Qualification Pack



MEP Technician

Mechanical Systems

QP Code: ICE/CON/Q1502 Instantiated QP Code: ICE/CON/Q1502-SI001

Version: 1.0

NSQF Level: 4

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Qualification Pack

ICE/CON/Q1502-SI001: MEP Technician

Brief Job Description

The MEP Technician is responsible for installing, maintaining, troubleshooting, and repairing Mechanical, Electrical, and Plumbing systems at construction sites or facilities. The role ensures compliance with safety standards, project specifications, preventive maintenance schedules, and operational efficiency across all MEP systems.

Personal Attributes

The individual should be physically fit and mentally alert. The person should have problem-solving, coordination and appropriate verbal and written communication skills.

Applicable National Occupational Standards (NOS)

Compulsory NOS:

1. ICE/CON/N1501: Plan, Schedule and Manage Resources for Project Execution
2. ICE/CON/N1502: Inspect and Report Issues in MEP Installations
3. ICE/CON/N1503: Carry out Documentation Concerning MEP Works and ensure Compliance
4. ICE/CON/N9901: Implement Safe Work Practices and Environmental Stewardship at Construction Sites
5. DGT/VSQ/N0101: Employability Skills (30 Hours)

Electives*(mandatory to select at least one):*

Elective : Mechanical Systems

1. ICE/CON/N1504: Install mechanical systems and components
2. ICE/CON/N1505: Perform Data-Driven Predictive Maintenance for Mechanical Systems
3. ICE/CON/N1506: Use Smart Control systems and Automation in Mechanical operations
4. ICE/CON/N1507: Operate and Maintain Mechanical Control Systems

Qualification Pack (QP) Parameters

Qualification Pack

Sector	Construction
Sub-Sector	Real Estate and Infrastructure Construction
Occupation	MEP (Mechanical, Electrical and Plumbing)
Country	India
NSQF Level	4
Credits	15
Aligned to NCO/ISCO/ISIC Code	NCO-2015/ 7412.0202, NCO-2015/7412.0200, NCO-2015/ 7411.0100, NCO-2015/ 7126.0103, NCO-2015/ 7126.0107
Minimum Educational Qualification & Experience	12th grade Pass OR 10th grade pass with 2 Years of experience Relevant Industry OR 8th grade pass with 4 Years of experience Relevant Industry OR Previous relevant Qualification of NSQF Level (3 as MEP Executive) with 3 Years of experience Relevant Industry OR Previous relevant Qualification of NSQF Level (3.5) with 1.5 years of experience Relevant Industry
Minimum Level of Education for Training in School	Not Applicable
Pre-Requisite License or Training	Not Applicable
Minimum Job Entry Age	18 Years
Last Reviewed On	07/10/2025
Next Review Date	07/10/2028
NSQC Approval Date	07/10/2025
Version	1.0
Reference code on NQR	NCVET-QG-04-CO-046412025-V1-ICES
NQR Version	1.0

Remarks:

The Min. Job Entry Age for this Job Role will be as per Government Norms

ICE/CON/N1501: Plan, Schedule and Manage Resources for Project Execution

Description

This unit covers the competencies required for planning and organizing work activities, managing resources effectively, monitoring project progress, and maintaining documentation to ensure the timely and efficient execution of MEP projects.

Scope

The scope covers the following :

- Plan work activities
- Manage resources
- Collaborate with team members
- Monitor project progress

Elements and Performance Criteria

Plan work activities

To be competent, the user/individual on the job must be able to:

PC1. Interpret project drawings and specifications for mechanical, electrical, and plumbing systems

PC2. Identify tasks to be completed and arrange them in a logical sequence

PC3. Prepare a daily work schedule based on project timelines

Manage resources

To be competent, the user/individual on the job must be able to:

PC4. Assess the quantity and quality of materials required for specific tasks

PC5. Check the availability of tools, machinery, and safety equipment

PC6. Ensure proper storage and handling of materials to avoid wastage

Collaborate with team members

To be competent, the user/individual on the job must be able to:

PC7. Communicate daily targets and tasks to team members effectively

PC8. Report issues related to resource shortages or technical challenges to supervisors

PC9. Assist in assigning tasks to junior technicians or helpers based on their skills

Monitor project progress

To be competent, the user/individual on the job must be able to:

PC10. Track completion of tasks against the schedule

PC11. Inspect ongoing work to ensure compliance with quality standards

PC12. Suggest adjustments in plans to accommodate unexpected delays or challenges

Maintain documentation

To be competent, the user/individual on the job must be able to:

PC13. Maintain daily logs concerning project work progress
PC14. Maintain records of materials used and tools issued
PC15. Prepare reports on resource utilization and submit them to supervisors

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. The basics of MEP systems and their installation processes
KU2. How to read and interpret engineering drawings and schematics
KU3. Different types of materials and tools required for MEP work
KU4. The fundamental principles of project planning and resource allocation
KU5. The importance of timelines and task prioritization
KU6. The inventory management and procurement processes
KU7. The applicable occupational health and safety practices
KU8. The quality control parameters for MEP installations
KU9. The appropriate techniques for effective team communication and conflict resolution
KU10. The reporting formats for documenting work progress and issues
KU11. The basics of software/tools for maintaining project logs (e.g., MS Excel)
KU12. The documentation related to project resources

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. Identify and address common challenges in project execution
GS2. Analyze project plans to identify potential bottlenecks
GS3. Prioritize tasks effectively to meet deadlines
GS4. Work as part of a team to achieve project objectives
GS5. Perform basic calculations for material estimation and measurement
GS6. Ensure accuracy in work activities and documentation
GS7. Adjust to changes in project requirements or schedules
GS8. Convey clear instructions and document information effectively

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Plan work activities	**6**	**12**	**-**	**2**
PC1. Interpret project drawings and specifications for mechanical, electrical, and plumbing systems	-	-	-	-
PC2. Identify tasks to be completed and arrange them in a logical sequence	-	-	-	-
PC3. Prepare a daily work schedule based on project timelines	-	-	-	-
Manage resources	**6**	**12**	**-**	**2**
PC4. Assess the quantity and quality of materials required for specific tasks	-	-	-	-
PC5. Check the availability of tools, machinery, and safety equipment	-	-	-	-
PC6. Ensure proper storage and handling of materials to avoid wastage	-	-	-	-
Collaborate with team members	**6**	**12**	**-**	**2**
PC7. Communicate daily targets and tasks to team members effectively	-	-	-	-
PC8. Report issues related to resource shortages or technical challenges to supervisors	-	-	-	-
PC9. Assist in assigning tasks to junior technicians or helpers based on their skills	-	-	-	-
Monitor project progress	**6**	**12**	**-**	**2**
PC10. Track completion of tasks against the schedule	-	-	-	-
PC11. Inspect ongoing work to ensure compliance with quality standards	-	-	-	-
PC12. Suggest adjustments in plans to accommodate unexpected delays or challenges	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Maintain documentation	**6**	**12**	**-**	**2**
PC13. Maintain daily logs concerning project work progress	-	-	-	-
PC14. Maintain records of materials used and tools issued	-	-	-	-
PC15. Prepare reports on resource utilization and submit them to supervisors	-	-	-	-
NOS Total	**30**	**60**	**-**	**10**

