Qualification Pack

MEP Technician

Mechanical Systems/ Electrical Systems/ Plumbing Systems

QP Code: ICE/CON/Q1502

Version: 1.0

NSQF Level: 4

THE INSTITUTION OF CIVIL ENGINEERS SOCIETY || 533-R
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Contents

Qualification Pack

ICE/CON/Q1502: 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 1: 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

Elective 2: Electrical Systems

1. ICE/CON/N1508: Install Electrical Systems and Wiring

2. ICE/CON/N1509: Install and Integrate IoT- Enabled Electrical Systems
3. ICE/CON/N1510: Install and Maintain Renewable Energy Solutions in Electrical Systems
4. ICE/CON/N1511: Diagnose, Maintain and Repair Electrical Systems and Components

Elective 3: Plumbing Systems

1. ICE/CON/N1512: Install Plumbing Fixtures, Pipes and Water Systems
2. ICE/CON/N1513: Install IoT based Water Management Systems
3. ICE/CON/N1514: Repair and Maintain Plumbing Installations
4. ICE/CON/N1515: Follow Sustainable Water Quality and Conservation Solutions

Qualification Pack (QP) Parameters

Sector	Construction
Sub-Sector	Real Estate and Infrastructure Construction
Occupation	MEP (Mechanical, Electrical and Plumbing)
Country	India
NSQF Level	4
Credits	27
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

Qualification Pack

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	NA
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

Qualification Pack

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	07/10/2025
Next Review Date	07/10/2028
NSQC Clearance Date	07/10/2025

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**

Qualification Pack

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**

Qualification Pack

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

Qualification Pack

ICE/CON/N1508: Install Electrical Systems and Wiring

Description

This unit focuses on the installation of electrical systems and wiring in compliance with safety and quality standards, ensuring functionality and reliability of the systems.

Scope

The scope covers the following :

- Plan and prepare for installation tasks
- Install electrical systems and wiring
- Test and verify installations
- Maintain work area and documentation
- Ensure compliance with standards

Elements and Performance Criteria

Plan and prepare for installation tasks

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

PC1. Read and interpret electrical diagrams, circuit schematics, and layouts

PC2. Inspect and confirm availability of tools, equipment, and materials

PC3. Follow work schedules and safety protocols

Install electrical systems and wiring

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

PC4. Lay conduits and cable trays as per project requirements

PC5. Pull and secure electrical wires in conduits or raceways

PC6. Install circuit breakers, distribution boards, switches, and outlets

PC7. Ensure proper grounding and earthing of systems

Test and verify installations

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

PC8. Conduct continuity and insulation resistance tests on wiring

PC9. Check the functionality of installed systems using appropriate testing equipment

PC10. Identify and resolve faults or deficiencies in installations

Maintain work area and documentation

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

PC11. Clean and organize the workspace after completion

PC12. Record installation details and test results in logs or reports

PC13. Follow environmental regulations for waste disposal

Ensure compliance with standards

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

PC14. Follow National Electrical Code (NEC) or local regulations during installation

PC15. Adhere to workplace safety standards to prevent accidents

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. The principles of electricity and wiring systems
KU2. Different types of electrical circuits and their applications
KU3. The standards and regulations for electrical installations (e.g., NEC, IEC)
KU4. The use of relevant tools and equipment for electrical installations (e.g., multimeters, wire strippers)
KU5. The importance of grounding and earthing
KU6. Different electrical hazards and the appropriate risk mitigation techniques
KU7. The safe handling and storage of electrical materials
KU8. The methods for recording test results and installation details
KU9. How to read and interpret electrical blueprints and technical manuals

Generic Skills (GS)

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

GS1. Identify and resolve installation-related challenges effectively
GS2. Collaborate with colleagues and supervisors during projects
GS3. Convey information effectively during work and report progress
GS4. Ensure accurate alignment and secure connections in installations
GS5. Perform basic calculations for load, resistance, and voltage drops
GS6. Respond to unexpected issues and adjust work plans accordingly
GS7. Consistently follow safety protocols and use protective equipment
GS8. Complete tasks within the allocated timelines
GS9. Follow updates on new tools, technologies, and regulations
GS10. Demonstrate reliability, punctuality, and a professional attitude

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Plan and prepare for installation tasks	**6**	**12**	**-**	**2**
PC1. Read and interpret electrical diagrams, circuit schematics, and layouts	-	-	-	-
PC2. Inspect and confirm availability of tools, equipment, and materials	-	-	-	-
PC3. Follow work schedules and safety protocols	-	-	-	-
Install electrical systems and wiring	**6**	**12**	**-**	**2**
PC4. Lay conduits and cable trays as per project requirements	-	-	-	-
PC5. Pull and secure electrical wires in conduits or raceways	-	-	-	-
PC6. Install circuit breakers, distribution boards, switches, and outlets	-	-	-	-
PC7. Ensure proper grounding and earthing of systems	-	-	-	-
Test and verify installations	**6**	**12**	**-**	**2**
PC8. Conduct continuity and insulation resistance tests on wiring	-	-	-	-
PC9. Check the functionality of installed systems using appropriate testing equipment	-	-	-	-
PC10. Identify and resolve faults or deficiencies in installations	-	-	-	-
Maintain work area and documentation	**6**	**12**	**-**	**2**
PC11. Clean and organize the workspace after completion	-	-	-	-
PC12. Record installation details and test results in logs or reports	-	-	-	-
PC13. Follow environmental regulations for waste disposal	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Ensure compliance with standards	**6**	**12**	**-**	**2**
PC14. Follow National Electrical Code (NEC) or local regulations during installation	-	-	-	-
PC15. Adhere to workplace safety standards to prevent accidents	-	-	-	-
NOS Total	**30**	**60**	**-**	**10**

National Occupational Standards (NOS) Parameters

NOS Code	ICE/CON/N1508
NOS Name	Install Electrical Systems and Wiring
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/N1509: Install and Integrate IoT- Enabled Electrical Systems

Description

This unit focuses on the installation, integration, and basic troubleshooting of IoT-enabled electrical systems, ensuring functionality and compliance with safety standards.

