



Model Curriculum

QP Name: Mechanic (Electrical/Electronics/Instrumentation)

QP Code: IES/Q1105

QP Version: 3.0

NSQF Level: 4

Model Curriculum Version: 1.0

Infrastructure Equipment Skill Council (IESC), Jubilee Building (Second Floor), No.45, Museum Road,
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Training Parameters

| | |
|--|---|
| Sector | Infrastructure Equipment |
| Sub-Sector | Equipment Service and Spares |
| Occupation | Equipment Maintenance |
| Country | India |
| NSQF Level | 4 |
| Aligned to NCO/ISCO/ISIC Code | NCO-2015/ 7233.0701 |
| Minimum Educational Qualification and Experience | 8th Grade pass with 2 year NTC plus 1 year NAC OR 10th Grade pass plus 1 year NTC/ NAC OR 10th Grade pass with 2 years of relevant experience OR 10th Grade pass and pursuing continuous schooling OR 11th Grade Pass OR IES/Q1104 - Junior Mechanic (Electrical/ Electronics/ Instrumentation) NSQF Level 3 with minimum education as 5th Grade pass with 2 year relevant experience |
| Pre-Requisite License or Training | NIL |
| Minimum Job Entry Age | 18 Years |
| Last Reviewed On | 17/11/2022 |
| Next Review Date | 17/11/2025 |
| NSQC Approval Date | 17/11/2022 |
| QP Version | 3.0 |
| Model Curriculum Creation Date | 30/10/2022 |
| Model Curriculum Valid Up to Date | 17/11/2025 |
| Model Curriculum Version | 1.0 |

| | |
|--------------------------------|-----------|
| Minimum Duration of the Course | 420 Hours |
| Maximum Duration of the Course | 420 Hours |

Program Overview

This section summarizes the end objectives of the program along with its duration.

Training Outcomes

At the end of the program, the learner should be able to:

- Describe the basic working principles of Electrical/Electronics/Instrumentation system in the Equipment.
- Perform daily and routine maintenance activities in the Electrical/Electronics/Instrumentation system.
- Employ multi-meter and other suitable diagnostic tools for troubleshooting problems.
- Demonstrate the techniques for testing of Electrical /Electronics /Instrumentation components, rectification, re-assembly and testing of the same.
- Describe the procedure for reporting and escalation of unresolved problems.
- Classify Environment, Health and Safety (EHS) policies.

Compulsory Modules

The table lists the modules and their duration corresponding to the Compulsory NOS of the QP.

| NOS and Module Details | Theory Duration | Practical Duration | On-the-Job Training Duration (Mandatory) | On-the-Job Training Duration (Recommended) | Total Duration |
|---|-----------------|--------------------|--|--|----------------|
| Bridge Module | 4 | 0 | 0 | 0 | 4 |
| NOS Code – IES/N 1105 NOS Name - Carry out the Repair and maintenance of Equipment's Electrical, Electronics and Instrumentation system NOS Version - 2.0 NSQF Level - 4 | 30 | 90 | 60 | 0 | 180 |

| | | | | | |
|--|-----------|------------|-----------|----------|------------|
| NOS Code – IES/N 7701 NOS Name – Carry out Reporting & Documentation NOS Version - 2.0 NSQF Level - 4 | 30 | 90 | 30 | 0 | 150 |
| NOS Code - IES/N 7602 NOS Name - Comply with Workshop Health and Safety Guidelines NOS Version - 2.0 NSQF Level – 4 | 30 | 30 | 0 | 0 | 60 |
| NOS Code - DST/VSQ/N0101 NOS Name - Employability Skills 30 hrs NOS Version-1.0 | 0 | 30 | 0 | 0 | 30 |
| Total Duration | 90 | 240 | 90 | 0 | 420 |

Module Details

Module 1: Orientation

Bridge Module

Terminal Outcomes:

- Describe the operations of the infrastructure industry in India.
- Outline the skill training schemes in the Skill Sector Councils.
- Discuss about the different types of job roles available in IESC.
- Explain the roles and responsibilities of the Mechanic – Electrical /Electronics /Instrumentation.