National Occupational Standards (NOS) Parameters

NOS Code	ICE/CON/N1501
NOS Name	Plan, Schedule and Manage Resources for Project Execution
Sector	Construction
Sub-Sector	
Occupation	MEP (Mechanical, Electrical and Plumbing)
NSQF Level	4
Credits	1
Version	1.0
Last Reviewed Date	07/10/2025
Next Review Date	07/10/2028
NSQC Clearance Date	07/10/2025

ICE/CON/N1502: Inspect and Report Issues in MEP Installations

Description

This unit covers the inspection, diagnosis, and reporting of issues in MEP installations using advanced diagnostic tools to ensure system functionality and compliance with safety standards.

Scope

The scope covers the following :

- Identify tools and equipment
- Conduct visual and preliminary inspections
- Perform diagnostic testing
- Data interpretation and analysis
- Report and make recommendations
- Conduct post-inspection procedures

Elements and Performance Criteria

Identify tools and equipment

To be competent, the user/individual on the job must be able to:

PC1. Select and prepare appropriate advanced diagnostic tools, e.g. thermal cameras, multimeters, vibration analyzers, for inspection

PC2. Verify the calibration status and functionality of tools before use

PC3. Ensure adherence to safety protocols and use personal protective equipment (PPE)

Conduct visual and preliminary inspections

To be competent, the user/individual on the job must be able to:

PC4. Conduct visual checks for signs of wear, damage, or irregularities in MEP installations

PC5. Record observations using digital documentation tools for traceability

Perform diagnostic testing

To be competent, the user/individual on the job must be able to:

PC6. Perform non-invasive diagnostic tests using advanced tools, such as thermal imaging for electrical panels, ultrasonic testing for pipes, or airflow analysis for HVAC systems

PC7. Identify abnormalities, such as overheating components, leaks, or pressure drops

Data interpretation and analysis

To be competent, the user/individual on the job must be able to:

PC8. Analyze diagnostic data to identify root causes of issues

PC9. Utilize software tools or dashboards to generate diagnostic reports

Report and make recommendations

To be competent, the user/individual on the job must be able to:

PC10. Document findings with supporting evidence (e.g., thermal images, test readings)

PC11. Provide recommendations for corrective actions and maintenance schedules

PC12. Communicate effectively with supervisors and clients, detailing the urgency of required interventions

Conduct post-inspection procedures

To be competent, the user/individual on the job must be able to:

PC13. Reset or re-calibrate diagnostic tools after use

PC14. Ensure all tools and equipment are stored securely and in good condition

PC15. Submit completed reports and data logs to the concerned department

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. The basic principles of mechanical, electrical, and plumbing systems, including HVAC components, electrical panels, and plumbing layouts

KU2. The functions, applications, and maintenance of tools such as thermal imaging cameras, ultrasonic leak detectors, and multimeters

KU3. The procedures for safe handling of electrical, mechanical, and plumbing systems

KU4. The relevant OSHA, IS, or IEC standards for workplace safety

KU5. The methods for interpreting data from diagnostic tools and software

KU6. The reporting formats and communication standards for technical findings

KU7. The approaches for diagnosing and resolving common MEP issues (e.g., leaks, overheating, circuit faults)

KU8. The use of software applications for inspection logs, data visualization, and report generation

KU9. The of electrical loads, circuit design, and mechanical stress factors in MEP systems

KU10. The importance and process of calibrating diagnostic equipment

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. Articulate findings and recommendations in verbal and written formats

GS2. Analyze data logically to diagnose issues and prioritize actions

GS3. Work effectively with colleagues, supervisors, and clients to address MEP concerns

GS4. Identify and resolve challenges efficiently during inspections

GS5. Complete inspections and reporting within stipulated time frames

GS6. Operate diagnostic software and digital tools proficiently

GS7. Conduct thorough inspections and documentation to ensure accuracy

GS8. Adjust to diverse MEP systems and evolving diagnostic technologies

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Identify tools and equipment	**6**	**12**	**-**	**2**
PC1. Select and prepare appropriate advanced diagnostic tools, e.g. thermal cameras, multimeters, vibration analyzers, for inspection	-	-	-	-
PC2. Verify the calibration status and functionality of tools before use	-	-	-	-
PC3. Ensure adherence to safety protocols and use personal protective equipment (PPE)	-	-	-	-
Conduct visual and preliminary inspections	**6**	**12**	**-**	**2**
PC4. Conduct visual checks for signs of wear, damage, or irregularities in MEP installations	-	-	-	-
PC5. Record observations using digital documentation tools for traceability	-	-	-	-
Perform diagnostic testing	**6**	**12**	**-**	**2**
PC6. Perform non-invasive diagnostic tests using advanced tools, such as thermal imaging for electrical panels, ultrasonic testing for pipes, or airflow analysis for HVAC systems	-	-	-	-
PC7. Identify abnormalities, such as overheating components, leaks, or pressure drops	-	-	-	-
Data interpretation and analysis	**6**	**12**	**-**	**2**
PC8. Analyze diagnostic data to identify root causes of issues	-	-	-	-
PC9. Utilize software tools or dashboards to generate diagnostic reports	-	-	-	-
Report and make recommendations	**6**	**12**	**-**	**2**
PC10. Document findings with supporting evidence (e.g., thermal images, test readings)	-	-	-	-
PC11. Provide recommendations for corrective actions and maintenance schedules	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC12. Communicate effectively with supervisors and clients, detailing the urgency of required interventions	-	-	-	-
Conduct post-inspection procedures	**-**	**-**	**-**	**-**
PC13. Reset or re-calibrate diagnostic tools after use	-	-	-	-
PC14. Ensure all tools and equipment are stored securely and in good condition	-	-	-	-
PC15. Submit completed reports and data logs to the concerned department	-	-	-	-
NOS Total	**30**	**60**	**-**	**10**

National Occupational Standards (NOS) Parameters

NOS Code	ICE/CON/N1502
NOS Name	Inspect and Report Issues in MEP Installations
Sector	Construction
Sub-Sector	
Occupation	MEP (Mechanical, Electrical and Plumbing)
NSQF Level	4
Credits	3
Version	1.0
Last Reviewed Date	07/10/2025
Next Review Date	07/10/2028
NSQC Clearance Date	07/10/2025

ICE/CON/N1503: Carry out Documentation Concerning MEP Works and ensure Compliance

Description

This unit focuses on documenting work processes, maintaining records, and adhering to compliance standards. This includes accurate recording of maintenance activities, compliance with safety protocols, and adherence to environmental regulations.