Scope

The scope covers the following :

- Set up and connect IoT-based electrical systems

Elements and Performance Criteria

Set up and connect IoT-based electrical systems

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

PC1. Identify the specifications and components required for IoT-enabled electrical systems from design plans and installation manuals

PC2. Assemble, mount, and install IoT-enabled devices such as sensors, switches, relays, and controllers

PC3. Establish wired and wireless connectivity between IoT-enabled devices and the central control system

PC4. Integrate IoT devices with mobile applications or cloud-based platforms for remote monitoring and control

PC5. Perform functional tests to ensure proper operation of IoT-enabled electrical systems

PC6. Conduct basic troubleshooting and resolve connectivity or performance issues in IoT-enabled systems

PC7. Follow workplace safety protocols, including lockout-tagout (LOTO), during installation and maintenance activities

PC8. Maintain proper documentation for installation, testing, and troubleshooting activities as per organizational guidelines

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. The fundamentals of IoT technology and its application in electrical systems

KU2. Different types of IoT-enabled devices and their specific functionalities

KU3. The basic concepts of electrical circuits and wiring in IoT setups

KU4. The network protocols such as Wi-Fi, Zigbee, Bluetooth, and LAN used in IoT-enabled systems

KU5. The tools and equipment required for installing IoT-enabled systems

KU6. The procedures for integrating IoT devices with software applications and platforms

KU7. The common issues in IoT-enabled electrical systems and basic troubleshooting techniques

KU8. The safety standards, including electrical safety and use of relevant PPE

KU9. The documentation requirements for IoT system installation and integration

Generic Skills (GS)

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

GS1. Read and interpret technical drawings, manuals, and instructions
GS2. Work collaboratively with other technicians and engineers during installation tasks
GS3. Analyze and resolve issues in IoT-enabled systems effectively
GS4. Plan and execute tasks efficiently to meet project deadlines
GS5. Operate mobile and desktop applications for IoT integration and control
GS6. Ensure all connections and integrations are accurate and compliant with standards
GS7. Learn and work with new IoT technologies and protocols
GS8. Address client requirements and explain system functionalities clearly
GS9. Adhere to safety protocols and guidelines during work
GS10. Record and maintain accurate logs of activities performed during installation

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Set up and connect IoT-based electrical systems	**30**	**60**	**-**	**10**
PC1. Identify the specifications and components required for IoT-enabled electrical systems from design plans and installation manuals	-	-	-	-
PC2. Assemble, mount, and install IoT-enabled devices such as sensors, switches, relays, and controllers	-	-	-	-
PC3. Establish wired and wireless connectivity between IoT-enabled devices and the central control system	-	-	-	-
PC4. Integrate IoT devices with mobile applications or cloud-based platforms for remote monitoring and control	-	-	-	-
PC5. Perform functional tests to ensure proper operation of IoT-enabled electrical systems	-	-	-	-
PC6. Conduct basic troubleshooting and resolve connectivity or performance issues in IoT-enabled systems	-	-	-	-
PC7. Follow workplace safety protocols, including lockout-tagout (LOTO), during installation and maintenance activities	-	-	-	-
PC8. Maintain proper documentation for installation, testing, and troubleshooting activities as per organizational guidelines	-	-	-	-
NOS Total	**30**	**60**	**-**	**10**

National Occupational Standards (NOS) Parameters

NOS Code	ICE/CON/N1509
NOS Name	Install and Integrate IoT- Enabled Electrical 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/N1510: Install and Maintain Renewable Energy Solutions in Electrical Systems

Description

This unit covers the installation, testing, and maintenance of renewable energy systems integrated into electrical systems, ensuring functionality, safety, and compliance with regulations.

Scope

The scope covers the following :

- Install renewable energy systems
- Perform testing and commissioning
- Perform maintenance and troubleshooting
- Ensure Health, Safety, and Environment (HSE) compliance

Elements and Performance Criteria

Install renewable energy systems

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

PC1. Interpret and follow installation drawings, diagrams, and manufacturer guidelines for renewable energy solutions

PC2. Assemble, install, and secure renewable energy system components (e.g., solar panels, inverters, batteries) in the designated area

PC3. Integrate renewable energy systems into existing electrical systems using appropriate tools and techniques

PC4. Perform wiring and connection tasks, ensuring proper polarity and earthing

Perform testing and commissioning

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

PC5. Conduct functionality tests on installed systems to ensure operational efficiency

PC6. Use appropriate diagnostic tools to measure voltage, current, and resistance to verify compliance with specifications

PC7. Rectify identified faults in the installed renewable energy systems

Perform maintenance and troubleshooting

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

PC8. Inspect renewable energy systems for wear, damage, or loose connections

PC9. Clean and replace defective components, including batteries and connectors

PC10. Update system configurations or software as required for optimal performance

