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| **Model Curriculum** **QP Name:** **Supervisor Maintenance (Infrastructure Equipment)****QP Code: IES/Q1201****QP Version: 2.0****NSQF Level: 7****Model Curriculum Version: 1.0**  |
| **­** Infrastructure Equipment Skill Council (IESC) , Jubilee Building (Second Floor), No.45, Museum Road, Bengaluru - 560025 |

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 Training Parameters

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| --- | --- |
| Sector  | Infrastructure Equipment |
| Sub-Sector | Equipment Service and Spares |
| Occupation | Equipment Maintenance |
| Country | India |
| NSQF Level | 7 |
| Aligned to NCO/ISCO/ISIC Code | NCO-2015/7233 |
| Minimum Educational Qualiﬁcation and Experience  | Diploma in Mechanical Engineering3years’ experience in equipment maintenance |
| Pre-Requisite License or Training  | NIL |
| Minimum Job Entry Age | 25 Years |
| Last Reviewed On  | 11/01/2016 |
| Next Review Date | 31/05/2022 |
| NSQC Approval Date | 11/01/2016 |
| QP Version  | 2.0 |
| Model Curriculum Creation Date | 30/04/2022 |
| Model Curriculum Valid Up to Date | 31/05/2025 |
| Model Curriculum Version *<* | 1.0 |
| Minimum Duration of the Course | 660 Hours |
| Maximum Duration of the Course | 660 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 have acquired the listed knowledge and skills

* Monitor the maintenance of the engine and power train systems.
* Identify and use diagnostic tools and equipment to locate faults.
* Demonstrate the techniques for removal of defective components, rectification, re-assembly and testing.
* Understand the procedure for reporting and escalating unresolved problems.
* Plan and schedule the maintenance of the engine and power train system.
* Classify Health, safety and environment policies.

## Compulsory Modules

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| NOS and Module Details | TheoryDuration | PracticalDuration | On-the-Job Training Duration (Mandatory) | On-the-Job Training Duration (Recommended) | Total Duration |
| Bridge Module |  4 |  0 |  0 |  0 |  4 |
| NOS Code IES/N1201 NOS Name – Supervise preventive maintenance and minor repair workNOS Version - 2.0 NSQF Level - 4 |  30 |  120 |  0 |  120 |  270 |
| NOS Code – IES/N 1202NOS Name – Supervise corrective maintenance of equipmentNOS Version - 2.0NSQF Level - 4 |  30 |  120 |  0 |  120 |  270 |
| NOS Code - IES/N 7602NOS Name - Comply with Workshop Health and Safety GuidelinesNOS Version - 2.0NSQF Level - 4 |  16 |  40 |  0 |  60 |  120 |
| Total Duration |  80 |  280 |  0 |  300  |  660 |

# Module Details

# Module 1: Orientation

**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 Supervisor Maintenance (Infrastructure Equipment).

|  |  |
| --- | --- |
| Duration: *<4:00>* | Duration: *<0:00>* |
| **Theory – Key Learning Outcomes**  | **Practical – Key Learning Outcomes** |
| * Describe the importance of skill training and bridging the skill gap to improve work efficiency.
* Explain the roles and responsibilities of Supervisor Maintenance (Infrastructure Equipment).
* Understand and describe the scope of employment opportunities in the industry for Supervisor Maintenance (Infrastructure Equipment) job role
* Describe different technical trainings conducted in SSC to multi skill an individual.
 | NIL |
| **Classroom Aids:** |
| Computer, projector, printer, student table, whiteboard, flip chart, markers and duster |
| **Tools, Equipment and Other Requirements**  |
|  |

##  Module 2: Preventive Maintenance

**Mapped to NOS Code – IES/N 1201 v2.0**

##  Terminal Outcomes:

* Understand the importance of preventive maintenance to reduce the repair cost of the equipment
* Prepare a proper schedule to conduct preventive maintenance on all the equipment at the intervals specified by the manufacturer.
* Explain the process of planning and organising repair and maintenance in the most efficient and cost effective way.
* Read and understand the general instructions/ manuals/ guidelines related to equipment.

|  |  |
| --- | --- |
| Duration: *<*30:00*>* | Duration: *<*120:00*>* |
| **Theory – Key Learning Outcomes**  | **Practical – Key Learning Outcomes** |
| * Explain in depth the function and purpose of the equipment components such as engine, pump.
* Understand the importance of preventive maintenance to reduce the repair cost of the equipment.
* Elaborate the manufacturer’s recommendation on preventive maintenance measures.
 | * Monitor equipment periodical maintenance as per the schedule.
* Conduct preventive maintenance on the equipment.
* Discuss with the customer regarding the condition of the equipment.
* Plan for the repair of the components based on the results derived in preventive maintenance.
* Convince the customer of the importance of preventive maintenance before failure of the component.
 |
| **Classroom Aids:** |
| Computer, projector, printer, student table, whiteboard, flip chart, markers and dusterCut-outs and models of major parts like filters and pumps.Manufacturer’s Engine Service a n d Repair Manual  |
| **Tools, Equipment and Other Requirements**  |
| Diesel Engine 4 or 6 cylinder with Turbo charger & all related components,assemblies, accessories, standard tools and lab equipment for dis-assembly and assembly |

# Module 3: Corrective Maintenance

**Mapped to NOS Code – IES/N 1202 v2.0**

**Terminal Outcomes:**

* Test and confirm the failure of the component and identify the defect in the system.
* Explain the methods to troubleshoot various problems with diagnostic tools.
* Discuss with customers as and when necessary to understand problems and issues

Demonstrate the repair/replacement of defective components using approved tools and procedures.