| Duration: <4:00> | Duration: <0:00> |
|---|--|
| Theory – Key Learning Outcomes | Practical – Key Learning Outcomes |
| <ul style="list-style-type: none"> • Describe the importance of skill training and bridging the skill gap to improve work efficiency. • Explain the roles and responsibilities of a Mechanic Electrical/Electronic/Instrumentation • Understand and describe the scope of employment opportunities in the industry for a Mechanic Electrical /Electronic/Instrumentation Job role • Describe different technical trainings conducted in SSC for multi-skilling an individual. | NIL |
| Classroom Aids: | |

| |
|---|
| Computer, projector, student table, whiteboard/flip chart, markers and duster |
| Tools, Equipment and Other Requirements |
| |

Module 2: Repair and maintenance of Equipment’s Electrical, Electronics and Instrumentation system

Mapped to NOS Code – IES/N 1105 v2.0

Terminal Outcomes:

- Understand the function of components involved in the Electrical/Electronics /Instrumentation system.
- Read and understand the manufacturer’s manuals related to the equipment’s Electrical/Electronics/Instrumentation system, correct operation & maintenance.
- Perform daily and routine maintenance activities in the Electrical/Electronics /Instrumentation system.
- Employ suitable multimeter and other diagnostic tools for troubleshooting various problems.
- Explain the process of repair and maintenance of the Equipment’s Electrical/Electronics /Instrumentation system.
- Demonstrate how to repair, replace the defective Electrical/Electronics/Instrumentation system components.

| Duration: <30:00> | Duration: <150:00> |
|---|---|
| Theory – Key Learning Outcomes | Practical – Key Learning Outcomes |
| <ul style="list-style-type: none"> • Understand the basics of Electricals /Electronic/Instrumentation. • Describe the functions of Electrical/Electronics/ Instrumentation components. • Describe the use of multimeter and other diagnostic tools for troubleshooting various problems. • Outline the correct operation technique & maintenance procedure to avoid component failures. • Describe the correct sequence to troubleshooting problems in the Electrical / Electronics / Instrumentation systems. | <ul style="list-style-type: none"> • Perform daily and periodical maintenance of Electricals/ Electronic / Instrumentation system. • Demonstrate troubleshooting of Electricals / Electronic / Instrumentation system for various problems. • Employ the correct procedure as per manufacturer’s instructions to check the voltage, current & resistance. • Demonstrate the procedure to repair or replace defective components. • Show how to remove and fit Electricals / Electronic / Instrumentation components. • Demonstrate the correct method to check the sensors. |
| Classroom Aids: | |
| Computer, projector, student table, whiteboard/flip chart, markers and duster Manufacturer’s Equipment’s Operation, Service and Repair Manual | |
| Tools, Equipment and Other Requirements | |

Standard tools and lab equipment for dis-assembly and assembly
Cut-outs & models of major parts like Battery, Alternator, gauges and panels

Module 3: Reporting & documentation

Mapped to NOS Code – IES/N 7701, v2.0

Terminal Outcomes:

- Describe the documenting process for various maintenance activities.
- Prepare a list of parts to be procured and initiate procurement action.
- Make a repair estimate of the component to be repaired
- Prepare and maintain a file for the repair & maintenance history for every equipment.
- Describe the procedure to escalate unresolved problems.

| Duration: <30:00> | Duration: <120:00> |
|--|---|
| Theory – Key Learning Outcomes | Practical – Key Learning Outcomes |
| <ul style="list-style-type: none"> • Know the importance of maintaining data about equipment maintenance and repair. • Elucidate the importance of filling documents and processing them. • Know which format to use to report problems with proper evidence. • Explain the escalation matrix of the organization to report unresolved problems. | <ul style="list-style-type: none"> • Demonstrate how to prepare and maintain a file for the repair history of every equipment. • Demonstrate the use of prescribed formats to record maintenance details accurately. • Employ suitable practice in keeping all the documents ready for inspection and audit. • Make the parts list and repair estimate to repair the component. |
| <ul style="list-style-type: none"> • Classroom Aids: | |
| Computer, projector, student table, whiteboard/flip chart, markers and duster Manufacturer’s Equipment Parts, Service and Repair Manual | |
| Tools, Equipment and Other Requirements | |
| | |