Ensure Health, Safety, and Environment (HSE) compliance

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

PC11. Follow safe working practices, including the use of personal protective equipment (PPE)

PC12. Adhere to environmental guidelines for the disposal of electronic and hazardous waste

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. The principles of solar, wind, and other renewable energy technologies
KU2. The wiring, circuits, and earthing methods
KU3. The installation standards, diagrams, and manufacturer manuals
KU4. The use of diagnostic tools, such as multimeters, insulation testers, etc.
KU5. The electrical safety standards, PPE usage, and emergency procedures
KU6. The techniques for identifying and resolving common issues in renewable energy systems
KU7. The routine checks and preventive maintenance procedures
KU8. The relevant national and international standards for renewable energy systems
KU9. The waste disposal and recycling methods for renewable energy components
KU10. The basics of monitoring software and system configuration tools

Generic Skills (GS)

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

GS1. Interpret and explain technical information clearly to supervisors or customers
GS2. Collaborate effectively with other technicians or contractors
GS3. Manage installation and maintenance schedules efficiently
GS4. Diagnose and rectify issues in renewable energy systems
GS5. Ensure precision in wiring, connections, and system alignment
GS6. Operate software tools and maintain digital records
GS7. Perform accurate measurements and calculations
GS8. Work in diverse environments and conditions
GS9. Evaluate the performance of systems and recommend improvements
GS10. Address client concerns and ensure satisfaction with installed systems

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Install renewable energy systems	**8**	**15**	**-**	**3**
PC1. Interpret and follow installation drawings, diagrams, and manufacturer guidelines for renewable energy solutions	-	-	-	-
PC2. Assemble, install, and secure renewable energy system components (e.g., solar panels, inverters, batteries) in the designated area	-	-	-	-
PC3. Integrate renewable energy systems into existing electrical systems using appropriate tools and techniques	-	-	-	-
PC4. Perform wiring and connection tasks, ensuring proper polarity and earthing	-	-	-	-
Perform testing and commissioning	**8**	**15**	**-**	**3**
PC5. Conduct functionality tests on installed systems to ensure operational efficiency	-	-	-	-
PC6. Use appropriate diagnostic tools to measure voltage, current, and resistance to verify compliance with specifications	-	-	-	-
PC7. Rectify identified faults in the installed renewable energy systems	-	-	-	-
Perform maintenance and troubleshooting	**7**	**15**	**-**	**2**
PC8. Inspect renewable energy systems for wear, damage, or loose connections	-	-	-	-
PC9. Clean and replace defective components, including batteries and connectors	-	-	-	-
PC10. Update system configurations or software as required for optimal performance	-	-	-	-
Ensure Health, Safety, and Environment (HSE) compliance	**7**	**15**	**-**	**2**
PC11. Follow safe working practices, including the use of personal protective equipment (PPE)	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC12. Adhere to environmental guidelines for the disposal of electronic and hazardous waste	-	-	-	-
NOS Total	**30**	**60**	**-**	**10**

National Occupational Standards (NOS) Parameters

NOS Code	ICE/CON/N1510
NOS Name	Install and Maintain Renewable Energy Solutions in Electrical 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/N1511: Diagnose, Maintain and Repair Electrical Systems and Components

Description

This unit focuses on diagnosing, maintaining, and repairing electrical systems and components using digital diagnostic tools, predictive maintenance techniques, and industry-standard repair methods.m

Scope

The scope covers the following :

- Use diagnostic and analyze data
- Perform predictive maintenance
- Repair and replace electrical components
- Optimize electrical system performance
- Conduct system testing and troubleshooting
- Use software and IoT applications
- Ensure compliance and proper reporting

Elements and Performance Criteria

Use Diagnostic Tools and Analyze Data

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

PC1. Operate digital diagnostic tools such as multimeters, thermal cameras, and IoT-enabled monitoring devices to analyze electrical systems

PC2. Check the accuracy of the readings and identify inconsistencies or faults

PC3. Analyze real-time data from electrical systems to detect anomalies such as voltage drops, overheating, or current imbalances

PC4. Use trend analysis to predict potential system failures

Perform predictive maintenance

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

PC5. Plan and execute predictive maintenance activities based on diagnostics, including replacement of worn-out components and calibration of electrical systems

PC6. Document digital logs of maintenance activities using the appropriate software

Repair and Replace Electrical Components

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

PC7. Inspect electrical systems to identify faulty components such as fuses, switches, circuit breakers, and wiring.

PC8. Safely disconnect, remove, and document faulty components for proper disposal or repair.

PC9. Install compatible replacement components, ensuring proper connections and compliance with electrical standards.

PC10. Repair minor electrical faults such as loose connections or faulty terminals.

PC11. Test repaired components before reinstallation.

Optimize electrical system performance

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

PC12. Implement system optimization recommendations provided by diagnostic tools, such as balancing loads or adjusting parameters to improve efficiency

PC13. Identify and rectify faults in electrical systems based on diagnostic results, ensuring compliance with safety standards

Conduct System Testing and Troubleshooting

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

PC14. Reassemble the system and perform functional tests to ensure components operate correctly.

PC15. Use appropriate testing tools to verify system safety and efficiency.

PC16. Diagnose and resolve any issues arising after component replacement or repair.

PC17. Ensure system performance aligns with expected parameters.

