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| **Model Curriculum** **QP Name: Vessel Operator Grade 2 Elective – Deck Operations/ Engine Operations)****(Options – Tug Vessel Operations/ Profit Management/ Ship and Yard Planning)** **QP Code: LSC/Q4102****QP Version: 2.0** **NSQF Level: 4****Model Curriculum Version: 2.0**  |
| **­**Logistics Sector Skill Council|| Logistics Sector Skill Council, Ground Floor, Temple Tower, No.476, Anna Salai, Nandanam, Chennai, Tamil Nadu 600035 |

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**Training Parameters**

|  |  |
| --- | --- |
| **Sector**  | Logistics |
| **Sub-Sector** | Inland Waterways |
| **Occupation** | Deck Operations, Vessel Operations, Engine Operations,  |
| **Country** | India |
| **NSQF Level** | 4 |
| **Aligned to NCO/ISCO/ISIC Code** | Currently N/a, available only for sea faring vessels |
| **Minimum Educational Qualiﬁcation and Experience**  | 12th grade pass Or Completed 2nd year of 3-year diploma (after 10th) and pursuing regular diploma Or 10th grade pass plus 2-year NTCOr 10th grade pass plus 1-year NTC plus 1 year NAC Or 8th pass plus 2-year NTC plus 1- Year NAC plus CITS Or 10th grade pass and pursuing continuous schooling Or 10th Grade Pass + 2 year relevant experienceOr Certificate - NSQF (Vessel Operator Grade 1 - Level 3) with minimum education as 8th Grade pass + 3 year relevant experienceOr Previous relevant Qualification of NSQF Level 3.5 + 1.5 year relevant experience |
| **Pre-Requisite License or Training**  | NA |
| **Minimum Job Entry Age** | 18 |
| **Last Reviewed On**  | NA |
| **Next Review Date** | NA |
| **NSQC Approval Date** | NA |
| **QP Version**  | 2.0 |
| **Model Curriculum Creation Date** | 03-08-2022 |
| **Model Curriculum Valid Up to Date** | 03-08-2025 |
| **Model Curriculum Version**  | 2.0 |
| **Minimum Duration of the Course** | 540 |
| **Maximum Duration of the Course** | 810 |

# 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 will be able to:

* Plan the navigation route based on draught level, weather and other parameters and manage navigation.
* Troubleshoot, repair and maintain all equipment in deck and engine.
* Execute advanced welding and fitting operation to maintain the equipment.
* Budget and allocate resources for vessel operations.
* Comply to work place integrity, ethical and regulatory practices.
* Manage workplace for safe and healthy work environment by following and ensuring compliance to regulatory and safety norms.
* Steer the vessel and ensure safe navigation, berthing and de-berthing of vessel
* Perform accurate cargo loading, unloading, stowage, security and inventory in vessel
* Train and onboard deck crew on basic navigation, troubleshooting for maintenance, cargo handling, watchkeeping and other deck processes
* Monitor and guide engine room activities to ensure smooth operation of the vessel
* Overhaul and maintain optimal operations of engine and related equipment
* Train and onboard engine crew on basic engine room operations, welding and fitting, troubleshooting for maintenance, oiling and greasing and engine room processes
* Plan, navigate and operate tug vessel to move the attached vessel to the desired location
* Manage business profitably by analysing profit and loss and undertaking operations improvement initiatives
* Plan and manage yard for optimal and efficient storage and compliance to regulatory requirements

