



# Model Curriculum

**QP Name: Hydra Crane Operator**

**QP Code: IES/Q0108**

**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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# Table of Contents

Training Parameters .....	3
Program Overview.....	4
Training Outcomes .....	4
Compulsory Modules.....	4
Module Details .....	5
Annexure.....	15
Trainer Requirements.....	15
Assessor Requirements .....	16
Assessment Strategy .....	177
References .....	18
Glossary .....	188
Acronyms and Abbreviations .....	199

## Training Parameters

Sector	Infrastructure Equipment
Sub-Sector	Equipment Operation
Occupation	Operator
Country	India
NSQF Level	4
Aligned to NCO/ISCO/ISIC Code	NCO-2015/8343.0500
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/Q0111 - Junior Operator Crane NSQF Level 3 with minimum education as 5th Grade pass with 2 year relevant experience
Pre-Requisite License or Training	Light Commercial Vehicle Driving License (LCV) is preferred
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:

- Outline the organization's procedures and guidelines related to hydra crane operations.
- Explain the roles and responsibilities of the hydra crane Operator.
- Classify the different types of hydra cranes and their applications and functions.
- Describe the controls, levers and switches needed to operate the hydra crane efficiently.
- Elaborate the crane tipping prevention technique.
- Employ safe practices to use the tools and equipment.
- 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
<b>Bridge Module</b>	4	0	0	0	4
<b>NOS Code – IES/N 0122</b> <b>NOS Name: Carry out pre-operations checks on a hydra crane</b> <b>NOS Version - 3.0</b> <b>NSQF Level - 4</b>	<b>30</b>	<b>30</b>	<b>60</b>	<b>0</b>	<b>120</b>
<b>NOS Code – IES/N 0123</b> <b>NOS Name – Operate a hydra crane</b> <b>NOS Version - 3.0</b> <b>NSQF Level - 4</b>	<b>30</b>	<b>60</b>	<b>30</b>	<b>0</b>	<b>120</b>
<b>NOS Code - IES/N 0124</b> <b>NOS Name - Perform routine maintenance and troubleshooting of a hydra crane</b> <b>NOS Version - 3.0</b> <b>NSQF Level - 4</b>	<b>30</b>	<b>30</b>	<b>60</b>	<b>0</b>	<b>120</b>
<b>NOS Code - IES/N 7601</b>		<b>30</b>	<b>0</b>	<b>0</b>	<b>30</b>

NOS Name - Comply with worksite health and safety 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
<b>Total Duration</b>	<b>90</b>	<b>180</b>	<b>150</b>	<b>0</b>	<b>420</b>

## Module Details

### Module 1: Orientation

#### Bridge Module

##### Terminal Outcomes:

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

<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 hydra crane 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: Pre-op checks on Hydra Crane

Mapped to NOS Code – IES/N0122 v 3.0

### Terminal Outcomes:

- Outline the organisation's performance criteria and processes.
- Classify the different types of hydra cranes and their applications and functions.
- Know the basic working of engine, transmission and other systems of the hydra crane.
- Illustrate the importance of greasing and oiling crane components that require routine lubrication.
- Elaborate the procedure to check that all associated fasteners and pins are in position and properly fastened.
- Perform a visual inspection of the entire hydra crane for cracks in welds and the structural components.
- Understand the risks and consequences of not adhering to established processes and job instructions.
- Know the reporting structure in the organization, schedule for resolving the complaint/problem and escalation matrix for reporting unresolved problems.
- Know the emergency organization of the specific work site.

