



# Model Curriculum

**QP Name: Junior Operator Crane**

**QP Code: IES/Q0111**

**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, Bengaluru - 560025

# Table of Contents

Training Parameters .....	3
Program Overview.....	4
Training Outcomes .....	4
Compulsory Modules.....	4
Module Details .....	5
<b>Annexure</b> .....	14
Trainer Requirements.....	14
Assessor Requirements .....	15
Assessment Strategy .....	186
References .....	17
Glossary .....	197
Acronyms and Abbreviations .....	208

## Training Parameters

Sector	Infrastructure Equipment
Sub-Sector	Equipment Operation
Occupation	Junior Operator
Country	India
NSQF Level	4
Aligned to NCO/ISCO/ISIC Code	NCO-2015/8343.0500
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

## 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:

- Explain the roles and responsibilities of the Junior Operator Crane.
- Explain the different types of cranes and their applications.
- Summarize the engine, hydraulic & electrical functions of the crane.
- Assist the operator in maintaining stability when transferring a load.
- Describe the controls, levers and switches needed to operate the crane efficiently.
- Understand all the typical occupational hazards and techniques to overcome them.
- Explain how to record machine running hours to determine the best service plan.
- Prepare and maintain a logbook to keep track of all actions.
- Describe the guide lines 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 0131 NOS Name: Assist in performing pre-operation checks on the Crane NOS Version - 2.0 NSQF Level - 3	10	20	30	0	60
NOS Code – IES/N 0132 NOS Name – Assist in operating a crane NOS Version - 2.0 NSQF Level - 3	30	60	30	0	120
NOS Code - IES/N 0133 NOS Name - Assist in regular maintenance of crane NOS Version - 2.0 NSQF Level – 3	10	20	30	0	60
NOS Code - IES/N 7601 NOS Name - Comply with worksite health and safety guidelines NOS Version - 2.0 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>	<b>60</b>	<b>150</b>	<b>90</b>	<b>0</b>	<b>300</b>

## Module Details

### Module 1: Orientation

#### Bridge Module

##### Terminal Outcomes:

- Describe the operations of Infrastructure industry in India.
- Elaborate the skill training schemes in Skill Sector Councils.
- Discuss about different types of job roles available in IESC.
- Explain the roles and responsibilities of the Junior Operator Crane.

<b>Duration:&lt;4:00&gt;</b>	<b>Duration:&lt;0:00&gt;</b>
<b>Theory – Key Learning Outcomes</b>	<b>Practical – Key Learning Outcomes</b>
<ul style="list-style-type: none"> <li>• Describe the scope of employment opportunities in the industry.</li> <li>• Explain the roles and responsibilities of a Junior Operator Crane.</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 of the Crane

Mapped to NOS Code – IES/N0131 v 2.0

### Terminal Outcomes:

- Outline the organization's procedures and guidelines related to crane operations.
- Explain the reporting structure in the Organization.
- Know the emergency organization of the specific work site.
- Summarize the engine, hydraulic & electrical functions of a crane
- Confirm that all labels are visible and in position according to the operating manual
- Determine the procedure to check that all compartment lids are in place and locked in accordance with the operating manual.
- Perform a visual inspection of the entire crane for cracks in welds and the structural components.
- Understand the risks and consequences of not adhering to established processes and job instructions.

<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>• Classify the different types of cranes and their applications and functions.</li> <li>• Elucidate the importance of greasing and oiling crane components that require routine lubrication.</li> <li>• Explain the use of various controls, levers and switches in order to operate the crane properly.</li> <li>• Know about the various types of hand signals &amp; emergency signs used on the site.</li> <li>• Record any deviations or occurrences that do not conform to the specified standards.</li> <li>• Know the escalation matrix for reporting unresolved problems.</li> <li>• Know the parameters to be included in a checklist for pre operation inspection of the equipment to detect damage, flaws, cracks or leaks.</li> <li>• Explain the importance of maintaining a log book to record all actions completed prior to starting the crane.</li> </ul>	<ul style="list-style-type: none"> <li>• Inspect all the ground engaging tools to ensure stability.</li> <li>• Demonstrate the procedure to check the tyre pressure and lug nut torque according to the manufacturer's recommendations.</li> <li>• Elaborate the steps to ensure that the cables and grappling devices are in accordance with the manufacturer's specifications.</li> <li>• Assist in visual inspection for cracks, damage, flaws, or leaks is performed before operation.</li> <li>• Show how to check the hydraulic power unit, reservoir, hoses, fittings and cylinders for oil leaks and ensure that the oil level is according to the manufacturer's indication.</li> <li>• Assist in hoisting and release of the load at a low height to ensure that the holding and control brakes are working properly.</li> <li>• Assist in checking the electrical components, wiring and electrical cables and manifolds platform for damage, improper installation or missing parts.</li> </ul>