## Compulsory Modules

The table lists the modules, their duration and mode of delivery.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| NOS and Module Details | TheoryDuration | PracticalDuration | On-the-Job Training Duration (Mandatory) | On-the-Job Training Duration (Recommended) | Total Duration |
| Bridge Module | **20** | **10** |  |  | **30** |
| Module 1: Introduction to Vessel Operator Grade 2 | 20 | 10 |  |  | 30  |
| [[LSC/N4104 - Perform navigation](file:///D%3A%5C%5CReenaoffice%5C%5CQP%20-%2033%5C%5CLSCQ4101_Vessel%20Operator%20Grade%201_QP.docx%22%20%5Cl%20%22NOS1_navigation)](#NOS1_navigation)V1.04 | **20** | **35** | **5** |  | **60** |
| Module 2: Advanced vessel navigation  | 20 | 35 | 5 |  | 60 |
| [[LSC/N4005 - Repair and maintenance](file:///D%3A%5C%5CReenaoffice%5C%5CQP%20-%2033%5C%5CLSCQ4101_Vessel%20Operator%20Grade%201_QP.docx%22%20%5Cl%20%22NOS2_maint)](#NOS2_maint) [of vessel](file:///D%3A%5C%5CReenaoffice%5C%5CQP%20-%2033%5C%5CLSCQ4101_Vessel%20Operator%20Grade%201_QP.docx%22%20%5Cl%20%22NOS2_maint)V1.04 | **20** | **35** | **5** |  | **60** |
| Module 3: Repair and maintenance of vessel | 20 | 35 | 5 |  | 60 |
| [[LSC/N4006 -Perform welding, cutting and machining](file:///D%3A%5C%5CReenaoffice%5C%5CQP%20-%2033%5C%5CLSCQ4101_Vessel%20Operator%20Grade%201_QP.docx%22%20%5Cl%20%22NOS3_mooring)](#NOS3_welding_cutting)V1.04 | **20** | **35** | **5** |  | **60** |
| Module 4: Welding, cutting, and machining operations in vessel | 20 | 35 | 5 |  | 60 |
| LSC/N3531- Allocate resources and manage storesV1.04 | **20** | **35** | **5** |  | **60** |
| Module 5: Resource allocation and store management | 20 | 35 | 5 |  | 60 |
| LSC/N9904 - Maintain integrity and ethics in operations V1.04 | **20** | **35** | **5** |  | **60** |
| Module 6: Guidelines on integrity and ethics | 20 | 35 | 5 |  | 60 |
| [LSC/N4102- Follow health, safety and security](#health_safety) procedures on vessel V1.03 | **20** | **35** | **5** |  | **60** |
| Module 7: Compliance to health, safety and security norms | 20 | 35 | 5 |  | 60 |
| Employability Skills | **30** | **30** |  |  | **60** |
| Total Duration | **170** | **250** | **30** |  | **450** |

## Elective Modules

The table lists the option modules, their duration and mode of delivery.

**Elective 1: Advanced Deck Operations**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| NOS and Module Details | TheoryDuration | PracticalDuration | On-the-Job Training Duration (Mandatory) | On-the-Job Training Duration (Recommended) | Total Duration |
| [[LSC/N4105 - Vessel handling and steering](#NOS_E1_lookout)](#NOS_E1_1_steering) **V1.0****4** | **15** | **15** |  |  | **30** |
| Module 8: Vessel handling and steering | 15 | 15 |  |  | 30 |
| [[LSC/N4007- Cargo facilitation during loading and discharge](#NOS_E2_cargo)](#NOS_E1_2_cargo)**V1.0**4 | **15** | **15** |  |  | **30** |
| Module 9: Stowed cargo safety and security in vessel | 15 | 15 |  |  | 30 |
| [[LSC/N4008 -Onboard training of crew](#NOS_E2_deck)](#NOS_E1_3_decktraining) [members for deck operations](#NOS_E2_deck)[Perform deck assistance](#NOS_E2_deck)**V1.0**4 | **15** | **15** |  |  | **30** |
| Module 10: Training of crew on deck operations | 15 | 15 |  |  | 30 |
| Total Duration | **45** | **45** |  |  | **90** |

**Elective 2: Advanced Engine Operations**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| NOS and Module Details | TheoryDuration | PracticalDuration | On-the-Job Training Duration (Mandatory) | On-the-Job Training Duration (Recommended) | Total Duration |
| [LSC/N4204 – Supervise engine operation and troubleshooting](#NOS_E1_3_decktraining) **V1.0****4** | **15** | **15** |  |  | **30** |
| Module 11: Engine operation and troubleshooting | 15 | 15 |  |  | 30 |
| LSC/N4203: Assist in overhauling of engine and auxillary equipment V1.04 | **15** | **15** |  |  | **30** |
| Module 12: Overhauling of engine and auxillary equipment | 15 | 15 |  |  | 30 |
| LSC/N4205: Onboard training of crew members for engine operationsV1.04 | **15** | **15** |  |  | **30** |
| Module 13: Training of crew on engine operations | 15 | 15 |  |  | 30 |
| Total Duration | **45** | **45** |  |  | **90** |

## Option Modules

The table lists the option modules, their duration and mode of delivery.

