



# Model Curriculum

**QP Name: Junior Backhoe Operator**

**QP Code: IES/Q0102**

**QP Version: 3.0**

**NSQF Level: 4**

**Model Curriculum Version: 1.0**

Infrastructure Equipment Skill Council, No.45, Jubilee Building (Second Floor), Museum Road,  
Bengaluru - 560025

# Table of Contents

Training Parameters .....	3
Program Overview.....	4
Training Outcomes .....	4
Compulsory Modules.....	4
Module Details .....	5
Annexure.....	12
Trainer Requirements.....	12
Assessor Requirements.....	13
Assessment Strategy.....	164
References .....	14
Glossary.....	174
Acronyms and Abbreviations .....	185

## Training Parameters

Sector	Infrastructure Equipment
Sub-Sector	Equipment Operation
Occupation	Junior Operator
Country	India
NSQF Level	4
Aligned to NCO/ISCO/ISIC Code	NCO-2015/8342.2101
Minimum Educational Qualification and Experience	Ability to Read and Write with 5 years of relevant experience OR 5th Class pass with 4 years of relevant experience OR 8th Class pass with 1 year of relevant experience OR 8th Class pass with 1 year of NTC/ NAC OR 8th Class pass and pursuing continuous schooling in regular school with vocational subject
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	300 Hours

Maximum Duration of the Course	300 Hours
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## 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 various components of the backhoe loader and their functions.
- Aid the operator in properly and effectively shifting loads.
- Identify common defects and general causes of breakdown.
- Describe the guidelines for health, safety and security requirements.

### 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 0104 NOS Name: Assist in carrying out pre-operation checks for backhoe operations NOS Version - 3.0 NSQF Level - 3	10	20	30	0	60
NOS Code – IES/N 0105 NOS Name – Assist in backhoe operations NOS Version - 3.0 NSQF Level - 3	30	60	30	0	120
NOS Code - IES/N 0106 NOS Name - Assist in regular maintenance of the backhoe loader NOS Version - 3.0 NSQF Level - 3	10	20	30	0	60
NOS Code - IES/N 7601 NOS Name - Comply with worksite health and safety guidelines NOS Version - 3.0 NSQF Level - 3	10	20	0	0	30
NOS Code - DST/VSQ/N0101	0	30	0	0	30

NOS Name - Employability Skills 30 hrs NOS Version - 1.0					
<b>Total Duration</b>	60	150	90	0	300

## Module Details

### Module 1: Orientation

#### Bridge Module

##### Terminal Outcomes:

- Describe the operations of the Infrastructure Industry in India.
- Outline the skill training schemes offered by Skill Sector Councils.
- Know the different types of job roles available in IESC.
- Explain the roles and responsibilities of the Junior Backhoe Loader Operator.

<b>Duration:</b> <4:00>	<b>Duration:</b> <0:00>
<b>Theory – Key Learning Outcomes</b>	<b>Practical – Key Learning Outcomes</b>
<ul style="list-style-type: none"> <li>• Describe the employment opportunities in the industry.</li> <li>• Explain the roles and responsibilities of a Junior Backhoe Loader Operator.</li> <li>• Describe the different technical trainings conducted in SSC.</li> </ul>	NIL
<b>Classroom Aids:</b>	
Computer, projector, printer, student table, whiteboard, flip chart, markers and duster	
<b>Tools, Equipment and Other Requirements</b>	

## Module 2: Assist in pre-op checks on backhoe loader

Mapped to NOS Code – IES/N0104 v 3.0

### Terminal Outcomes:

- Explain the responsibilities of the assigned job role.
- Classify the various components of the backhoe loader and their uses and functions.
- Assist with the inspection of ground conditions to assess safe operation of the backhoe loader.
- Understand how to record all repair activities in the equipment logbook
- Describe the procedure to check leaks in the equipment.

<b>Duration: &lt;10:00&gt;</b>	<b>Duration: &lt;50:00&gt;</b>
<b>Theory – Key Learning Outcomes</b>	<b>Practical – Key Learning Outcomes</b>
<ul style="list-style-type: none"> <li>• List the general safety rules for operating a backhoe loader.</li> <li>• Describe the operation of the engine and transmission and their functions.</li> <li>• Describe the working of various controls, levers, switches, instrument panel &amp; fuse box of the machine.</li> <li>• Describe the use of various tools provided with the machine.</li> <li>• Elaborate the procedure to check leaks in the equipment.</li> <li>• Explain the importance of greasing and lubricating backhoe loader components.</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate the procedure to check and grease all the greasing points</li> <li>• Prepare the periodic maintenance sheet of Backhoe Loader.</li> <li>• Illustrate the clearance between the drawbar ball and socket.</li> <li>• Assist in checking the engine, transmission, differential and hydraulic oil levels.</li> <li>• Create a checklist for pre operation inspection of the equipment to detect damage, flaws, cracks or leaks.</li> <li>• Demonstrate how to adjust the operator’s seat, rear and side mirrors and seat belts for ease of operation.</li> <li>• Show how to clean the air filter dust bowls and check that the gasket and inner filter are in good condition.</li> <li>• Demonstrate how to drain water and debris from the fuel tank.</li> <li>• Show how to check fan belt tension, battery electrolyte level and tightness of the terminals.</li> <li>• Demonstrate how to conduct visual inspection of various controls, gauges, warning lamp and other safety devices.</li> <li>• Examine the body of the backhoe loader for cracks and wear.</li> <li>• Inspect the parking brake, main</li> </ul>