Use software and IoT applications

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

PC18. Use software or IoT platforms to monitor electrical systems remotely and schedule predictive maintenance

PC19. Configure and troubleshoot IoT devices connected to electrical systems

Ensure compliance and proper reporting

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

PC20. Ensure all diagnostic and maintenance activities adhere to electrical safety standards and regulations

PC21. Maintain accurate records of diagnostic results, maintenance activities, and compliance checks

PC22. Communicate diagnostic results and maintenance recommendations to supervisors and stakeholders

PC23. Generate detailed technical reports for maintenance activities

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. The principles of electricity, including voltage, current, resistance, and power

KU2. The operations of diagnostic tools such as thermal imaging, power analyzers, and vibration sensors

KU3. The predictive maintenance strategies like vibration analysis, infrared thermography, and condition monitoring

KU4. The basics of IoT-enabled devices and their application in monitoring and diagnostics

KU5. The interpretation of diagnostic data and use of trend analysis for predictive maintenance

KU6. The methods to optimize electrical system performance, including load balancing and efficiency improvement

KU7. The electrical safety standards, codes, and procedures

KU8. The techniques for maintaining logs and creating detailed reports for diagnostics and maintenance activities

KU9. The proper use, care, and calibration of diagnostic tools and equipment

KU10. The methods to identify and resolve common electrical system issues

Generic Skills (GS)

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

GS1. Apply logical and analytical approaches to troubleshoot and resolve electrical system issues

GS2. Evaluate diagnostic data to make informed decisions on maintenance actions

GS3. Ensure accuracy in diagnostics, maintenance, and reporting tasks

GS4. Convey technical information effectively to team members and stakeholders

GS5. Use software and IoT platforms proficiently for diagnostics and maintenance

GS6. Prioritize tasks to ensure timely maintenance and minimal downtime

GS7. Work effectively with team members and supervisors in maintenance activities

GS8. Learn and implement new diagnostic tools and techniques

GS9. Adhere to safety protocols and regulations during all tasks

GS10. Follow updates on the latest technologies and trends in predictive maintenance and diagnostics

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Use Diagnostic Tools and Analyze Data	**5**	**9**	**-**	**2**
PC1. Operate digital diagnostic tools such as multimeters, thermal cameras, and IoT-enabled monitoring devices to analyze electrical systems	-	-	-	-
PC2. Check the accuracy of the readings and identify inconsistencies or faults	-	-	-	-
PC3. Analyze real-time data from electrical systems to detect anomalies such as voltage drops, overheating, or current imbalances	-	-	-	-
PC4. Use trend analysis to predict potential system failures	-	-	-	-
Perform predictive maintenance	**5**	**9**	**-**	**2**
PC5. Plan and execute predictive maintenance activities based on diagnostics, including replacement of worn-out components and calibration of electrical systems	-	-	-	-
PC6. Document digital logs of maintenance activities using the appropriate software	-	-	-	-
Repair and Replace Electrical Components	**4**	**9**	**-**	**2**
PC7. Inspect electrical systems to identify faulty components such as fuses, switches, circuit breakers, and wiring.	-	-	-	-
PC8. Safely disconnect, remove, and document faulty components for proper disposal or repair.	-	-	-	-
PC9. Install compatible replacement components, ensuring proper connections and compliance with electrical standards.	-	-	-	-
PC10. Repair minor electrical faults such as loose connections or faulty terminals.	-	-	-	-
PC11. Test repaired components before reinstallation.	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Optimize electrical system performance	**4**	**9**	**-**	**1**
PC12. Implement system optimization recommendations provided by diagnostic tools, such as balancing loads or adjusting parameters to improve efficiency	-	-	-	-
PC13. Identify and rectify faults in electrical systems based on diagnostic results, ensuring compliance with safety standards	-	-	-	-
Conduct System Testing and Troubleshooting	**4**	**8**	**-**	**1**
PC14. Reassemble the system and perform functional tests to ensure components operate correctly.	-	-	-	-
PC15. Use appropriate testing tools to verify system safety and efficiency.	-	-	-	-
PC16. Diagnose and resolve any issues arising after component replacement or repair.	-	-	-	-
PC17. Ensure system performance aligns with expected parameters.	-	-	-	-
Use software and IoT applications	**4**	**8**	**-**	**1**
PC18. Use software or IoT platforms to monitor electrical systems remotely and schedule predictive maintenance	-	-	-	-
PC19. Configure and troubleshoot IoT devices connected to electrical systems	-	-	-	-
Ensure compliance and proper reporting	**4**	**8**	**-**	**1**
PC20. Ensure all diagnostic and maintenance activities adhere to electrical safety standards and regulations	-	-	-	-
PC21. Maintain accurate records of diagnostic results, maintenance activities, and compliance checks	-	-	-	-
PC22. Communicate diagnostic results and maintenance recommendations to supervisors and stakeholders	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC23. Generate detailed technical reports for maintenance activities	-	-	-	-
NOS Total	**30**	**60**	**-**	**10**

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	ICE/CON/N1511
NOS Name	Diagnose, Maintain and Repair Electrical 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/N1512: Install Plumbing Fixtures, Pipes and Water Systems

Description

This unit is about installing and maintaining plumbing fixtures, pipes, and water systems, ensuring adherence to safety standards and operational efficiency.