Scope

The scope covers the following :

- Carry out documentation
- Ensure compliance

Elements and Performance Criteria

Carry out documentation

To be competent, the user/individual on the job must be able to:

PC1. Record daily work activities, including installations, repairs, and maintenance tasks

PC2. Fill out work orders, maintenance logs, and inspection reports as per organizational standards

PC3. Ensure all documentation is error-free and up-to-date

PC4. Use digital tools or software to maintain and update records as required

PC5. Submit reports to supervisors or quality assurance teams in a timely manner

Ensure compliance

To be competent, the user/individual on the job must be able to:

PC6. Follow safety standards while performing MEP tasks as per local and national regulations

PC7. Comply with environmental regulations related to the disposal of hazardous materials and waste management

PC8. Adhere to organization-specific Standard Operating Procedures (SOPs)

PC9. Conduct regular self-audits to ensure compliance with relevant codes and standards

PC10. Participate in inspections and audits conducted by internal or external teams

PC11. Address gaps or errors in compliance as identified during audits

PC12. Provide feedback on documentation processes and suggest improvements

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. MEP tasks, including installation, maintenance, and repair activities

KU2. The documentation formats such as work orders, maintenance logs, and inspection reports

KU3. The safety, health, and environmental regulations applicable to MEP tasks

KU4. The tools and software for digital documentation and record-keeping
KU5. The local, national, and international standards (e.g., IS, BIS, ISO) relevant to MEP operations
KU6. The waste management protocols and handling of hazardous material
KU7. The organizations SOPs for documentation and compliance
KU8. The reporting hierarchy and submission deadlines
KU9. The principles of auditing and the steps involved in internal and external compliance checks
KU10. The corrective actions required to address non-compliance issues

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. Communicate effectively with team members and supervisors
GS2. Use documentation tools, spreadsheets, and software
GS3. Ensure accuracy in documentation and compliance activities
GS4. Collaborate with colleagues to ensure smooth documentation and compliance processes
GS5. Meet deadlines for report submissions and audits
GS6. Identify and address gaps in compliance or documentation processes
GS7. Analyze audit findings and suggest improvements
GS8. Adjust to changes in compliance requirements or documentation formats
GS9. Maintain well-organized records and archives
GS10. Follow changes in regulations and best practices

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Carry out documentation	**15**	**30**	**-**	**5**
PC1. Record daily work activities, including installations, repairs, and maintenance tasks	-	-	-	-
PC2. Fill out work orders, maintenance logs, and inspection reports as per organizational standards	-	-	-	-
PC3. Ensure all documentation is error-free and up-to-date	-	-	-	-
PC4. Use digital tools or software to maintain and update records as required	-	-	-	-
PC5. Submit reports to supervisors or quality assurance teams in a timely manner	-	-	-	-
Ensure compliance	**15**	**30**	**-**	**5**
PC6. Follow safety standards while performing MEP tasks as per local and national regulations	-	-	-	-
PC7. Comply with environmental regulations related to the disposal of hazardous materials and waste management	-	-	-	-
PC8. Adhere to organization-specific Standard Operating Procedures (SOPs)	-	-	-	-
PC9. Conduct regular self-audits to ensure compliance with relevant codes and standards	-	-	-	-
PC10. Participate in inspections and audits conducted by internal or external teams	-	-	-	-
PC11. Address gaps or errors in compliance as identified during audits	-	-	-	-
PC12. Provide feedback on documentation processes and suggest improvements	-	-	-	-
NOS Total	**30**	**60**	**-**	**10**

National Occupational Standards (NOS) Parameters

NOS Code	ICE/CON/N1503
NOS Name	Carry out Documentation Concerning MEP Works and ensure Compliance
Sector	Construction
Sub-Sector	
Occupation	MEP (Mechanical, Electrical and Plumbing)
NSQF Level	4
Credits	3
Version	1.0
Last Reviewed Date	07/10/2025
Next Review Date	07/10/2028
NSQC Clearance Date	07/10/2025

ICE/CON/N9901: Implement Safe Work Practices and Environmental Stewardship at Construction Sites

Description

This NOS focuses on enabling construction workers and supervisors to actively adopt safe work practices, promote environmental stewardship and ensure a hazard-free workplace through proactive risk management, sustainable resource usage and timely emergency response.

Scope

The scope covers the following :

- Conduct workplace safety inspections
- Apply safe operational practices
- Promote health, hygiene, and well-being
- Implement sustainability and environmental conservation measures
- Respond effectively to onsite emergencies

Elements and Performance Criteria

Conduct Workplace Safety Inspections

To be competent, the user/individual on the job must be able to:

PC1. identify unsafe conditions such as improper scaffolding, poor lighting, open edges or obstructed pathways

PC2. assess task-specific risks involving tools, machinery, and hazardous materials

PC3. document safety observations and communicate them to the safety lead or supervisor

PC4. verify that safety controls such as guard rails, signages and access controls are in place

Apply Safe Operational Practices

To be competent, the user/individual on the job must be able to:

PC5. use appropriate PPE and ensure correct fit before beginning any activity

PC6. follow safe operation procedures for cutting, lifting, mixing and power tools

PC7. implement ergonomic practices to reduce fatigue and prevent musculoskeletal injuries

PC8. maintain housekeeping standards by ensuring clean and clutter-free work areas

Promote Health, Hygiene and Well-Being

To be competent, the user/individual on the job must be able to:

PC9. follow personal hygiene practices such as handwashing, clean clothing and proper hydration

PC10. identify signs of health issues such as heat stress, dehydration and respiratory discomfort

PC11. ensure availability and safe usage of sanitation facilities, drinking water and resting zones

PC12. report workplace illnesses or physical discomfort to the assigned authority

Implement Sustainability and Environmental Conservation Measures

To be competent, the user/individual on the job must be able to:

PC13. follow procedures for safe storage and controlled use of chemicals, fuels and hazardous substances

PC14. practice material conservation by preventing spillage, wastage and improper handling
PC15. undertake waste segregation for recyclable, non-recyclable and hazardous waste
PC16. support measures for dust suppression, noise control and energy/water conservation

Respond Effectively to Onsite Emergencies

To be competent, the user/individual on the job must be able to:

PC17. identify emergency alarms, muster points and evacuation routes
PC18. use basic firefighting equipment such as extinguishers, fire blankets and sand buckets where appropriate
PC19. assist in basic first-aid procedures including bleeding control, CPR and heat-stroke management
PC20. support emergency communication protocols and follow command instructions