	<p>horn, reverse horn, and headlights to ensure that they are in proper working order.</p> <ul style="list-style-type: none"> <li>• Prepare daily top-up plan of coolants, lubricants and fluids to ensure conformity with manufacturer's specifications.</li> <li>• Walk around the backhoe loader before starting it, to make sure no one is beneath it.</li> </ul>
<p><b>Classroom Aids:</b></p>	
<p>Computer, projector, printer, student table, whiteboard, flip chart, markers and duster Manufacturer's Service and Repair Manual</p>	
<p><b>Tools, Equipment and Other Requirements</b></p>	
<p>Safety Gear, Tool Kit, PPE</p>	

## Module 3: Assist in backhoe loader operations

Mapped to NOS Code – IES/N0105 v 3.0

### Terminal Outcomes:

- Assist the operator in properly and effectively in operating the machine.
- Assist in ascertaining the right location to begin operations
- Explain the different components of a backhoe loader and their functions.
- Describe all signs, warnings and other emergency signals.

<b>Duration:&lt;30::00&gt;</b>	<b>Duration:&lt;90:00&gt;</b>
<b>Theory – Key Learning Outcomes</b>	<b>Practical – Key Learning Outcomes</b>
<ul style="list-style-type: none"> <li>• Outline the performance standards &amp; procedures followed in the company.</li> <li>• Know the cost of the equipment and loss to the company resulting from its damage and the direct/indirect cost of accidents.</li> <li>• Outline the job role and responsibilities of the junior operator.</li> <li>• Explain the need for stabilisers when digging.</li> <li>• Elaborate the safe use of attachments like rock breaker.</li> <li>• Identify the tools in the tool kit and explain their use.</li> <li>• Know the advantages of documenting all activities in the prescribed formats in a timely manner.</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate how to examine the jobsite for loose soil, concealed deep ditches, or marshy spots where the backhoe loader might become trapped.</li> <li>• Demonstrate the use of emergency stop button.</li> <li>• Demonstrate how to utilise the priming pump and pre-heater to start the engine in extreme cold weather.</li> <li>• Demonstrate how to control the machine's speed and direction in accordance with the stated purpose.</li> <li>• Show how to fit the selected attachment.</li> <li>• Demonstrate effective use of stabilizers to ensure the backhoe loader is completely immobile while digging.</li> <li>• Demonstrate the importance of turning off and locking the backhoe loader when leaving it unattended.</li> <li>• Show how to examine the backhoe loader for any damage or defective components and report the same to the operator.</li> </ul>
<b>Classroom Aids:</b>	
Computer, projector, printer, student table, whiteboard, flip chart, markers and duster Manufacturer's Service and Repair Manual	
<b>Tools, Equipment and Other Requirements</b>	
Safety Gear, Tool Kit, PPE	



## Module 4: Assist with Routine maintenance & trouble shooting

Mapped to NOS Code: IES/N0106 v 3.0

### Terminal Outcomes:

- Explain the importance of the right service schedule.
- Identify common defects and general causes of breakdown.
- Demonstrate the procedure to respond to emergency situations.
- Explain the process to complete daily/weekly service sheets.
- Outline the company's performance criteria and processes.