**Option 1: Tug vessel operations**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| NOS and Module Details | TheoryDuration | PracticalDuration | On-the-Job Training Duration (Mandatory) | On-the-Job Training Duration (Recommended) | Total Duration |
| **LSC/N4106 – Manage tug vessel operations****V1.0****4** | **30** | **30** |  |  | **60** |
| Module 14: Tug vessel operations | 30 | 30 |  |  | 60 |
| Total Duration | **30** | **30** |  |  | **60** |

**Option 2: Profit management**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| NOS and Module Details | TheoryDuration | PracticalDuration | On-the-Job Training Duration (Mandatory) | On-the-Job Training Duration (Recommended) | Total Duration |
| **LSC/N9603 – profit and loss account management and cost accounting****V1.0****4** | **30** | **30** |  |  | **60** |
| Module 14: Profit management | 30 | 30 |  |  | 60 |
| Total Duration | **30** | **30** |  |  | **60** |

**Option 3: Ship and yard planning**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| NOS and Module Details | TheoryDuration | PracticalDuration | On-the-Job Training Duration (Mandatory) | On-the-Job Training Duration (Recommended) | Total Duration |
| **LSC/N3511 - Perform ship and yard planning****V1.0****4** | **30** | **30** |  |  | **60** |
| Module 16: Ship and yard planning | 30 | 30 |  |  | 60 |
| Total Duration | **60** | **60** |  |  | **60** |

**Module Details**

## Module 1: Introduction to Vessel Operator Grade 2

***Mapped to Bridge Module***

**Terminal Outcomes:**

* Describe the basic structure and function of supply chain
* Detail the various functions of a Vessel Operator Grade 2

|  |  |
| --- | --- |
| Duration: *20:00* | Duration: *10:00* |
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| * Classify the components of Supply Chain and Logistics sector
* Identify the various sub-sectors and the opportunities in them
* Identify various activities in warehouse, port yard, land, ship and air transportation
* Explain job roles in Inland waterways
* Describe your job role as Vessel operator grade 2 and its interface with other job roles
 | * Describe the duties of Vessel operator grade 2
* Explain the hierarchy in a vessel
* List the various activities in a vessel and inland port
* Discuss the various equipment used in a vessel
* Explain the basics of hazardous goods handling
 |
| **Classroom Aids** |
| Charts, Models, Video presentation, Flip Chart, Whiteboard/Smart Board, Marker, Board eraser |
| **Tools, Equipment and Other Requirements**  |
|  |

## Module 2: Advanced Vessel Navigation

***Mapped to LSC/N4104, v1.0***

**Terminal Outcomes:**

* Detail the steps involved in advanced vessel navigation

|  |  |
| --- | --- |
| Duration: *20:00* | Duration: *35:00* |
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| * Prepare vessel route and navigation plan
* Discuss how to estimate ETA based on route map
* Explain the impact of tides on navigation
* Record depth of water, vessel berthing depth, weather condition and other nautical readings
* Detail the process in steering of vessel
* Detail the preparation of contingency plans in case of emergencies
* Record ship navigation in ship manoeuvring book
 | * Use navigation maps to prepare vessel route and navigation plan
* Compute Estimated Time of Arrival (ETA) based on route plan
* Identify the impact of tides on navigation
* Track depth of water, vessel berthing depth, weather condition and other nautical readings
* Perform manual steering of vessel
* Prepare contingency plans in case of emergencies
* Track ship navigation in ship manoeurving book
 |
| **Classroom Aids** |
| Charts, Models, Video presentation, Flip Chart, Whiteboard/Smart Board, Marker, Board eraser |
| **Tools, Equipment and Other Requirements**  |
| PPEs, SOPs and manuals, Vessel, maps & charts, navigation aids, compass, GPS, worksheets, stationery, computer, projector etc.. |

## Module 3: Repair and maintenance of vessel

***Mapped to LSC/N4005, V1.0***

**Terminal Outcomes:**

* Detail the steps to be followed for repair and maintenance of vessel

|  |  |
| --- | --- |
| Duration: *20:00* | Duration: *35:00* |
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| * Discuss safe working load (SWL) or working load limit (WWL) of vessel and equipment
* Describe the maintenance procedure for deck and engine
* Discuss reasons for equipment failure to provide corrective and preventive action plan
* Detail repair and maintenance procedure of deck and engine room equipment
* Detail scaffolding procedure in different areas of the vessel
* Detail various types of consumables, oils and grease to be used for different types of equipment
* Describe PPE, safety and security precautions to be undertaken during repair and maintenance
* Document maintenance activities
 | * Compute safe working load (SWL) or working load limit (WWL) of vessel and equipment
* Perform maintenance of deck and engine
* Identify reasons for equipment failure to take preventive and corrective action
* Demonstrate repair and maintenance of deck and engine room equipment
* Demonstrate scaffolding in different areas of the vessel
* Use the right type of consumables, oils and grease for different types of equipment
* Follow safety precautions during repair and maintenance
* Record maintenance activities
 |
| **Classroom Aids** |
| Charts, Models, Video presentation, Flip Chart, Whiteboard/Smart Board, Marker, Board eraser |
| **Tools, Equipment and Other Requirements**  |
| Vessel and engine room equipment, tools and tackles, cranes and winches, welding equipment, fitting tools, SOP, computer, work bench, worksheets, projector, etc |