Scope

The scope covers the following :

- Prepare for installation tasks
- Install pipes and fixtures
- Perform testing and commissioning
- Perform post-installation maintenance

Elements and Performance Criteria

Prepare for installation tasks

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

PC1. Inspect the worksite and review plumbing installation plans and blueprints

PC2. Select and prepare appropriate tools, materials, and safety equipment for the task

PC3. Verify that materials meet specifications and standards (e.g., pipe type, fixture quality)

Install pipes and fixtures

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

PC4. Measure, cut, and shape pipes accurately using tools like pipe cutters and threading machines

PC5. Assemble and install plumbing fixtures, such as faucets, sinks, and water heaters, ensuring secure connections

PC6. Install water supply and drainage pipes, maintaining proper slopes and alignments

PC7. Connect pipes to fixtures, tanks, and water distribution systems using appropriate techniques like welding, soldering, or gluing

Perform testing and commissioning

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

PC8. Conduct pressure tests to identify leaks and ensure the system is watertight

PC9. Adjust and fine-tune plumbing fixtures for optimal performance and user satisfaction

PC10. Inspect the entire installation for compliance with industry standards and regulations

Perform post-installation maintenance

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

PC11. Perform basic cleaning and maintenance of tools and equipment after the installation

PC12. Document work completed and report any deviations from the plan

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. The basics of water supply systems, drainage systems, and plumbing materials
KU2. Different types of pipes, fittings, and fixtures commonly used in plumbing systems
KU3. The tools and equipment used for cutting, shaping, and joining pipes
KU4. The methods for testing plumbing systems for leaks and pressure
KU5. The health and safety procedures, including handling hazardous materials and tools
KU6. The standards and regulations for plumbing installations (e.g., IS codes)
KU7. How to read and interpret blueprints and plumbing schematics
KU8. The techniques for pipe joining, including soldering, welding, and gluing
KU9. How to troubleshoot common issues in plumbing systems
KU10. The maintenance of tools and equipment used in plumbing installations

Generic Skills (GS)

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

GS1. Communicate effectively with team members and supervisors
GS2. Identify and address common issues during installation
GS3. Perform basic calculations for measurements and material estimations
GS4. Work collaboratively with other technicians and helpers on-site
GS5. Prioritize tasks and complete work within stipulated timelines
GS6. Respond to unexpected challenges or changes in work plans
GS7. Ensure precision in pipe measurements and alignment
GS8. Understand and implement safety protocols during installation
GS9. Learn new tools, techniques, or industry standards
GS10. Maintain professional behaviour and address client needs effectively

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Prepare for installation tasks	**8**	**15**	**-**	**3**
PC1. Inspect the worksite and review plumbing installation plans and blueprints	-	-	-	-
PC2. Select and prepare appropriate tools, materials, and safety equipment for the task	-	-	-	-
PC3. Verify that materials meet specifications and standards (e.g., pipe type, fixture quality)	-	-	-	-
Install pipes and fixtures	**8**	**15**	**-**	**3**
PC4. Measure, cut, and shape pipes accurately using tools like pipe cutters and threading machines	-	-	-	-
PC5. Assemble and install plumbing fixtures, such as faucets, sinks, and water heaters, ensuring secure connections	-	-	-	-
PC6. Install water supply and drainage pipes, maintaining proper slopes and alignments	-	-	-	-
PC7. Connect pipes to fixtures, tanks, and water distribution systems using appropriate techniques like welding, soldering, or gluing	-	-	-	-
Perform testing and commissioning	**7**	**15**	**-**	**2**
PC8. Conduct pressure tests to identify leaks and ensure the system is watertight	-	-	-	-
PC9. Adjust and fine-tune plumbing fixtures for optimal performance and user satisfaction	-	-	-	-
PC10. Inspect the entire installation for compliance with industry standards and regulations	-	-	-	-
Perform post-installation maintenance	**7**	**15**	**-**	**2**
PC11. Perform basic cleaning and maintenance of tools and equipment after the installation	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC12. Document work completed and report any deviations from the plan	-	-	-	-
NOS Total	**30**	**60**	**-**	**10**

National Occupational Standards (NOS) Parameters

NOS Code	ICE/CON/N1512
NOS Name	Install Plumbing Fixtures, Pipes and Water 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

ICE/CON/N1513: Install IoT based Water Management Systems

Description

This unit focuses on the skills and knowledge required to install IoT-based water management systems, ensuring efficiency, accuracy, and compliance with safety and operational guidelines.

Scope

The scope covers the following :

- Prepare for installation
- Install IoT devices and components
- Configure the system
- Conduct system testing and troubleshooting
- Ensure compliance and documentation

Elements and Performance Criteria

Prepare for installation

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

PC1. Read and interpret installation drawings and specifications

PC2. Identify and select appropriate tools, materials, and IoT devices for water management systems

PC3. Verify site readiness for installation, ensuring power supply and connectivity

Install IoT devices and components

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

PC4. Mount IoT sensors and actuators on designated water management components, e.g. pumps, tanks, and pipelines

PC5. Install and secure controllers and gateways as per the layout plan

PC6. Ensure proper electrical and mechanical connections for devices

Configure the system

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

PC7. Connect IoT devices to the network and configure them using the specified software

PC8. Set up communication protocols and test connectivity

PC9. Calibrate sensors to ensure accurate data collection

Conduct system testing and troubleshooting

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

PC10. Perform functional testing of the installed system to validate correct operation

PC11. Identify and rectify installation errors or connectivity issues

PC12. Coordinate with the supervisor or vendor support for advanced troubleshooting