- Assist in checking the turntable and wear pads for damage, improper installation or missing parts.
- Assist in checking the tyres and wheels, trailer lights and reflectors, parking brake and electric braking system (including the breakaway system), drive wheel and motor for damage, improper installation or missing parts.
- Assist in checking the outriggers, hoist limit switches, hitch components and safety chains.
- Check that all associated fasteners and pins are in position and properly fastened.
- Check that all compartment lids are in place and locked properly.
- Prepare a maintenance logbook in which all actions conducted prior to operating the crane are recorded.
- Prepare a daily top-up plan of coolants, lubricants and fluids to ensure conformity with the manufacturer's specifications.
- Assist in testing that the main horn, reverse horn, and headlights are in good working order.
- Assist in examining the different controls, gauges, warning lights, and other safety devices to ensure that they are working.
- Demonstrate how to adjust the operator's seat, rear and side mirrors and seat belt for ease of operation.
- Demonstrate how to check that the greasing points and pivots are properly greased.
- Demonstrate how to clean the air filter dust bowls and check that the gasket and inner filter are in good condition.
- Demonstrate how to drain water and debris from the fuel tank.
- Demonstrate how to check the fan belt tension, battery electrolyte

	level and tightness of the terminals.
<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 3: Assist in Crane operations

Mapped to NOS Code – IES/N0132 v 2.0

### Terminal Outcomes:

- Demonstrate the techniques for preventing crane tipping.
- Explain the responsibilities of the Junior Operator Crane in his assigned job role.
- Assist the operator in maintaining stability when transferring a load.
- Assist in examining that the ground on which the crane is assembled/stationed is solid and level.
- Explain the correct maintenance procedures for cranes.
- Explain the controls, levers and switches for efficient operation of the crane.
- Assist the operator in reading the load charts to accurately determine the load to be lifted.
- Determine the causes of crane related accidents and associated preventive measures.
- Expound the importance of positioning and application of the crane.

<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>• Know the crane load bearing capacity and types of loads it can carry.</li> <li>• Determine the usage of appropriate attachment available as ad-ons with the main crane.</li> <li>• Know how to use the rigging hardware and slings.</li> <li>• Explain the use of various sorts of rigging setups.</li> <li>• Know the hook-up points to balance the load as per its centre of gravity.</li> <li>• Know the conditions and hazards that may impact the stability of the crane.</li> <li>• Elaborate crane tipping prevention techniques.</li> <li>• Explain why the crane is always assembled /stationed on solid, level ground.</li> <li>• Expound the importance of position and application of the crane.</li> <li>• Explain the importance of having the outriggers extended fully.</li> <li>• Know the importance of walking around the crane before starting it.</li> </ul>	<ul style="list-style-type: none"> <li>• Assist the operator in hooking the load to the slings, shackles, and chains in accordance with the operations handbook.</li> <li>• Assist the operator during the hoisting process to make sure that there are no barriers, people, or other obstructions.</li> <li>• Assist in examining the soil condition of the worksite to identify where to station the crane so that it does not get trapped.</li> <li>• Assist the operator in maintaining stability when transferring a load.</li> <li>• Assist the rigger in instructing the operator on how to carry out lifting of the load.</li> <li>• Demonstrate how to check that the wind speeds are within the crane's operational limitations.</li> <li>• Demonstrate how to utilise the priming pump and pre-heater to start the engine in extreme cold weather.</li> <li>• Show how to wear the seatbelt and adjust the seat position.</li> </ul>

<ul style="list-style-type: none"> <li>• Know the hazard of improper boom extension.</li> <li>• Outline the procedure to notify the Operator if a fault is found that is outside the scope of the Junior operator crane's job role.</li> <li>• Identify the tools in the tool kit, explain their use and know the storage place of the kit.</li> <li>• Explain the significance of greasing and oiling parts of the crane.</li> <li>• Know the optimal engine oil pressure and radiator coolant temperature.</li> <li>• Describe the risk and consequences of failing to follow clearly specified procedures /work instructions.</li> </ul>	<ul style="list-style-type: none"> <li>• Show the position of the emergency stop button to disable all power to the crane.</li> <li>• Describe the instrument panel, its position and its functions.</li> <li>• Assist in test checking product load in order to avoid overloading during operations.</li> <li>• Assist in selecting the appropriate attachment as per the job requirement.</li> <li>• Give examples of all signs, warnings, and other emergency signals.</li> <li>• Check that the laydown area is large enough to support the load and is free of obstruction.</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 4: Assist in crane routine maintenance & trouble shooting

Mapped to NOS Code: IES/N0133 v 2.0

### Terminal Outcomes:

- Explain the organization's procedures and guidelines related to breakdown & maintenance services.
- Elaborate the various components of the crane and their functions.
- Check the crane for deformed, cracked or corroded members in the structure and boom.
- Assist in the reporting procedures established by the employer.
- List typical defects and general reasons of failure.
- Check the crane wire ropes for wear and tear.