## Module 4: Welding, cutting and machining operations in vessel

***Mapped to LSC/N4006, v1.0***

**Terminal Outcomes:**

* Demonstrate the procedure for welding, cutting and machining operations in vessel as per SOP

|  |  |
| --- | --- |
| Duration: *20:00* | Duration: *35:00* |
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| * Detail the PPE and safety precautions to be undertaken during welding and machining
* Differentiate between different types of welding equipment, its consumables, applicability to requirement and process of execution
* Detail different types of welding skills
* Discuss different types of lathe operation skills
* Detail reasons for leaks in pipes and valves
* Propose corrective and preventive action for pipe leaks
* Detail different types of plumbing skills
 | * Choose the right tools and PPE for welding and machining
* Use the right type of welding equipment as per the applicability, requirement and process
* Demonstrate different types of welding skills
* Demonstrate different types of lathe operation skills
* Identify reasons for leaks in pipes and valves
* Perform corrective and preventive action for pipe leaks
* Demonstrate different types of plumbing skills
 |
| **Classroom Aids** |
| Charts, Models, Video presentation, Flip Chart, Whiteboard/Smart Board, Marker, Board eraser |
| **Tools, Equipment and Other Requirements**  |
| Vessel equipment, tools and tackles, welding equipment, consumables, work bench, cranes and winches, stationery, work sheets, SOP, computer, projector, etc. |

## Module 5: Resource allocation and store management

***Mapped to LSC/N3531, v1.0***

**Terminal Outcomes:**

* Detail the steps to be followed for resource allocation and store management as per SOP

|  |  |
| --- | --- |
| Duration: *20:00* | Duration: *35:00* |
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| * Formulate maintenance plan for deck and engine equipment
* Create workplan for deck/engine room activities
* Describe inspection procedures for cargo hold, storeroom, deck equipment, engine operations for compliance to regulatory norms, SOP and cleanliness
* Describe stores inventory management process
* Record goods inventory in stores
* Explain safe disposal methods for vessel waste and consumables
* Describe escalation procedure for procurement process
 | * Prepare maintenance plan for deck and engine equipment
* Prepare workplan for deck/engine room operations
* Inspect cargo hold, storeroom, deck equipment, engine operations as per regulatory norms, SOP and cleanliness
* Perform stores inventory management process
* Report goods inventory in stores
* Perform safe disposal of waste and consumables
* Resolve escalated issues
 |
| **Classroom Aids** |
| Charts, Models, Video presentation, Flip Chart, Whiteboard/Smart Board, Marker, Board eraser |
| **Tools, Equipment and Other Requirements**  |
| SOP, route plans, communication equipment, inventory models, computer, projector, worksheets, etc. |

## Module 6: Guidelines on integrity and ethics

***Mapped to LSC/N9904, v1.0***

**Terminal Outcomes:**

* Explain the concepts of integrity, ethics
* Detail the various regulatory requirements related to logistics industry

|  |  |
| --- | --- |
| Duration: *20:00* | Duration: *35:00* |
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| * Describe the concepts of integrity, ethics
* Detail the various regulatory requirements related to logistics industry
* Explain data and information security practices
* Discuss corrupt practices
* Discuss regulatory requirements, code of conduct and etiquettes
* Detail the procedure for documenting all integrity and ethics violations
* Explain escalation matrix for reporting deviation
 | * Practice the principles of integrity and ethics
* Follow the various regulatory requirements related to logistics industry
* Perform data and information security practices
* Identify corrupt practices
* Comply to regulatory requirements
* Practice code of conduct and etiquettes
* Document all integrity and ethics violations
* Report deviation as per the escalation matrix
 |
| **Classroom Aids** |
| Charts, Models, Video presentation, Flip Chart, Whiteboard/Smart Board, Marker, Board eraser |
| **Tools, Equipment and Other Requirements**  |
| SOP, Teaching board, computer, projector, video player, stationery, worksheets and TV |