Ensure compliance and documentation

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

PC13. Adhere to safety standards and environmental guidelines during installation

PC14. Maintain an installation report, including system configuration details

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. The basic principles of IoT and its application in water management systems
KU2. The components of IoT-based water management systems (e.g., sensors, actuators, controllers, gateways)
KU3. Electrical circuits and mechanical installation techniques
KU4. The procedures for configuring IoT devices and communication protocols
KU5. The tools and equipment for mounting, wiring, and connecting IoT devices
KU6. The standards and guidelines for electrical and water system safety
KU7. The troubleshooting techniques for common issues experienced during the installation of IoT-based water management systems
KU8. The basics of networking, including Wi-Fi, Bluetooth, and LoRaWAN
KU9. The applicable reporting and documentation requirements
KU10. The applicable environmental and legal regulations

Generic Skills (GS)

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

GS1. Communicate effectively with team members, supervisors, and clients
GS2. Identify and resolve system installation and configuration challenges
GS3. Plan and execute tasks within the allotted timeframe
GS4. Ensure accuracy in installation and configuration activities
GS5. Collaborate with other technicians and departments for smooth installation
GS6. Use configuration software and maintain digital records
GS7. Perform basic calculations for alignment and calibration tasks
GS8. Follow and apply updates on emerging IoT technologies and installation techniques

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Prepare for installation	**6**	**12**	**-**	**2**
PC1. Read and interpret installation drawings and specifications	-	-	-	-
PC2. Identify and select appropriate tools, materials, and IoT devices for water management systems	-	-	-	-
PC3. Verify site readiness for installation, ensuring power supply and connectivity	-	-	-	-
Install IoT devices and components	**6**	**12**	**-**	**2**
PC4. Mount IoT sensors and actuators on designated water management components, e.g. pumps, tanks, and pipelines	-	-	-	-
PC5. Install and secure controllers and gateways as per the layout plan	-	-	-	-
PC6. Ensure proper electrical and mechanical connections for devices	-	-	-	-
Configure the system	**6**	**12**	**-**	**2**
PC7. Connect IoT devices to the network and configure them using the specified software	-	-	-	-
PC8. Set up communication protocols and test connectivity	-	-	-	-
PC9. Calibrate sensors to ensure accurate data collection	-	-	-	-
Conduct system testing and troubleshooting	**6**	**12**	**-**	**2**
PC10. Perform functional testing of the installed system to validate correct operation	-	-	-	-
PC11. Identify and rectify installation errors or connectivity issues	-	-	-	-
PC12. Coordinate with the supervisor or vendor support for advanced troubleshooting	-	-	-	-

Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Ensure compliance and documentation	**6**	**12**	**-**	**2**
PC13. Adhere to safety standards and environmental guidelines during installation	-	-	-	-
PC14. Maintain an installation report, including system configuration details	-	-	-	-
NOS Total	**30**	**60**	**-**	**10**

National Occupational Standards (NOS) Parameters

NOS Code	ICE/CON/N1513
NOS Name	Install IoT based Water Management 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/N1514: Repair and Maintain Plumbing Installations

Description

This unit specifies the competencies required to repair and maintain plumbing systems, including pipes, fittings, valves, and fixtures, while ensuring safety, efficiency, and compliance with relevant standards.

Scope

The scope covers the following :

- Carry out repair and maintenance
- Ensure safety and compliance
- Carry out documentation

Elements and Performance Criteria

Carry out repair and maintenance

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

PC1. Inspect plumbing installations to identify faults, leaks, or damages

PC2. Dismantle defective pipes, fittings, or fixtures using appropriate tools and techniques

PC3. Replace or repair faulty components, including pipes, taps, valves, or other fixtures

PC4. Assemble and install the repaired or replacement plumbing components as per specifications

PC5. Test the repaired plumbing systems for functionality, ensuring no leaks or blockages

PC6. Conduct preventive maintenance, including cleaning pipes, removing clogs, and lubricating valves

PC7. Perform soldering, threading, and joining operations to ensure secure connections

Ensure safety and compliance

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

PC8. Adhere to safety protocols and guidelines while performing plumbing maintenance tasks

PC9. Ensure compliance with local and national plumbing standards and regulations

PC10. Use and maintain Personal Protective Equipment (PPE) as required

Carry out documentation

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

PC11. Record maintenance activities, including parts used and services performed

PC12. Communicate effectively with team members and supervisors regarding tasks and progress

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. The types, components, and functions of plumbing systems

KU2. The proper usage, maintenance, and limitations of tools such as pipe wrenches, soldering kits, and plungers

KU3. Different pipe materials (PVC, copper, steel) and their applications

KU4. The methods to detect leaks, repair damages, and restore plumbing systems to operational conditions

KU5. The guidelines and protocols to prevent accidents, including the handling of hot water systems and corrosive materials

KU6. The relevant plumbing codes and standards applicable to the work

KU7. The techniques for testing water pressure, flow rates, and leak detection

KU8. The safe disposal of waste materials and adherence to sustainability practices

Generic Skills (GS)

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

GS1. Convey information clearly to supervisors, clients, and team members

GS2. Analyze faults and determine efficient solutions

GS3. Collaborate effectively with other technicians and tradespeople

GS4. Ensure precise measurements and accurate repairs

GS5. Prioritize tasks to meet deadlines effectively

GS6. Perform basic calculations related to pipe dimensions, flow rates, and pressure