Duration: <10:00>	Duration: <50:00>
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> <li>• Elaborate the fundamental mechanical system at work in the different operations of the backhoe loader.</li> <li>• Explain the consequences of process delays in repairing the machine.</li> <li>• List typical occupational hazards and techniques to overcome them.</li> <li>• Define safety protocols to be observed before undertaking any repair.</li> <li>• Identify all tools and equipment in the tool kit and where it is stored.</li> <li>• Explain the importance of the optimal levels of control indicators e.g. fuel gauge, engine oil pressure gauge and temperature gauge.</li> <li>• Describe why regular cleaning of air filter dust bowls is necessary.</li> <li>• Describe importance of daily greasing of all greasing pins and pivot points.</li> <li>• Identify the potential causes of any unusual noises coming from the engine.</li> <li>• Identify prominent places on the equipment for display of safety and maintenance stickers.</li> </ul>	<ul style="list-style-type: none"> <li>• Show how to check the battery electrolyte level and condition of the terminals and make minor adjustments as needed.</li> <li>• Create daily /weekly maintenance sheets in conformance with organization recommendation and machine running hours.</li> <li>• Demonstrate how to use appropriate props /support devices while doing maintenance.</li> <li>• Demonstrate the procedure to check and maintain the tyre rims, air pressure, wheel nuts and treads according to the manufacturer's recommendations.</li> <li>• Demonstrate how to position the locking bar to prevent the front and rear chassis moving.</li> <li>• Show how to clean the air filter dust bowls.</li> <li>• Demonstrate how to check and top up coolants, lubricants and fluids in conformance with manufacturer's specifications.</li> <li>• Show how to oil all greasing pins and pivot points.</li> <li>• Demonstrate how to drain water and debris from the fuel tank.</li> </ul>

<b>Classroom Aids:</b>	
Computer, projector, printer, student table, whiteboard, flip chart, markers and duster Manufacturer's Service and Repair Manual	
<b>Tools, Equipment and Other Requirements</b>	
Safety Gear, Tool Kit, PPE	

## Module 5: Health and safety

Mapped to NOS Code: IES/N 7601 v3.0

### Terminal Outcomes:

- Describe the guidelines for health, safety and security requirements.
- Identify the common hazards and risks at workshop.
- Employ safe practices to use the tools and machines.
- Explain emergency procedure to stop and shutdown machinery.
- Carry out basic first-aid treatment for common injuries.
- Demonstrate the operation of firefighting equipment.
- Describe the procedure for storage and disposal of hazardous materials and waste.
- Describe various safety signs, symbols and warnings used on site.

<b>Duration: &lt;10:00&gt;</b>	<b>Duration: &lt;20:00&gt;</b>
<b>Theory – Key Learning Outcomes</b>	<b>Practical – Key Learning Outcomes</b>
<ul style="list-style-type: none"> <li>• Describe the Health, safety, environmental (HSE) policies.</li> <li>• Explain the reporting procedure for all HSE activities.</li> <li>• List down the contact details of HSE personnel, in case of emergencies.</li> <li>• Explain safe working practices to avoid common hazards and risks.</li> <li>• Classify waste based on non-recyclable, hazardous and recyclable material.</li> </ul>	<ul style="list-style-type: none"> <li>• Show the correct use of Personal Protective Equipment (PPE).</li> <li>• Demonstrate safe procedure for lifting loads.</li> <li>• Demonstrate the operation of fire extinguishers.</li> <li>• Demonstrate the procedure to give basic first aid.</li> <li>• Prepare hazard log register and report incident and accidents.</li> <li>• Conduct mock drill for dealing with emergencies like fires and other calamities.</li> <li>• Demonstrate safe storage and disposal of waste.</li> </ul>
<b>Classroom Aids:</b>	
Computer, projector, printer, student table, whiteboard, flip chart, marker and duster	
<b>Tools, Equipment and Other Requirements</b>	
Fire Extinguishers, Personal Protective Equipment and other safety gears	

## Module 6: 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

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

## Annexure

### Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training/Assessment Experience		Remarks
		Years	Specialization	Years	Specialization	
Class VIII		3	2	1		

Trainer Certification	
Domain Certification	Platform Certification
<p>Certified for Job Role: Junior Backhoe Loader Operator Mapped to QP: IES/Q0102 Version2.0. Minimum accepted score 70%.</p>	<p>Certified for Job Role: Junior Backhoe Loader Operator Minimum accepted score 70%.</p>

## Assessor Requirements

Assessor Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training/Assessment Experience		Remarks
		Years	Specialization	Years	Specialization	
Class VIII		3	2	1		

Assessor Certification	
Domain Certification	Platform Certification
Certified for Job Role: Junior Backhoe Loader Operator Mapped to QP: IES/Q0102–Version2.0 Minimum accepted score 70%.	Certified for Job Role: Junior Backhoe Loader Operator Minimum accepted score 70%.

## Assessment Strategy

Criteria for assessment for Qualification Pack have 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
<b>Declarative Knowledge</b>	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.
<b>Key Learning Outcome</b>	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).
<b>OJT (M)</b>	On-the-job training (Mandatory); trainees are mandated to complete specified hours of training on site
<b>OJT (R)</b>	On-the-job training (Recommended); trainees are recommended the specified hours of training on site
<b>Procedural Knowledge</b>	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.
<b>Training Outcome</b>	Training outcome is a statement of what a learner will know, understand and be able to do upon the completion of the training.
<b>Terminal Outcome</b>	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