<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 organization's procedures and guidelines related to breakdown &amp; maintenance services.</li> <li>• Explain the different types of cranes and their applications and functions.</li> <li>• Know the escalation matrix for reporting unresolved problems.</li> <li>• Know the basic working of engine, transmission, hydraulic, electrical and other systems of the hydra crane.</li> <li>• Describe the various controls and switches needed to operate the hydra crane properly.</li> <li>• Explain the importance of greasing and oiling crane components that require routine lubrication.</li> <li>• Know about the various types of hand signals &amp; emergency signs used on the site.</li> <li>• Record deviations and occurrences that do not conform to the specified standards.</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate how visual inspection for cracks, damage, flaws, or leaks is performed before operation.</li> <li>• Describe how to check the tyre pressure and lug nut torque.</li> <li>• Elaborate the methods to check that all structural and other key components are present and in working order.</li> <li>• Hoist and release the load at a low height to ensure that the holding and control brakes are working properly.</li> <li>• Check the electrical components, wiring and electrical cables, hydraulic power unit, reservoir, hoses, fittings, cylinders and manifolds platform for damage, improper installation or missing parts.</li> <li>• Check tyres, wheels and reflectors.</li> <li>• Check the parking brake, drive wheel and motor.</li> <li>• Check that all associated fasteners and pins are in position and properly fastened.</li> </ul>

<ul style="list-style-type: none"> <li>• Know what parameters are to be included in a checklist for pre operation inspection of the hydra crane to detect damage, flaws, cracks or leaks.</li> <li>• Know the importance of maintaining a log book to record all actions completed prior to starting the hydra crane.</li> </ul>	<ul style="list-style-type: none"> <li>• Check that all compartment lids are in place and locked.</li> <li>• Prepare a maintenance logbook in which all actions conducted prior to operating the hydra crane are recorded.</li> <li>• Prepare a daily top-up plan of coolants, lubricants and fluids to ensure conformity with the manufacturer’s specifications.</li> <li>• Test that the main horn, reverse horn, and headlights are in good working order.</li> <li>• Examine the different controls, gauges, warning lights, horns and other safety devices to ensure that they are working.</li> <li>• Demonstrate how to adjust the operator’s seat, rear and side mirrors and seat belt for ease of operation.</li> <li>• Demonstrate the procedure to check that the greasing points and pivots are properly greased.</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> </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 3: Operation of a Hydra Crane

Mapped to NOS Code – IES/N0123 v 3.0

### Terminal Outcomes:

- Outline the reporting structure of the company.
- Explain the responsibilities of the operator in his assigned job role.
- Explain the controls, levers and switches for efficient operation of the hydra crane.
- Summarize the methods to read load charts and accurately determine the load to be lifted.
- Determine the causes of hydra crane related accidents and associated preventive measures.
- Expound the importance of positioning as per application of the hydra crane.
- Examine the soil condition of the worksite to identify where to station the hydra crane.
- Determine the conditions and hazards that may impact hydra crane stability.
- Elaborate the crane tipping prevention technique.

<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 organization's performance criteria and processes.</li> <li>• Discuss the manufacturer's criteria for hydra crane operations.</li> <li>• Explain the use of various sorts of rigging setups.</li> <li>• Elucidate the techniques of the hoisting operation.</li> <li>• Summarize the various government regulations and other regulations imposed by crane safety standards.</li> <li>• Explain the use of various controls, levers and switches that are required to properly operate the hydra crane.</li> <li>• Know the hydra crane load bearing capacity and types of loads it can carry.</li> <li>• Know the use of proper rigging hardware and slings technique.</li> <li>• Know the load hook-up points.</li> <li>• Know the conditions and hazards that may impact the stability of the crane.</li> <li>• Elaborate crane tipping prevention techniques.</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate how to ensure safe working load as per the operation manual.</li> <li>• Show how to monitor stability while moving a load.</li> <li>• Demonstrate how to use the sling, shackle and chains.</li> <li>• Illustrate how to carry out lifting of load in coordination with the rigger.</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> <li>• Know the position of the emergency stop button to disable all power to the hydra crane.</li> <li>• Describe the instrument panel, its position and its functionality.</li> <li>• Demonstrate how to adjust the hydra crane's speed and direction in accordance with the requirement.</li> </ul>