* Prepare a repair estimate and arrange parts to complete the component repair.
* Prepare a complete list of parts to be procured and initiate procurement action.
* Prepare and maintain a file for the repair history file of every equipment.

|  |  |
| --- | --- |
| Duration: *<*30:00*>* | Duration: *<*120:00*>* |
| **Theory – Key Learning Outcomes**  | **Practical – Key Learning Outcomes** |
| * Test and confirm the failure of the component and identify the defect in the system.
* Explain the methods to troubleshoot various problems with diagnostic tools.
* Understand the manufacturer’s guidelines for regular maintenance and repair of the equipment.
* Know how to perform a failure analysis to find out the root cause of the failure.
 | * Discuss with customers as and when necessary to understand problems and issues.
* Demonstrate the repair/replacement of defective components using approved tools and procedures.
* Check the correctness of the parts list and repair estimate prepared by mechanic.
* Assign a mechanic to repair / replacement defective components, monitor and supervise.
* Prepare SOPs for the mechanic to check the performance of equipment components.
 |
| **Classroom Aids:** |
| Computer, projector, printer, student table, whiteboard/flip chart, markers and dusterCut-outs & models of major parts like filters and pumpsManufacturer’s Engine Service /Repair Manual  |
| **Tools, Equipment and Other Requirements**  |
| Diesel Engine 4/6 cylinder with Turbo charger & all related components/assemblies/ accessoriesStandard tools and lab equipment for dis-assembly and assembly |

# Module 4: Workshop health and safety

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

* Describe the guidelines for health, safety and security requirements.
* Discuss common hazards and risks at workshop and preventive measures.
* Employ safe practices when working with tools and machines.
* Explain the emergency procedure to stop/ shut down machinery.
* Demonstrate appropriate basic first aid treatment for common injuries.
* Demonstrate handling and using firefighting equipment.
* Elaborate the guidelines for storage and disposal of hazardous materials and waste.
* Describe various safety signs/symbols and warnings used in workshops and their meaning.

|  |  |
| --- | --- |
| Duration: *<*16:00*>* | Duration: *<*40:00*>* |
| **Theory – Key Learning Outcomes**  | **Practical – Key Learning Outcomes** |
| * Describe the Health, safety, environmental (HSE) policies and guidelines of the company & their importance.
* Explain the reporting channel and documentation procedure for all HSE related matters.
* List the contact details of personnel responsible for HSE related matters & in case of emergencies.
* Explain the emergency procedure to stop/ shut down machinery.
* Discuss common hazards and risks at workshop and preventive measures.
* Classify waste based on non- recyclable, hazardous and recyclable material.
* Describe various safety signs/symbols and warnings used in workshops and their meaning.
 | * Employ safe practices when working with tools and machines.
* Demonstrate the correct use of Personal Protective Equipment (PPE).
* Demonstrate handling and using firefighting equipment.
* Demonstrate appropriate basic first aid treatment for common injuries.
* Prepare a hazard log register and report incidents and accidents.
* Carry out a mock drill for firefighting, emergency exit escape routes, emergency equipment usage and assembling for evacuation.
* Demonstrate safe storage and disposal of hazardous materials and waste.
 |
| **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 |

**Annexure**

## Trainer Requirements

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| Trainer Prerequisites |
| Minimum Educational Qualification | **Specialization** | **Relevant Industry Experience**  | **Training Experience** | **Remarks**  |
| ***Years*** | ***Specialization*** | ***Years*** | ***Specialization*** |  |
| Diploma in Mechanical Engineering | Diesel Engine  |  **2** |  **1** |  **1** | Diesel Engine  |  |
| Trainer Certification |
| Domain Certification | **Platform Certification** |
| Certified for Job Role: Supervisor Maintenance (Infrastructure Equipment)mapped to QP: IES/Q 1201 – Version 2.0 Minimum accepted score 70% | Certified for Job Role: Supervisor Maintenance (Infrastructure Equipment) Minimum accepted score 70% |

## Assessor Requirements

|  |
| --- |
| Assessor Prerequisites |
| Minimum Educational Qualification  | **Specialization** | **Relevant Industry Experience** | **Training/Assessment Experience** | **Remarks**  |
| ***Years*** | ***Specialization*** | ***Years*** | ***Specialization*** |  |
| Diploma in Mechanical Engineering |  |  **3** |  |  **1** |  |  |

|  |
| --- |
| Assessor Certification |
| Domain Certification | **Platform Certification** |
| Certified for Job Role: Supervisor Maintenance (Infrastructure Equipment)mapped to QP: IES/Q 1201 – Version 2.0 Minimum accepted score 70% | Certified for Job Role: Supervisor Maintenance (Infrastructure Equipment) Minimum accepted score 70% |

## 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.

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# 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. |

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## [Acronyms and Abbreviations](#_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 |