Module 4: Workshop health and safety

Mapped to NOS Code: IES/N 7602 v2.0

- Describe the guidelines for health, safety and security requirements.
- Identify common hazards and risks at workplace.
- Employ safe practices to use the diagnostic tools.
- Demonstrate the emergency procedure to stop and shut down machinery.
- Perform basic first aid treatment for common injuries.
- Demonstrate the operation of firefighting equipment.
- Elaborate the guidelines for storage and disposal of hazardous materials and waste.
- Classify various safety signs, symbols and warnings used in the workplace.

| | |
|---|---|
| Duration: <30:00> | Duration: <30:00> |
| Theory – Key Learning Outcomes | Practical – Key Learning Outcomes |
| <ul style="list-style-type: none"> • Describe the Health, safety, environmental (HSE) policies. • Explain the reporting procedure for all HSE activities • List down the contact details of HSE personnel, in case of emergencies. • Classify waste based on non- recyclable, hazardous and recyclable material. • Classify various safety signs, symbols and warnings used in the workplace. • Elaborate the guidelines for storage and disposal of hazardous materials and waste. | <ul style="list-style-type: none"> • Demonstrate the emergency procedure to stop and shut down machinery. • Identify common hazards and risks at workplace. • Employ safe practices to use the diagnostic tools. • Show the correct use of Personal Protective Equipment (PPE). • Demonstrate the operation of fire extinguishers. • Demonstrate the procedure to give basic first aid. • Prepare a hazard log register and report incidents and accidents. • Conduct a mock drill for dealing with emergencies like fire and other calamities. |
| Classroom Aids: | |
| Computer, projector, printer, student table, whiteboard, flip chart, marker and duster | |
| Tools, Equipment and Other Requirements | |
| Fire Extinguishers, Personal Protective Equipment and other safety gears | |

Module 5: Employability Skills

Mapped to NOS: DST/VSQ/N0101

Terminal Outcomes:

At the end of this module, the learner should have acquired the listed knowledge and skills.

- Discuss the importance of Employability Skills in meeting the job requirements
- Show how to practice different environmentally sustainable practices
- Display positive attitude, self -motivation, problem solving, time management skills and continuous learning mind-set in different situations
- Demonstrate how to communicate in a well -mannered way with others
- Demonstrate working with others in a team
- Show how to conduct oneself appropriately with all genders and PwD
- Discuss the significance of reporting sexual harassment issues in time
- Discuss the significance of using financial products and services safely and securely
- Explain the significance of approaching the concerned authorities in time for any exploitation as per legal rights and laws
- Show how to operate digital devices and use the associated applications and features, safely and securely
- Discuss the significance of using internet for browsing, accessing social media platforms, safely and securely
- Discuss the need for identifying opportunities for potential business, sources for arranging money and potential legal and financial challenges
- Explain the significance of identifying customer needs and addressing them
- Create a biodata
- Use various sources to search and apply for jobs
- Discuss the significance of dressing up neatly and maintaining hygiene for an interview
- Discuss how to search and register for apprenticeship opportunities
- Describe opportunities as an entrepreneur

| Duration: <00:00> | Duration: <30:00> |
|--|---|
| Theory – Key Learning Outcomes | Practical – Key Learning Outcomes |
| <ul style="list-style-type: none"> • NA | <ul style="list-style-type: none"> • Discuss the importance of Employability Skills in meeting the job requirements • Show how to practice different environmentally sustainable practices • Display positive attitude, self -motivation, problem solving, time management skills and continuous learning mind-set in different situations • Demonstrate how to communicate in a well -mannered way with others • Demonstrate working with others in a team • Show how to conduct oneself appropriately with all genders and PwD • Show how to operate digital devices and use the associated applications and features, safely and securely • Explain the significance of identifying customer needs and addressing them • Create a biodata • Use various sources to search and apply for jobs • Discuss the significance of dressing up neatly and maintaining hygiene for an interview • Describe opportunities as an entrepreneur |
| Classroom Aids: | |
| Computer, projector, printer, student table, whiteboard/flip chart, marker, duster | |
| Tools, Equipment and Other Requirements | |