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. workplace safety policies, EHS manuals and site-specific procedures
KU2. roles of safety personnel, supervisors and emergency response teams
KU3. documentation formats for safety reporting and compliance
KU4. internal escalation protocols for hazardous conditions or incidents
KU5. legal obligations related to occupational safety and environmental protection
KU6. types of workplace hazards chemical, physical, electrical, ergonomic and environmental
KU7. safe handling techniques for construction materials, tools and machinery
KU8. principles of PPE selection, inspection and maintenance
KU9. basics of first aid, CPR and firefighting methods
KU10. environmental management practices including waste reduction and pollution control
KU11. measures for heat-stress prevention, hydration management and fatigue control
KU12. ergonomics and safe manual handling techniques

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. read and interpret safety signage, manuals and instructions
GS2. communicate safety findings and concerns clearly to team members
GS3. maintain basic documentation and reports for safety audits
GS4. use problem-solving skills to manage minor hazards or disruptions
GS5. collaborate effectively during drills, emergency situations and environmental initiatives
GS6. demonstrate awareness and discipline in following safe work practices consistently

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Conduct Workplace Safety Inspections	**6**	**12**	**-**	**2**
PC1. identify unsafe conditions such as improper scaffolding, poor lighting, open edges or obstructed pathways	-	-	-	-
PC2. assess task-specific risks involving tools, machinery, and hazardous materials	-	-	-	-
PC3. document safety observations and communicate them to the safety lead or supervisor	-	-	-	-
PC4. verify that safety controls such as guard rails, signages and access controls are in place	-	-	-	-
Apply Safe Operational Practices	**6**	**12**	**-**	**2**
PC5. use appropriate PPE and ensure correct fit before beginning any activity	-	-	-	-
PC6. follow safe operation procedures for cutting, lifting, mixing and power tools	-	-	-	-
PC7. implement ergonomic practices to reduce fatigue and prevent musculoskeletal injuries	-	-	-	-
PC8. maintain housekeeping standards by ensuring clean and clutter-free work areas	-	-	-	-
Promote Health, Hygiene and Well-Being	**6**	**12**	**-**	**2**
PC9. follow personal hygiene practices such as handwashing, clean clothing and proper hydration	-	-	-	-
PC10. identify signs of health issues such as heat stress, dehydration and respiratory discomfort	-	-	-	-
PC11. ensure availability and safe usage of sanitation facilities, drinking water and resting zones	-	-	-	-
PC12. report workplace illnesses or physical discomfort to the assigned authority	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Implement Sustainability and Environmental Conservation Measures	**6**	**12**	**-**	**2**
PC13. follow procedures for safe storage and controlled use of chemicals, fuels and hazardous substances	-	-	-	-
PC14. practice material conservation by preventing spillage, wastage and improper handling	-	-	-	-
PC15. undertake waste segregation for recyclable, non-recyclable and hazardous waste	-	-	-	-
PC16. support measures for dust suppression, noise control and energy/water conservation	-	-	-	-
Respond Effectively to Onsite Emergencies	**6**	**12**	**-**	**2**
PC17. identify emergency alarms, muster points and evacuation routes	-	-	-	-
PC18. use basic firefighting equipment such as extinguishers, fire blankets and sand buckets where appropriate	-	-	-	-
PC19. assist in basic first-aid procedures including bleeding control, CPR and heat-stroke management	-	-	-	-
PC20. support emergency communication protocols and follow command instructions	-	-	-	-
NOS Total	**30**	**60**	**-**	**10**

National Occupational Standards (NOS) Parameters

NOS Code	ICE/CON/N9901
NOS Name	Implement Safe Work Practices and Environmental Stewardship at Construction Sites
Sector	Construction
Sub-Sector	
Occupation	Generic
NSQF Level	4
Credits	1
Version	1.0
Last Reviewed Date	07/10/2025
Next Review Date	07/10/2028
NSQC Clearance Date	07/10/2025

DGT/VSQ/N0101: Employability Skills (30 Hours)

Description

This unit is about employability skills, Constitutional values, becoming a professional in the 21st Century, digital, financial, and legal literacy, diversity and Inclusion, English and communication skills, customer service, entrepreneurship, and apprenticeship, getting ready for jobs and career development.

Scope

The scope covers the following :

- Introduction to Employability Skills
- Constitutional values - Citizenship
- Becoming a Professional in the 21st Century
- Basic English Skills
- Communication Skills
- Diversity & Inclusion
- Financial and Legal Literacy
- Essential Digital Skills
- Entrepreneurship
- Customer Service
- Getting ready for Apprenticeship & Jobs

Elements and Performance Criteria

Introduction to Employability Skills

To be competent, the user/individual on the job must be able to:

PC1. understand the significance of employability skills in meeting the job requirements

Constitutional values – Citizenship

To be competent, the user/individual on the job must be able to:

PC2. identify constitutional values, civic rights, duties, personal values and ethics and environmentally sustainable practices

Becoming a Professional in the 21st Century

To be competent, the user/individual on the job must be able to:

PC3. explain 21st Century Skills such as Self-Awareness, Behavior Skills, Positive attitude, self-motivation, problem-solving, creative thinking, time management, social and cultural awareness, emotional awareness, continuous learning mindset etc.

Basic English Skills

To be competent, the user/individual on the job must be able to:

PC4. speak with others using some basic English phrases or sentences

Communication Skills

To be competent, the user/individual on the job must be able to:

PC5. follow good manners while communicating with others

PC6. work with others in a team

Diversity & Inclusion

To be competent, the user/individual on the job must be able to:

PC7. communicate and behave appropriately with all genders and PwD

PC8. report any issues related to sexual harassment

Financial and Legal Literacy

To be competent, the user/individual on the job must be able to:

PC9. use various financial products and services safely and securely

PC10. calculate income, expenses, savings etc.

PC11. approach the concerned authorities for any exploitation as per legal rights and laws

Essential Digital Skills

To be competent, the user/individual on the job must be able to:

PC12. operate digital devices and use its features and applications securely and safely

PC13. use internet and social media platforms securely and safely

Entrepreneurship

To be competent, the user/individual on the job must be able to:

PC14. identify and assess opportunities for potential business

PC15. identify sources for arranging money and associated financial and legal challenges

Customer Service

To be competent, the user/individual on the job must be able to:

PC16. identify different types of customers

PC17. identify customer needs and address them appropriately

PC18. follow appropriate hygiene and grooming standards

Getting ready for apprenticeship & Jobs

To be competent, the user/individual on the job must be able to:

PC19. create a basic biodata

PC20. search for suitable jobs and apply

PC21. identify and register apprenticeship opportunities as per requirement

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. need for employability skills

KU2. various constitutional and personal values

KU3. different environmentally sustainable practices and their importance

KU4. Twenty first (21st) century skills and their importance

KU5. how to use basic spoken English language

KU6. Do and dont of effective communication

KU7. inclusivity and its importance

KU8. different types of disabilities and appropriate communication and behaviour towards PwD