<ul style="list-style-type: none"> <li>• Expound the importance of positioning as per application of the hydra crane.</li> <li>• Plan work according to the required schedule and location.</li> <li>• Know the importance of walking around the hydra crane. before starting it.</li> <li>• Know how to choose the appropriate kind of brake in various scenarios and conditions.</li> <li>• List methods to enhance the operational efficiency of the hydra crane.</li> <li>• Outline the procedure to notify the supervisor if a fault is found that is outside the scope of the operator’s job role.</li> <li>• Know the cost of the equipment and loss to the Organization resulting from its damage and the direct/ indirect cost of accidents.</li> <li>• Identify the tools in the tool kit, explain their use and know the kit storage place.</li> <li>• Know the optimal engine oil pressure and radiator coolant temperature.</li> <li>• Identify immediate or temporary solutions to resolve mechanical issues.</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 how to test check product load in order to avoid overloading during operations.</li> <li>• Demonstrate turning radius of the hydra crane and safe operation in limited space.</li> <li>• Ensure that there are no barriers, people, or other impediments throughout the lifting procedure.</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: Routine maintenance & trouble shooting

Mapped to NOS Code: IES/N0124 v 3.0

### Terminal Outcomes:

- Outline the reporting structure in the company.
- Classify the various components of the hydra crane and their functions.
- Explain how to plan the correct service schedule on the basis of the hydra crane working hours.
- Demonstrate the process to find typical defects and general reasons of failure.
- Determine the steps to check the hydra crane wire ropes for wear and tear.

Duration: <30:00>	Duration: <90:00>
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> <li>• Outline the organizations procedures and guidelines related to breakdown &amp; maintenance services.</li> <li>• Elaborate the use of various control and switches needed to operate the hydra crane properly.</li> <li>• Explain the underlying mechanical and electrical system involved in the hydra crane various functions.</li> <li>• List out typical defects and general reasons of failure.</li> <li>• Identify the possible sources of any unusual sound emanating from the engine and other parts.</li> <li>• Explain the various components of the hydra crane and their functions.</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> </ul>	<ul style="list-style-type: none"> <li>• Exhibit the procedure to check the hydraulic system of the hydra crane as per the operation &amp; maintenance manual.</li> <li>• Employ suitable practise to check wire ropes for wear and tear.</li> <li>• Illustrate the process of greasing all the greasing pins and pivot points in accordance with the operation and maintenance handbook.</li> <li>• Check the crane structure for deformed, cracked or corroded members.</li> <li>• Check the cables, brakes and levers for poor adjustment or excessive wear.</li> <li>• Check the marking on the load, radius indicator over full range, load moment indicator, boom angle indicator.</li> <li>• Check lift cylinder(s), hydraulic hoses / tubing &amp; fittings and holding device.</li> <li>• Inspect to make sure that no engine repair is conducted while</li> </ul>

<ul style="list-style-type: none"> <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>• 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>	<p>the engine is running or remains hot.</p> <ul style="list-style-type: none"> <li>• Carry out periodic maintenance as per the checklist.</li> <li>• Demonstrate how to use appropriate props /support devices while doing maintenance.</li> <li>• Demonstrate how to clean the air filter dust bowls.</li> <li>• Demonstrate the procedure to check and maintain 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>• Demonstrate how to 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 v3.0

Terminal Outcomes:

- Describe the organisation's health, safety and security policies.
- Identify the common hazards and risks at site.
- 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.
- Elaborate the procedure for storage and disposal of hazardous materials and waste.
- Classify various safety signs, symbols and warnings used at 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 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>• Prepare a hazard log register to report incidents and accidents.</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

Duration: <00:00>	Duration: <30:00>
<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
<p>Certified for Job Role: Hydra Crane Operator Mapped to QP: IES/Q0108 Version2.0. Minimum accepted score 70%.</p>	<p>Certified for Job Role: Hydra Crane 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: Hydra Crane Operator Mapped to QP: IES/Q0108–Version2.0 Minimum accepted score 70%.	Certified for Job Role: Hydra Crane 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