Annexure

Trainer Requirements

| Trainer Prerequisites | | | | | | |
|-----------------------------------|----------------|------------------------------|----------------|---------------------|----------------|---------|
| Minimum Educational Qualification | Specialization | Relevant Industry Experience | | Training Experience | | Remarks |
| | | Years | Specialization | Years | Specialization | |
| ITI | Electrical | 3 | 2 | 1 | Electrical | |

| Trainer Certification | |
|---|--|
| Domain Certification | Platform Certification |
| Certified for Job Role: Mechanic - Electrical, Electronics and Instrumentation mapped to QP: IES/Q.1105 – Version 2.0 Minimum accepted score 70% | Certified for Job Role: Mechanic - Electrical, Electronics and Instrumentation Minimum accepted score 70% |

Assessor Requirements

| Assessor Prerequisites | | | | | | |
|-----------------------------------|----------------|------------------------------|----------------|--------------------------------|----------------|---------|
| Minimum Educational Qualification | Specialization | Relevant Industry Experience | | Training/Assessment Experience | | Remarks |
| | | Years | Specialization | Years | Specialization | |
| ITI | Electrical | 3 | 2 | 1 | Electrical | |

| Assessor Certification | |
|---|---|
| Domain Certification | Platform Certification |
| <p>Certified for Job Role: Mechanic - Electrical, Electronics and Instrumentation mapped to QP: IES/Q1105 – Version 2.0 Minimum accepted score 70%.</p> | <p>Certified for Job Role: Mechanic - Electrical, Electronics and Instrumentation Minimum accepted score 70%.</p> |

Assessment Strategy

Criteria for assessment for Qualification Pack has been laid down based on the NOS's.

Each Performance Criteria (PC) has been assigned marks proportional to its importance within NOS and weightages have also been given among the NOSs accordingly.

The assessment of the theory/knowledge will be based on written test/viva or both while skill test shall be hands on practical.

Behavior and attitude will be assessed while performing the assigned task.

The assessment shall be done as per the guidelines formulated by IESC.

The assessment agencies in consultation with IESC will create unique question papers for theory/knowledge and practical skills at each IESC accredited testing centers (as per assessment criteria below)

To pass the Qualification Pack, every trainee should score a minimum of 70%.

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.

References

Glossary

| Term | Description |
|------------------------------|---|
| Declarative Knowledge | Declarative knowledge refers to facts, concepts and principles that need to be known and/or understood in order to accomplish a task or to solve a problem. |
| Key Learning Outcome | Key learning outcome is the statement of what a learner needs to know, understand and be able to do in order to achieve the terminal outcomes. A set of key learning outcomes will make up the training outcomes. Training outcome is specified in terms of knowledge, understanding (theory) and skills (practical application). |
| OJT (M) | On-the-job training (Mandatory); trainees are mandated to complete specified hours of training on site |
| OJT (R) | On-the-job training (Recommended); trainees are recommended the specified hours of training on site |
| Procedural Knowledge | Procedural knowledge addresses how to do something, or how to perform a task. It is the ability to work, or produce a tangible work output by applying cognitive, affective or psychomotor skills. |
| Training Outcome | Training outcome is a statement of what a learner will know, understand and be able to do upon the completion of the training. |
| Terminal Outcome | Terminal outcome is a statement of what a learner will know, understand and be able to do upon the completion of a module. A set of terminal outcomes help to achieve the training outcome. |

Acronyms and Abbreviations

| Term | Description |
|-------|---|
| QP | Qualification Pack |
| NSQF | National Skills Qualification Framework |
| NSQC | National Skills Qualification Committee |
| NOS | National Occupational Standards |
| PMKVY | Pradhan Mantri Kaushal Vikas Yojana |
| QRC | Qualification Review Committee |
| SSC | Sector Skill Council |
| SDMS | Skill Development Management System |
| SIP | Skill India Portal |
| HSE | Health Safety Environment |
| PPE | Personal Protective Equipment |
| PwD | Persons with disabilities |