KU9. different types of financial products and services

KU10. how to compute income and expenses
KU11. importance of maintaining safety and security in financial transactions
KU12. different legal rights and laws
KU13. how to operate digital devices and applications safely and securely
KU14. ways to identify business opportunities
KU15. types of customers and their needs
KU16. how to apply for a job and prepare for an interview
KU17. apprenticeship scheme and the process of registering on apprenticeship portal

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. communicate effectively using appropriate language
GS2. behave politely and appropriately with all
GS3. perform basic calculations
GS4. solve problems effectively
GS5. be careful and attentive at work
GS6. use time effectively
GS7. maintain hygiene and sanitisation to avoid infection

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Introduction to Employability Skills	**1**	**1**	**-**	**-**
PC1. understand the significance of employability skills in meeting the job requirements	-	-	-	-
Constitutional values – Citizenship	**1**	**1**	**-**	**-**
PC2. identify constitutional values, civic rights, duties, personal values and ethics and environmentally sustainable practices	-	-	-	-
Becoming a Professional in the 21st Century	**1**	**3**	**-**	**-**
PC3. explain 21st Century Skills such as Self-Awareness, Behavior Skills, Positive attitude, self-motivation, problem-solving, creative thinking, time management, social and cultural awareness, emotional awareness, continuous learning mindset etc.	-	-	-	-
Basic English Skills	**2**	**3**	**-**	**-**
PC4. speak with others using some basic English phrases or sentences	-	-	-	-
Communication Skills	**1**	**1**	**-**	**-**
PC5. follow good manners while communicating with others	-	-	-	-
PC6. work with others in a team	-	-	-	-
Diversity & Inclusion	**1**	**1**	**-**	**-**
PC7. communicate and behave appropriately with all genders and PwD	-	-	-	-
PC8. report any issues related to sexual harassment	-	-	-	-
Financial and Legal Literacy	**3**	**4**	**-**	**-**
PC9. use various financial products and services safely and securely	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC10. calculate income, expenses, savings etc.	-	-	-	-
PC11. approach the concerned authorities for any exploitation as per legal rights and laws	-	-	-	-
Essential Digital Skills	**4**	**6**	**-**	**-**
PC12. operate digital devices and use its features and applications securely and safely	-	-	-	-
PC13. use internet and social media platforms securely and safely	-	-	-	-
Entrepreneurship	**3**	**5**	**-**	**-**
PC14. identify and assess opportunities for potential business	-	-	-	-
PC15. identify sources for arranging money and associated financial and legal challenges	-	-	-	-
Customer Service	**2**	**2**	**-**	**-**
PC16. identify different types of customers	-	-	-	-
PC17. identify customer needs and address them appropriately	-	-	-	-
PC18. follow appropriate hygiene and grooming standards	-	-	-	-
Getting ready for apprenticeship & Jobs	**1**	**3**	**-**	**-**
PC19. create a basic biodata	-	-	-	-
PC20. search for suitable jobs and apply	-	-	-	-
PC21. identify and register apprenticeship opportunities as per requirement	-	-	-	-
NOS Total	**20**	**30**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	DGT/VSQ/N0101
NOS Name	Employability Skills (30 Hours)
Sector	Cross Sectoral
Sub-Sector	Professional Skills
Occupation	Employability
NSQF Level	2
Credits	1
Version	1.0
Last Reviewed Date	22/07/2026
Next Review Date	22/07/2029
NSQC Clearance Date	22/07/2026

Qualification Pack

ICE/CON/N1504: Install mechanical systems and components

Description

This unit covers the skills and knowledge required to install mechanical systems and components, including HVAC systems, ventilation, and ducting, ensuring adherence to quality, safety, and technical standards.

Scope

The scope covers the following :

- Perform pre-installation preparation
- Install mechanical systems
- Carry out testing and calibration
- Carry out post-installation activities

Elements and Performance Criteria

Perform pre-installation preparation

To be competent, the user/individual on the job must be able to:

PC1. Interpret mechanical system layouts, drawings, and specifications

PC2. Verify the availability and condition of materials, tools, and equipment required for the installation

PC3. Conduct pre-installation checks of work areas for safety and readiness

Install mechanical systems

To be competent, the user/individual on the job must be able to:

PC4. Position and secure mechanical components (e.g., HVAC units, ducting, vents) as per design specifications

PC5. Assemble mechanical system parts using appropriate tools and techniques

PC6. Perform sealing, insulation, and fastening of ductwork to prevent leaks and ensure efficiency

Carry out testing and calibration

To be competent, the user/individual on the job must be able to:

PC7. Conduct functional tests on installed components to ensure proper operation

PC8. Adjust system settings (e.g., flow rate, temperature) to meet performance requirements

Carry out post-installation activities

To be competent, the user/individual on the job must be able to:

PC9. Clean work areas and dispose of waste material as per environmental guidelines

PC10. Document installation activities, including test results and adjustments

PC11. Provide feedback on system performance and recommend improvements

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. The function and specifications of HVAC systems, ventilation, ducting, and their components
KU2. How to read and interpret engineering drawings and technical layouts
KU3. The use of relevant tools, equipment and materials like duct lifters, torque wrenches, and insulation materials
KU4. The methods for assembling, sealing, and fastening mechanical systems
KU5. The applicable safety protocols, including PPE usage, fire prevention, and hazard identification
KU6. How to perform functional tests for HVAC systems, including calibration and troubleshooting
KU7. The applicable environmental regulations, inducing waste management
KU8. The performance benchmarks and quality assurance for mechanical systems
KU9. Basic mathematics and measurements to take measurements, and perform calculations, and unit conversions

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. Troubleshoot and resolve installation-related challenges
GS2. Apply logical reasoning to make informed decisions during installation
GS3. Work effectively with other technicians and supervisors
GS4. Prioritize tasks to meet deadlines
GS5. Adjust to changes in system designs or installation plans
GS6. Ensure accuracy in measurements and component alignment
GS7. Ensure clear verbal and written communication for instructions and reporting
GS8. Use digital tools to access layouts, update records, or conduct online research
GS9. Maintain professionalism, discipline, and integrity on-site
GS10. Apply basic math for alignment, calibration, and material usage calculations