Duration: <10:00>	Duration: <50:00>
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> <li>• Outline the organization's procedures and guidelines related to breakdown &amp; maintenance services.</li> <li>• Explain the various components of the crane and their functions.</li> <li>• Elaborate the various controls and switches needed to operate the crane properly.</li> <li>• Elaborate the fundamental mechanical system at work in the different operations of the crane.</li> <li>• Identify the potential causes of any unusual noises coming from the engine and other parts of the crane.</li> <li>• List parameters to be covered in the periodic maintenance sheet.</li> <li>• Explain the importance of timely completion of daily/ weekly maintenance sheets.</li> <li>• Define safety protocols to be observed before undertaking any repair.</li> <li>• Define the scope of the position and when and to whom to escalate for help.</li> <li>• Identify common defects and general causes of breakdown.</li> </ul>	<ul style="list-style-type: none"> <li>• Assist the operator in checking the hydraulic system of the crane as per the operation &amp; maintenance manual.</li> <li>• Assist in checking the alignment of the lattice boom with the main boom.</li> <li>• Examine the crane wire ropes for wear and tear and strain.</li> <li>• Check the crane structure for deformed, cracked or corroded members in the structure and boom, excessive wear on brake and clutch system parts.</li> <li>• Assist in checking the marking on the load/radius indicator over full range, load moment indicator and boom angle indicator.</li> <li>• Assist in checking the working of the anti-two-block system.</li> <li>• Assist in checking the lift cylinder(s), telescoping cylinder(s), hydraulic hoses / tubing &amp; fittings, holding device, auxiliary boom head structure in the main boom.</li> <li>• Grease all greasing pins and pivot points.</li> </ul>

<ul style="list-style-type: none"> <li>• Explain the importance of the optimal levels of control indicators e.g. fuel gauge, engine oil pressure and temperature.</li> <li>• Describe the importance of regular cleaning of air filter dust bowls.</li> <li>• Identify prominent places on the equipment for display of safety and maintenance stickers.</li> <li>• Describe the importance of daily greasing of all greasing pins and pivot points.</li> </ul>	<ul style="list-style-type: none"> <li>• Help to carry out periodic maintenance as per the checklist.</li> <li>• Help the operator to use appropriate props /support devices while doing maintenance.</li> <li>• Check the air pressure in the tyres and the tightness of the wheel nuts.</li> <li>• Prepare a daily top-up plan of coolants, lubricants and fluids to ensure conformity with the manufacturer’s specifications.</li> <li>• Drain water and debris from the fuel tank.</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 5: Health and safety

Mapped to NOS Code: IES/N 7601 v2.0

Terminal Outcomes:

- Describe the organisation’s health, safety and security policies.
- Identify the common hazards and risks at workshop.
- Employ safe practices to use the tools and machines.
- Explain the emergency procedure to stop and shutdown 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 and waste.
- Classify various safety signs, symbols and warnings used at site.

**Duration:** <10:00>

**Duration:** <20:00>

Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<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>• Report all health and safety related incidents/accidents.</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 the safe procedure for lifting loads.</li> <li>• Demonstrate the operation of the fire extinguisher.</li> <li>• Demonstrate the procedure to give basic first aid.</li> <li>• Conduct a 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 Experience		Remarks
		Years	Specialization	Years	Specialization	
CLASS VIII		3	2	1		

Trainer Certification	
Domain Certification	Platform Certification
Certified for Job Role: Junior Operator Crane Mapped to QP: IES/Q111 Version2.0 Minimum accepted score 70%.	Certified for Job Role: Junior Operator Crane Minimum accepted score 70%.



## 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
<p>Certified for Job Role: Junior Operator Crane Mapped to QP: IES/Q111–Version2.0 Minimum accepted score 70%.</p>	<p>Certified for Job Role: Junior Operator Crane Minimum accepted score 70%.</p>

## 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 40% in each NOS and 50% aggregate.

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