate. The Candidate Must Demonstrate Knowledge in the Following:-</p> <ul style="list-style-type: none"> - Common Mechanical Systems (e.g. Lubrication, Seals & Bearings, Alignment, Power Transmission, Cams, Cranks, Pneumatics, Hydraulics, Thermodynamics, Heat Transfer, Piping Systems, Steam Systems) - Correct Use of Tools & Equipment, Including Measuring Devices - Equipment Specifications - Equipment & Component Functions - Operation of Equipment & Components - Results of Troubleshooting Analysis - Specific Equipment Repair Procedures, Applicable Standards, & Guidelines
Task 2	<p>Repair the Malfunction by Performing Required Corrective Maintenance Tasks in Accordance with Best Maintenance Practices in Order to Return the Equipment to the Desired Operating Condition. The Candidate Must Demonstrate Knowledge in the Following:-</p> <ul style="list-style-type: none"> - Common Mechanical Systems (e.g. Lubrication, Seals & Bearings, Alignment, Power Transmission, Cams, Cranks, Pneumatics, Hydraulics, Thermodynamics, Heat Transfer, Piping Systems, Fabrication, Steam Systems) - Correct Use of Tools & Equipment, Including Measuring Devices - Equipment Specifications - Equipment & Component Functions (e.g. Pumps, Fans, Blowers, Turbines, Gear Boxes, Compressors, Fasteners, Motors, Piping Systems, Gaskets/Packing, Drive Systems, Conveying Systems) - Equipment & Component Operation - Specific Equipment Repair Procedures, Applicable Standards, & Guidelines
Task 3	<p>Monitor the Equipment after it has been Repaired while Operating it under Normal Conditions in Order to Determine Whether or Not the Repair was Successful. The Candidate Must Demonstrate Knowledge in the Following:-</p> <ul style="list-style-type: none"> - Equipment & Component Functions (e.g. Pumps, Fans, Blowers, Turbines, Gear Boxes, Compressors, Fasteners, Motors, Piping Systems, Gaskets/Packing, Drive Systems, Conveying Systems) - Equipment & Component Operation
Task 4	<p>Release Repaired Equipment for Return to Service Using Standard Operating Procedures in Order to Resume Normal Operations. The Candidate Must Demonstrate Knowledge in the Following:-</p> <ul style="list-style-type: none"> - Procedures for Releasing Equipment for Return to Service

MOCK Exam

Upon the completion of the course, participants have to sit for a MOCK Examination similar to the exam of the Certification Body through Haward's Portal. Each participant will be given a username and password to log in Haward's Portal for the MOCK Exam during the 7 days following the course completion. Each participant has only one trial for the MOCK exam within this 7-day examination window. Hence, you have to prepare yourself very well before starting your MOCK exam as this exam is a simulation to the one of the Certification Body.

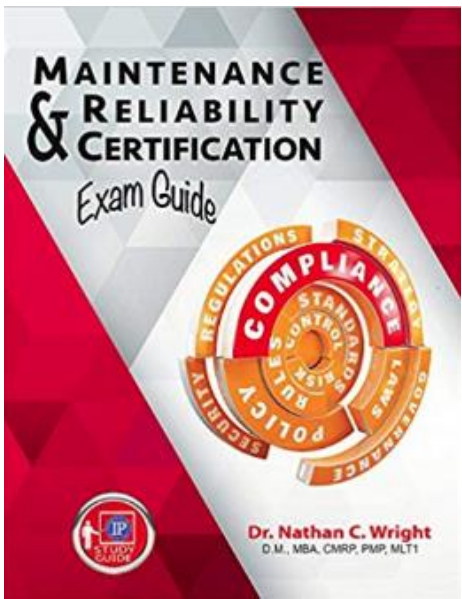
Practical Sessions

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



Book(s)

As part of the course kit, the following e-book will be given to all participants:



Title : Maintenance & Reliability Certification Exam Guide

ISBN : 9780831136239

Author : Dr. Nathan C. Wright

Publisher : Industrial Press, Inc.

Course Coordinator

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