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Perform pre-installation preparation	**5**	**15**	**-**	**2**
PC1. Interpret mechanical system layouts, drawings, and specifications	-	-	-	-
PC2. Verify the availability and condition of materials, tools, and equipment required for the installation	-	-	-	-
PC3. Conduct pre-installation checks of work areas for safety and readiness	-	-	-	-
Install mechanical systems	**5**	**15**	**-**	**2**
PC4. Position and secure mechanical components (e.g., HVAC units, ducting, vents) as per design specifications	-	-	-	-
PC5. Assemble mechanical system parts using appropriate tools and techniques	-	-	-	-
PC6. Perform sealing, insulation, and fastening of ductwork to prevent leaks and ensure efficiency	-	-	-	-
Carry out testing and calibration	**10**	**15**	**-**	**4**
PC7. Conduct functional tests on installed components to ensure proper operation	-	-	-	-
PC8. Adjust system settings (e.g., flow rate, temperature) to meet performance requirements	-	-	-	-
Carry out post-installation activities	**10**	**15**	**-**	**2**
PC9. Clean work areas and dispose of waste material as per environmental guidelines	-	-	-	-
PC10. Document installation activities, including test results and adjustments	-	-	-	-
PC11. Provide feedback on system performance and recommend improvements	-	-	-	-
NOS Total	**30**	**60**	**-**	**10**

National Occupational Standards (NOS) Parameters

NOS Code	ICE/CON/N1504
NOS Name	Install mechanical systems and components
Sector	Construction
Sub-Sector	
Occupation	MEP (Mechanical, Electrical and Plumbing)
NSQF Level	4
Credits	1
Version	1.0
Last Reviewed Date	07/10/2025
Next Review Date	07/10/2028
NSQC Clearance Date	07/10/2025

ICE/CON/N1505: Perform Data-Driven Predictive Maintenance for Mechanical Systems

Description

This unit covers predictive maintenance and data-driven troubleshooting of mechanical systems to enhance equipment reliability and operational efficiency.

Scope

The scope covers the following :

- Prepare for predictive maintenance
- Conduct predictive maintenance tasks
- Perform data-driven troubleshooting
- Ensure system efficiency and documentation

Elements and Performance Criteria

Prepare for Predictive Maintenance

To be competent, the user/individual on the job must be able to:

PC1. Read and interpret maintenance schedules, equipment manuals, and data logs for condition monitoring.

PC2. Select and inspect condition monitoring tools such as vibration analyzers, infrared thermography, and ultrasonic sensors.

PC3. Integrate IoT-based predictive maintenance strategies within Facility Maintenance Management (FMM).

PC4. Plan predictive maintenance tasks to align with operational demands while minimizing downtime.

Conduct Predictive Maintenance Tasks

To be competent, the user/individual on the job must be able to:

PC5. Utilize sensors and IoT-based monitoring tools to track key performance indicators (KPIs) such as temperature, vibration, pressure, and fluid levels.

PC6. Implement real-time fault alarming mechanisms based on predefined thresholds.

PC7. Analyze data trends to assess the condition of mechanical systems and predict potential failures.

Perform Data-Driven Troubleshooting

To be competent, the user/individual on the job must be able to:

PC8. Access and interpret historical performance data, system logs, and predictive maintenance reports.

PC9. Use advanced diagnostics tools to identify root causes of inefficiencies or impending failures.

PC10. Formulate maintenance plans based on predictive analytics to ensure timely interventions.

Ensure System Efficiency and Documentation

To be competent, the user/individual on the job must be able to:

PC11. Validate the effectiveness of predictive maintenance activities by assessing system performance post-maintenance.

PC12. Document findings, update maintenance logs, and generate reports on condition monitoring and predictive insights.

PC13. Follow industry-standard protocols and safety guidelines while performing predictive maintenance.

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. The basic principles of mechanical, electrical, and plumbing systems.

KU2. The preventive and predictive maintenance schedules and their benefits.

KU3. Key differences, advantages, and best practices of predictive versus preventive maintenance.

KU4. Principles of condition monitoring and mechanical system wear and degradation.

KU5. The appropriate tools and methods for condition monitoring, including sensors and software applications.

KU6. The role of IoT-based fault alarming systems and real-time data acquisition in predictive maintenance.

KU7. The methods for assessing mechanical system conditions using sensor outputs, historical data, and performance logs.

KU8. The software and tools used for analyzing predictive maintenance data.

KU9. Application of condition prediction models, including AI and machine learning, for failure prediction and maintenance planning.

KU10. Integration of IoT-based Facility Maintenance Management (FMM) systems, including smart sensors, cloud integration, and automation.

KU11. The systematic troubleshooting processes including root cause analysis.

KU12. The industry standards and regulatory requirements for predictive maintenance in MEP systems.

KU13. Basics of optimizing system performance for energy savings.

KU14. The strategies for optimizing energy usage and extending equipment lifespan through predictive maintenance.

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. Analyze data and make informed decisions

GS2. Maintain clear and effective verbal and written communication

GS3. Plan and execute tasks efficiently

GS4. Apply logical approach to resolve system faults

GS5. Work effectively in a team environment

GS6. Adopt new tools and techniques in predictive maintenance

GS7. Understand and interpret numerical data

GS8. Adhere to safety guidelines and risk mitigation practices

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Prepare for Predictive Maintenance	**8**	**15**	**-**	**2**
PC1. Read and interpret maintenance schedules, equipment manuals, and data logs for condition monitoring.	-	-	-	-
PC2. Select and inspect condition monitoring tools such as vibration analyzers, infrared thermography, and ultrasonic sensors.	-	-	-	-
PC3. Integrate IoT-based predictive maintenance strategies within Facility Maintenance Management (FMM).	-	-	-	-
PC4. Plan predictive maintenance tasks to align with operational demands while minimizing downtime.	-	-	-	-
Conduct Predictive Maintenance Tasks	**8**	**15**	**-**	**2**
PC5. Utilize sensors and IoT-based monitoring tools to track key performance indicators (KPIs) such as temperature, vibration, pressure, and fluid levels.	-	-	-	-
PC6. Implement real-time fault alarming mechanisms based on predefined thresholds.	-	-	-	-
PC7. Analyze data trends to assess the condition of mechanical systems and predict potential failures.	-	-	-	-
Perform Data-Driven Troubleshooting	**7**	**15**	**-**	**3**
PC8. Access and interpret historical performance data, system logs, and predictive maintenance reports.	-	-	-	-
PC9. Use advanced diagnostics tools to identify root causes of inefficiencies or impending failures.	-	-	-	-
PC10. Formulate maintenance plans based on predictive analytics to ensure timely interventions.	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Ensure System Efficiency and Documentation	**7**	**15**	**-**	**3**
PC11. Validate the effectiveness of predictive maintenance activities by assessing system performance post-maintenance.	-	-	-	-
PC12. Document findings, update maintenance logs, and generate reports on condition monitoring and predictive insights.	-	-	-	-
PC13. Follow industry-standard protocols and safety guidelines while performing predictive maintenance.	-	-	-	-
NOS Total	**30**	**60**	**-**	**10**

National Occupational Standards (NOS) Parameters

NOS Code	ICE/CON/N1505
NOS Name	Perform Data-Driven Predictive Maintenance for Mechanical Systems
Sector	Construction
Sub-Sector	
Occupation	MEP (Mechanical, Electrical and Plumbing)
NSQF Level	4
Credits	2
Version	1.0
Last Reviewed Date	07/10/2025
Next Review Date	07/10/2028
NSQC Clearance Date	07/10/2025

ICE/CON/N1506: Use Smart Control systems and Automation in Mechanical operations

Description

This unit focuses on the competencies required to install, configure, operate, and maintain smart control systems and automation technologies in mechanical operations to optimize performance, enhance energy efficiency.