GS7. Respond to changing work requirements and unexpected issues

GS8. Interact courteously with clients and address their concerns

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Carry out repair and maintenance	**10**	**20**	**-**	**3**
PC1. Inspect plumbing installations to identify faults, leaks, or damages	-	-	-	-
PC2. Dismantle defective pipes, fittings, or fixtures using appropriate tools and techniques	-	-	-	-
PC3. Replace or repair faulty components, including pipes, taps, valves, or other fixtures	-	-	-	-
PC4. Assemble and install the repaired or replacement plumbing components as per specifications	-	-	-	-
PC5. Test the repaired plumbing systems for functionality, ensuring no leaks or blockages	-	-	-	-
PC6. Conduct preventive maintenance, including cleaning pipes, removing clogs, and lubricating valves	-	-	-	-
PC7. Perform soldering, threading, and joining operations to ensure secure connections	-	-	-	-
Ensure safety and compliance	**10**	**20**	**-**	**4**
PC8. Adhere to safety protocols and guidelines while performing plumbing maintenance tasks	-	-	-	-
PC9. Ensure compliance with local and national plumbing standards and regulations	-	-	-	-
PC10. Use and maintain Personal Protective Equipment (PPE) as required	-	-	-	-
Carry out documentation	**10**	**20**	**-**	**3**
PC11. Record maintenance activities, including parts used and services performed	-	-	-	-
PC12. Communicate effectively with team members and supervisors regarding tasks and progress	-	-	-	-
NOS Total	**30**	**60**	**-**	**10**

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	ICE/CON/N1514
NOS Name	Repair and Maintain Plumbing Installations
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/N1515: Follow Sustainable Water Quality and Conservation Solutions

Description

This unit focuses on sustainable water management, covering water quality monitoring, waste management, and green plumbing solutions.

Scope

The scope covers the following :

- Monitor and maintain water quality
- Install and maintain wastewater and greywater management systems
- Implement green plumbing solutions for water conservation

Elements and Performance Criteria

Monitor and maintain water quality

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

PC1. Install water quality monitoring systems like sensors and meters following manufacturer guidelines and safety standards.

PC2. Collect and analyze water samples to check parameters such as pH, turbidity, hardness, and microbial contamination using standard procedures.

PC3. Calibrate and adjust treatment systems such as filtration units and water softeners based on test results.

PC4. Maintain accurate records of water quality tests and report anomalies promptly.

Install and maintain wastewater and greywatermanagement systems

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

PC5. Set up plumbing systems for wastewater treatment and greywater recycling.

PC6. Identify and segregate biodegradable, recyclable, and hazardous waste streams as per local guidelines.

PC7. Conduct routine inspections of waste disposal systems, identifying leaks or malfunctions.

PC8. Perform basic repairs on wastewater and greywater recycling units.

PC9. Educate peers and clients on waste reduction practices and sustainable disposal methods.

Implement green plumbing solutions for water conservation

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

PC10. Inspect plumbing systems to identify inefficiencies and water wastage points.

PC11. Install and maintain water-efficient fixtures such as aerators, dual-flush toilets, and low-flow showerheads.

PC12. Install rainwater harvesting systems and integrate them into plumbing systems.

PC13. Conduct leak detection tests using pressure gauges and ultrasonic devices, repairing leaks promptly.

PC14. Install and maintain greywater recycling systems for non-potable applications, such as irrigation and flushing.

PC15. Implement pipe insulation to minimize water temperature loss and reduce waste during heating.

PC16. Monitor and report water usage data using smart metering devices.

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. Principles of water chemistry, microbiology, and quality parameters (e.g., pH, turbidity, hardness).

KU2. Water treatment systems such as filtration units, reverse osmosis, and water softeners.

KU3. Waste segregation, recycling, and disposal regulations.

KU4. Concepts of greywater and wastewater plumbing systems.

KU5. Principles of water conservation and sustainable plumbing practices.

KU6. Best practices for reducing, reusing, and recycling resources in water and waste management.

KU7. Techniques for leak detection and repair using advanced tools.

KU8. Importance of water pressure, flow rate, and fixture performance in conservation.

KU9. Safe handling of chemicals and equipment in water and waste management.

KU10. Environmental compliance relevant to water and waste systems.

KU11. Methods for recording and reporting data on water quality, waste, and water conservation practices.

KU12. Application of smart water metering devices for monitoring usage.

KU13. Technologies like IoT-enabled water monitoring and advanced waste recycling systems.

KU14. Local building codes and water conservation regulations.

KU15. Impact of rainwater harvesting and greywater recycling on sustainability.

KU16. Strategies for optimizing energy and water usage while extending equipment lifespan.

