



Model Curriculum

QP Name: Mechanic (Engine)

QP Code: IES/Q1101

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/Q01102 Junior Mechanic (Engine) 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 Engine.
- Describe the function Engine components.
- Perform daily and routine maintenance activities on the Engine.
- Employ suitable diagnostic tools for troubleshooting the problems in the Engine.
- Demonstrate the techniques for removal of defective components, rectification, re-assembly and testing.
- Elucidate the procedure for reporting and escalation of unresolved problems.
- Describe Environment, Health and Safety (EHS) policies.
- Demonstrate use of personal protective equipment, fire-fighting equipment. and show how to give basic first aid for common injuries.

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 1101 NOS Name -Repair Engine NOS Version - 3.0 NSQF Level - 4	30	90	60	0	180
NOS Code – IES/N 7701 NOS Name – Reporting and documentation NOS Version - 3.0 NSQF Level - 4	30	90	30	0	150
NOS Code - IES/N 7602 NOS Name - Comply with Workshop Health and Safety	30	30	0	0	60

Guidelines NOS Version - 3.0 NSQF Level - 4					
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 - Engine.

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 the Mechanic- Engine • Understand and describe the scope of employment opportunities in the industry for the Mechanic- Engine 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 Engine

Mapped to NOS Code – IES/N 1101 v 3.0

Terminal Outcomes:

- Understand the basic working principle of an Engine.
- Understand the function of Engine components.
- Read and understand the manufacturer’s manuals related to Engine operation & maintenance.
- Perform daily and routine maintenance activities on the Engine.
- Discuss with customers as and when necessary to understand problems and issues.
- Employ suitable techniques for troubleshooting various problems.
- Explain the process of repair and maintenance of Engine.
- Demonstrate the repair or replacement of defective engine components.

Duration: <30:00>	Duration: <150:00>
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Describe the working principle of an Engine. • Describe the functions of the Engine sub systems like fuel system, air system etc. • Understand and elaborate the repair procedure and limit of engine components. • Refer to the manufacturer’s manual for the correct procedure to conduct engine maintenance. • Understand the importance of cleanliness while working with engine components. • Understand the use of various diagnostic tools for troubleshooting problems in an Engine • Explain the correct sequence to troubleshoot problems in an engine. 	<ul style="list-style-type: none"> • Perform daily and periodical maintenance in the Engine. • Perform troubleshooting in the Engine for various problems. • Employ correct procedure as per manufacturer’s instructions to check the Engine oil pressure and other parameters. • Demonstrate the procedure to repair or replace defective components. • Remove and fit components from the Engine. • Dis assemble and assemble the Engine inside the workshop, when necessary. • Demonstrate the adjustment of valve tappet clearance. • Employ suitable practice to check the fuel consumption.
Classroom Aids:	
Computer, projector, student table, whiteboard / flip chart, markers and duster Manufacturer’s Engine Service and Repair Manual	
Tools, Equipment and Other Requirements	
Diesel Engine 4 or 6 cylinder with Turbocharger & all related components, assemblies, accessories, standard tools and lab equipment for dis-assembly and assembly	

Module 3: Reporting and Documentation

Mapped to NOS Code – IES/N 7701 v3.0

Terminal Outcomes:

- Describe the documenting process of various maintenance activities.
- Prepare a list of parts to be procured and initiate procurement action.
- Prepare a repair estimate of the component to be repaired
- Prepare and maintain a file for repair & maintenance history for every engine.
- 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"> • Understand the importance of maintaining data about engine maintenance and repair. • Describe the importance of filling documents and processing them. • Know the correct format in which to report problems with proper evidence. <p>Explain the escalation matrix Of the Organization to report unresolved problems.</p>	<ul style="list-style-type: none"> • Apply methods to escalate problems and incidents. • Prepare and maintain repair history file for every engine. • Use prescribed formats and record maintenance details accurately. • Employ suitable practice in keeping all the documents ready for inspection and audit. • Prepare the parts list and repair estimate to repair the component.
<ul style="list-style-type: none"> • Classroom Aids: <p>Computer, projector, student table, whiteboard / flip chart, markers and duster Manufacturer’s engine parts, service and repair manual.</p>	
Tools, Equipment and Other Requirements	

Module 4: Health and safety

Mapped to NOS Code: IES/N 7602 v3.0

Terminal Outcomes:

- Describe the guidelines for health, safety and security requirements.
- Identify common hazards and risks at workshop.
- Employ safe practices to use the tools and machines.
- Explain the emergency procedure to stop and shut down machinery.
- Carry out basic first aid treatment for common injuries.
- Demonstrate the operation of firefighting equipment.
- Elaborate the procedure for storage and disposal of hazardous materials.
- 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. 	<ul style="list-style-type: none"> • 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, 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	Diesel Engine	3	2	1	Diesel Engine	

Trainer Certification	
Domain Certification	Platform Certification
Certified for Job Role: Mechanic Engine mapped to QP: IES/Q 1101 – Version 3.0 Minimum accepted score - 70%	Certified for Job Role: Mechanic Engine Minimum accepted score - 70%

Assessor Requirements

Assessor Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training/Assessment Experience		Remarks
		Years	Specialization	Years	Specialization	
ITI	Diesel Engine	3	2	1	Diesel Engine	

Assessor Certification	
Domain Certification	Platform Certification
Certified for Job Role: Mechanic Engine mapped to QP: IES/Q1101 – Version 3.0 Minimum accepted score 70%	Certified for Job Role: Mechanic Engine 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.

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