Scope

The scope covers the following :

- Install and set up systems
- Calibrate systems
- Operate and monitor systems
- Troubleshoot and maintain systems
- Integrate automation systems
- Perform safety testing
- Analyze data and generate reports

Elements and Performance Criteria

Install and set up the systems

To be competent, the user/individual on the job must be able to:

PC1. Install smart sensors, actuators, and controllers in mechanical systems such as HVAC, water supply, and elevators

PC2. Configure connectivity between automation devices and central control systems

Calibrate systems

To be competent, the user/individual on the job must be able to:

PC3. Calibrate sensors and actuators to ensure accurate readings and responsiveness

PC4. Test the functionality of the installed control systems using predefined checklists

Operate and monitor systems

To be competent, the user/individual on the job must be able to:

PC5. Operate and monitor smart control systems using user interfaces like touch panels, mobile applications, or desktops

PC6. Perform real-time adjustments to system parameters for energy optimization and performance improvement

Troubleshoot and maintain systems

To be competent, the user/individual on the job must be able to:

PC7. Diagnose issues in smart systems using diagnostic tools and software

PC8. Replace faulty components or update firmware/software to resolve identified issues

Integrate automation systems

To be competent, the user/individual on the job must be able to:

PC9. Integrate automation systems with existing mechanical systems and Building Management Systems (BMS)

PC10. Ensure compatibility with energy management standards and IoT protocols

Perform safety testing

To be competent, the user/individual on the job must be able to:

PC11. Perform safety testing to ensure system reliability under various load conditions

PC12. Document and address safety concerns related to automation components and processes

Analyze data and generate reports

To be competent, the user/individual on the job must be able to:

PC13. Analyze data generated by smart systems to identify trends, anomalies, and areas for improvement

PC14. Generate periodic reports on system performance and energy savings

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. The basics of control systems, IoT, and building automation technologies

KU2. The compatibility of automation technologies with HVAC, plumbing, and mechanical systems

KU3. The types, functions, and calibration methods for sensors and actuators in smart systems

KU4. The techniques to enhance energy efficiency through automation

KU5. The operation of Building Management Systems (BMS) and interfaces for remote monitoring and control

KU6. The relevant standards such as ISO 50001, and local building codes

KU7. The tools and methods for maintaining and troubleshooting automated mechanical systems

KU8. The risks and best practices for securing smart control systems

KU9. The role of automation in achieving green building certifications and reducing carbon footprints

KU10. The safe working procedures for installing and maintaining smart control systems

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. Effectively communicate with team members and clients during system installation and maintenance

GS2. Identify and resolve technical issues related to smart systems promptly

GS3. Collaborate with other technicians and engineers to ensure seamless system integration

GS4. Analyze system data to make informed decisions about performance optimization

GS5. Prioritize tasks to complete installations and repairs within deadlines

GS6. Adjust to emerging technologies and upgrades in smart control systems

GS7. Ensure precision in installations and system calibrations to avoid errors

GS8. Use digital tools and software for configuration, diagnostics, and reporting

GS9. Provide user-friendly solutions and training to clients or building occupants

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Install and set up the systems	**5**	**9**	**-**	**2**
PC1. Install smart sensors, actuators, and controllers in mechanical systems such as HVAC, water supply, and elevators	-	-	-	-
PC2. Configure connectivity between automation devices and central control systems	-	-	-	-
Calibrate systems	**5**	**9**	**-**	**2**
PC3. Calibrate sensors and actuators to ensure accurate readings and responsiveness	-	-	-	-
PC4. Test the functionality of the installed control systems using predefined checklists	-	-	-	-
Operate and monitor systems	**4**	**9**	**-**	**2**
PC5. Operate and monitor smart control systems using user interfaces like touch panels, mobile applications, or desktops	-	-	-	-
PC6. Perform real-time adjustments to system parameters for energy optimization and performance improvement	-	-	-	-
Troubleshoot and maintain systems	**4**	**9**	**-**	**1**
PC7. Diagnose issues in smart systems using diagnostic tools and software	-	-	-	-
PC8. Replace faulty components or update firmware/software to resolve identified issues	-	-	-	-
Integrate automation systems	**4**	**8**	**-**	**1**
PC9. Integrate automation systems with existing mechanical systems and Building Management Systems (BMS)	-	-	-	-
PC10. Ensure compatibility with energy management standards and IoT protocols	-	-	-	-
Perform safety testing	**4**	**8**	**-**	**1**

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC11. Perform safety testing to ensure system reliability under various load conditions	-	-	-	-
PC12. Document and address safety concerns related to automation components and processes	-	-	-	-
Analyze data and generate reports	**4**	**8**	**-**	**1**
PC13. Analyze data generated by smart systems to identify trends, anomalies, and areas for improvement	-	-	-	-
PC14. Generate periodic reports on system performance and energy savings	-	-	-	-
NOS Total	**30**	**60**	**-**	**10**

National Occupational Standards (NOS) Parameters

NOS Code	ICE/CON/N1506
NOS Name	Use Smart Control systems and Automation in Mechanical operations
Sector	Construction
Sub-Sector	
Occupation	MEP (Mechanical, Electrical and Plumbing)
NSQF Level	4
Credits	2
Version	1.0
Last Reviewed Date	07/10/2025
Next Review Date	07/10/2028
NSQC Clearance Date	07/10/2025

ICE/CON/N1507: Operate and Maintain Mechanical Control Systems

Description

This unit focuses on operating and maintaining mechanical control systems and associated components in mechanical systems to ensure optimal performance and reliability.