Generic Skills (GS)

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

GS1. Communicate effectively with team members and clients

GS2. Identify and resolve issues in water and waste systems

GS3. Prioritize tasks to complete them within deadlines

GS4. Collaborate with other technicians and stakeholders

GS5. Adjust to new methods and technologies in water and waste management

GS6. Ensure accuracy in tasks like testing and documentation

GS7. Address client concerns regarding water and waste systems professionally

GS8. Use software for water quality monitoring and waste tracking

GS9. Maintain safety in all tasks related to water and waste management

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Monitor and maintain water quality	**10**	**20**	**-**	**3**
PC1. Install water quality monitoring systems like sensors and meters following manufacturer guidelines and safety standards.	-	-	-	-
PC2. Collect and analyze water samples to check parameters such as pH, turbidity, hardness, and microbial contamination using standard procedures.	-	-	-	-
PC3. Calibrate and adjust treatment systems such as filtration units and water softeners based on test results.	-	-	-	-
PC4. Maintain accurate records of water quality tests and report anomalies promptly.	-	-	-	-
Install and maintain wastewater and greywatermanagement systems	**10**	**20**	**-**	**4**
PC5. Set up plumbing systems for wastewater treatment and greywater recycling.	-	-	-	-
PC6. Identify and segregate biodegradable, recyclable, and hazardous waste streams as per local guidelines.	-	-	-	-
PC7. Conduct routine inspections of waste disposal systems, identifying leaks or malfunctions.	-	-	-	-
PC8. Perform basic repairs on wastewater and greywater recycling units.	-	-	-	-
PC9. Educate peers and clients on waste reduction practices and sustainable disposal methods.	-	-	-	-
Implement green plumbing solutions for water conservation	**10**	**20**	**-**	**3**
PC10. Inspect plumbing systems to identify inefficiencies and water wastage points.	-	-	-	-
PC11. Install and maintain water-efficient fixtures such as aerators, dual-flush toilets, and low-flow showerheads.	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC12. Install rainwater harvesting systems and integrate them into plumbing systems.	-	-	-	-
PC13. Conduct leak detection tests using pressure gauges and ultrasonic devices, repairing leaks promptly.	-	-	-	-
PC14. Install and maintain greywater recycling systems for non-potable applications, such as irrigation and flushing.	-	-	-	-
PC15. Implement pipe insulation to minimize water temperature loss and reduce waste during heating.	-	-	-	-
PC16. Monitor and report water usage data using smart metering devices.	-	-	-	-
NOS Total	**30**	**60**	**-**	**10**

National Occupational Standards (NOS) Parameters

NOS Code	ICE/CON/N1515
NOS Name	Follow Sustainable Water Quality and Conservation Solutions
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

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**

Elective: 2 Electrical Systems

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
ICE/CON/N1508.Install Electrical Systems and Wiring	30	60	-	10	100	10
ICE/CON/N1509.Install and Integrate IoT- Enabled Electrical Systems	30	60	-	10	100	10
ICE/CON/N1510.Install and Maintain Renewable Energy Solutions in Electrical Systems	30	60	-	10	100	20
ICE/CON/N1511.Diagnose, Maintain and Repair Electrical Systems and Components	30	60	-	10	100	20
Total	**120**	**240**	**-**	**40**	**400**	**60**

Elective: 3 Plumbing Systems

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
ICE/CON/N1512.Install Plumbing Fixtures, Pipes and Water Systems	30	60	-	10	100	10
ICE/CON/N1513.Install IoT based Water Management Systems	30	60	-	10	100	10
ICE/CON/N1514.Repair and Maintain Plumbing Installations	30	60	-	10	100	20
ICE/CON/N1515.Follow Sustainable Water Quality and Conservation Solutions	30	60	-	10	100	20
Total	**120**	**240**	**-**	**40**	**400**	**60**

Acronyms

NOS	National Occupational Standard(s)
NSQF	National Skills Qualifications Framework
QP	Qualifications Pack
TVET	Technical and Vocational Education and Training

Glossary

Sector	Sector is a conglomeration of different business operations having similar business and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.
Sub-sector	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.
Occupation	Occupation is a set of job roles, which perform similar/ related set of functions in an industry.
Job role	Job role defines a unique set of functions that together form a unique employment opportunity in an organisation.
Occupational Standards (OS)	OS specify the standards of performance an individual must achieve when carrying out a function in the workplace, together with the Knowledge and Understanding (KU) they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.
Performance Criteria (PC)	Performance Criteria (PC) are statements that together specify the standard of performance required when carrying out a task.
National Occupational Standards (NOS)	NOS are occupational standards which apply uniquely in the Indian context.
Qualifications Pack (QP)	QP comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A QP is assigned a unique qualifications pack code.
Unit Code	Unit code is a unique identifier for an Occupational Standard, which is denoted by an 'N'
Unit Title	Unit title gives a clear overall statement about what the incumbent should be able to do.
Description	Description gives a short summary of the unit content. This would be helpful to anyone searching on a database to verify that this is the appropriate OS they are looking for.
Scope	Scope is a set of statements specifying the range of variables that an individual may have to deal with in carrying out the function which have a critical impact on quality of performance required.

Knowledge and Understanding (KU)	Knowledge and Understanding (KU) are statements which together specify the technical, generic, professional and organisational specific knowledge that an individual needs in order to perform to the required standard.
Organisational Context	Organisational context includes the way the organisation is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
Technical Knowledge	Technical knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
Core Skills/ Generic Skills (GS)	Core skills or Generic Skills (GS) are a group of skills that are the key to learning and working in today's world. These skills are typically needed in any work environment in today's world. These skills are typically needed in any work environment. In the context of the OS, these include communication related skills that are applicable to most job roles.
Electives	Electives are NOS/set of NOS that are identified by the sector as contributive to specialization in a job role. There may be multiple electives within a QP for each specialized job role. Trainees must select at least one elective for the successful completion of a QP with Electives.
Options	Options are NOS/set of NOS that are identified by the sector as additional skills. There may be multiple options within a QP. It is not mandatory to select any of the options to complete a QP with Options.