Scope

The scope covers the following :

- Operate mechanical control systems
- Perform routine maintenance
- Troubleshoot and repair mechanical systems
- Ensure system safety and compliance

Elements and Performance Criteria

Operate mechanical control systems

To be competent, the user/individual on the job must be able to:

PC1. Start, stop, and monitor pumps and valves as per operational requirements

PC2. Adjust system settings (e.g. pressure, flow rates) based on operational standards

PC3. Inspect mechanical systems for unusual noises, vibrations, or leaks during operation

Perform routine maintenance

To be competent, the user/individual on the job must be able to:

PC4. Conduct preventive maintenance checks on valves, pumps, and other mechanical systems

PC5. Lubricate and clean mechanical components following manufacturer guidelines

PC6. Replace worn-out parts (e.g., seals, bearings) as per the maintenance schedule

Troubleshoot and repair mechanical systems

To be competent, the user/individual on the job must be able to:

PC7. Identify and diagnose common faults in pumps, valves, and associated systems

PC8. Use appropriate tools and techniques to repair or replace defective components

PC9. Test the system post-repair to ensure proper functioning

Ensure system safety and compliance

To be competent, the user/individual on the job must be able to:

PC10. Check the safety controls, such as pressure relief valves, for correct functioning

PC11. Follow standard procedures and safety protocols during maintenance

PC12. Maintain detailed records of maintenance and repair activities

PC13. Communicate system issues and maintenance updates to supervisors or stakeholders

PC14. Coordinate with other team members to ensure minimal disruption to operations

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. The types, functions, and working principles of valves, pumps, and associated control systems
KU2. The preventive and corrective maintenance practices for mechanical control systems
KU3. The use of tools like pressure gauges, flow meters, and diagnostic equipment
KU4. The workplace safety standards, SOPs, and emergency protocols
KU5. How to read and interpret mechanical drawings, system schematics, and manuals
KU6. Different types of seals, bearings, and materials used in mechanical control systems
KU7. Pressure, flow rate, and other operational parameters of mechanical systems
KU8. The regulations application to water, air, and energy conservation in MEP systems
KU9. The use of maintenance tools such as wrenches, spanners, etc.
KU10. How to systematically identify and resolve common mechanical issues

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. Report system issues and maintenance updates
GS2. Work effectively with a team to ensure seamless system operations
GS3. Analyze system malfunctions and apply logical troubleshooting techniques
GS4. Prioritize tasks to ensure timely maintenance and repairs
GS5. Adjust to new tools, technologies, and procedures in the workplace
GS6. Interpret numerical data such as pressure levels and flow rates
GS7. Use basic computer applications for record-keeping and reporting
GS8. Ensure all maintenance and repairs are thorough and comply with standards
GS9. Follow new maintenance procedures and mechanical technologies
GS10. Identify and mitigate potential hazards in the work environment

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Operate mechanical control systems	**8**	**15**	**-**	**3**
PC1. Start, stop, and monitor pumps and valves as per operational requirements	-	-	-	-
PC2. Adjust system settings (e.g. pressure, flow rates) based on operational standards	-	-	-	-
PC3. Inspect mechanical systems for unusual noises, vibrations, or leaks during operation	-	-	-	-
Perform routine maintenance	**8**	**15**	**-**	**3**
PC4. Conduct preventive maintenance checks on valves, pumps, and other mechanical systems	-	-	-	-
PC5. Lubricate and clean mechanical components following manufacturer guidelines	-	-	-	-
PC6. Replace worn-out parts (e.g., seals, bearings) as per the maintenance schedule	-	-	-	-
Troubleshoot and repair mechanical systems	**7**	**15**	**-**	**2**
PC7. Identify and diagnose common faults in pumps, valves, and associated systems	-	-	-	-
PC8. Use appropriate tools and techniques to repair or replace defective components	-	-	-	-
PC9. Test the system post-repair to ensure proper functioning	-	-	-	-
Ensure system safety and compliance	**7**	**15**	**-**	**2**
PC10. Check the safety controls, such as pressure relief valves, for correct functioning	-	-	-	-
PC11. Follow standard procedures and safety protocols during maintenance	-	-	-	-
PC12. Maintain detailed records of maintenance and repair activities	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC13. Communicate system issues and maintenance updates to supervisors or stakeholders	-	-	-	-
PC14. Coordinate with other team members to ensure minimal disruption to operations	-	-	-	-
NOS Total	**30**	**60**	**-**	**10**

National Occupational Standards (NOS) Parameters

NOS Code	ICE/CON/N1507
NOS Name	Operate and Maintain Mechanical Control Systems
Sector	Construction
Sub-Sector	
Occupation	MEP (Mechanical, Electrical and Plumbing)
NSQF Level	4
Credits	1
Version	1.0
Last Reviewed Date	07/10/2025
Next Review Date	07/10/2028
NSQC Clearance Date	07/10/2025

Assessment Guidelines and Assessment Weightage

Assessment Guidelines

1. Criteria for assessment for each Qualification Pack will be created by the Awarding Body. Each Performance Criteria (PC)/ Element will be assigned marks proportional to its importance in NOS. AB will also lay down proportion of marks for Theory and Practical Skills for each PC/ Element.

2. The assessment of the knowledge part will be based on knowledge bank of questions created by Assessment Bodies subject to approval by AB.

3. Individual assessment agencies will create unique question papers for knowledge/theory part for assessment of candidates as per assessment criteria given below.

4. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training center based on assessment criteria.

5. To pass the Qualification Pack, every trainee must score 70% on overall QP.

6. The Assessor shall check the outcome of the practices while evaluating the steps performed to achieve the outcome.

7. The trainee shall be provided with a chance to repeat the test to correct his procedures in case of

improper performance, with a deduction of marks for each iteration.

8. After the certain number of iterations as decided by AB the trainee is marked as fail, scoring zero marks for the procedure for the practical activity.

9. In case of successfully passing only certain number of NOS's, the trainee is eligible to take subsequent assessment on the balance NOS's to pass the Qualification Pack within the specified time frame set by AB.

10. Minimum duration of Assessment of each QP shall be 8hrs/batch (max. 30 candidates).

Minimum Aggregate Passing % at QP Level : 70

(**Please note**: Every Trainee should score a minimum aggregate passing percentage as specified above, to successfully clear the Qualification Pack assessment.)

Assessment Weightage

Compulsory NOS

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
ICE/CON/N1501.Plan, Schedule and Manage Resources for Project Execution	30	60	-	10	100	10
ICE/CON/N1502.Inspect and Report Issues in MEP Installations	30	60	-	10	100	10
ICE/CON/N1503.Carry out Documentation Concerning MEP Works and ensure Compliance	30	60	-	10	100	10
ICE/CON/N9901.Implement Safe Work Practices and Environmental Stewardship at Construction Sites	30	60	-	10	100	5
DGT/VSQ/N0101.Employability Skills (30 Hours)	20	30	-	-	50	5
Total	**140**	**270**	**-**	**40**	**450**	**40**

Elective: 1 Mechanical Systems

Qualification Pack

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
ICE/CON/N1504.Install mechanical systems and components	30	60	-	10	100	10
ICE/CON/N1505.Perform Data-Driven Predictive Maintenance for Mechanical Systems	30	60	-	10	100	10
ICE/CON/N1506.Use Smart Control systems and Automation in Mechanical operations	30	60	-	10	100	20
ICE/CON/N1507.Operate and Maintain Mechanical Control Systems	30	60	-	10	100	20
Total	**120**	**240**	**-**	**40**	**400**	**60**