## Module 7: Compliance to health safety and security procedures on vessel

***Mapped to LSC/N4102, v1.0***

**Terminal Outcomes:**

* Describe health, safety, and security procedures in vessel
* Demonstrate the inspection procedure to ensure appropriate and safe conditions of activity area and equipment
* Illustrate the standard protocol to be followed during emergency situations, accidents and breach of safety

|  |  |
| --- | --- |
| Duration: *20:00* | Duration: *35:00* |
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| * Describe health, safety and security procedures in vessel
* Explain survival techniques
* Detail medical emergency assessment
* Explain medical procedures to be undertaken for various emergencies
* Describe different types of fire-fighting equipment
* Operate various fire-fighting equipment
* List fire safety inspection techniques
* Interpret fire safety plans and escape routes
* Describe fire safety measures to be undertaken in vessel
* Inspect fire equipment for safe handling and usage
* Explain safety and security measures to be under taken in vessel
 | * Explain health, safety and security procedures in vessel
* Demonstrate safe jumping from height
* Demonstrate usage of life jacket and life boats
* Perform emergency evacuation activities
* Assess medical emergency needs
* Explain medical procedures to be undertaken for various emergencies
* Perform Cardio Pulmonary Resuscitation (CPR)
* Explain treatment methods for burns
* Describe different types of fire-fighting equipment
* Operate water, foam, powder, carbon dioxide and wet chemical fire extinguishers
* Draft fire safety plans and escape routes
* Describe fire safety measures to be undertaken in vessel
* Inspect fire safety equipment for functionality and expiry
* Describe safety and security measures to be under taken in vessel
 |
| **Classroom Aids** |
| Charts, Models, Video presentation, Flip Chart, Whiteboard/Smart Board, Marker, Board eraser |
| **Tools, Equipment and Other Requirements**  |
| First aid kit, firefighting equipment, life jacket, safety jacket, raft etc. |

## Module 8: Vessel handling and steering

***Mapped to LSC/N4105, v1.0***

**Terminal Outcomes:**

* Detail the various watchkeeping functions to be performed in navigation as per SOP

|  |  |
| --- | --- |
| Duration: *15:00* | Duration: *15:00* |
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| * Discuss preparation of vessel berthing schedule
* Discuss inspection procedure of mooring line and vessel preparedness for berthing
* Prepare course for navigation and berthing
* Discuss usage of gyro/ magnetic compass, GPS, and communication equipment
* Discuss usage of automatic and manual steering of vessel in bank channels, bends, bank suctions etc.
* Detail precautions to be undertaken while encountering channels, estuaries, bank cushions/suctions, bends etc.
* Discuss inspection procedure for activities completed assigned to junior staff
 | * Prepare vessel berthing schedule
* Inspect mooring lines and vessel preparedness for berthing
* Plot course for navigation and berthing
* Use gyro/ magnetic compass, GPS, and communication equipment
* Demonstrate usage of automatic and manual steering of vessel in bank channels, bends, bank suctions etc.
* Employ appropriate precautions while encountering channels, estuaries, bank cushions/suctions, bends etc.
* Inspect completion of activities assigned to junior staff
 |
| **Classroom Aids** |
| Charts, Models, Video presentation, Flip Chart, Whiteboard/Smart Board, Marker, Board eraser |
| **Tools, Equipment and Other Requirements**  |
| Maps, charts, GPS, compass, other navigation aids, vessel, simulator, SOP, computer, projector, worksheets, stationery etc. |

## Module 9: Stowed cargo safety and security in vessel

***Mapped to LSC/N4007, v1.0***

**Terminal Outcomes:**

* Detail the steps to be followed for cargo safety and security in vessel as per SOP

|  |  |
| --- | --- |
| Duration: *15:00* | Duration: *15:00* |
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| * Describe cargo loading/unloading and stowage plan
* Detail precautions to be undertaken during loading/unloading of vessel
* Discuss usage of MHE to load/unload and stow cargo
* Describe cargo documentation procedure as per regulation
* Explain cargo lashing inspection procedure
* Explain hazardous cargo segregation and storage procedure
* Detail inventory management process undertaken in vessel
 | * Perform cargo loading/unloading and stowage plan as per SOP
* Apply precautionary measures during loading/unloading of vessel
* Demonstrate usage of MHE to load/unload and stow cargo
* Inspect cargo documentation for compliance as per regulation
* Perform cargo lashing inspection procedure
* Perform segregation and storage of hazardous cargo as per appropriate procedure
* Perform inventory management in vessel
 |
| **Classroom Aids** |
| Charts, Models, Video presentation, Flip Chart, Whiteboard/Smart Board, Marker, Board eraser |
| **Tools, Equipment and Other Requirements**  |
| Vessel, sample cargo, MHE, PPE, safety equipment, cargo documentation, computer, projector, worksheets etc. |

## Module 10: Training of crew on deck operations

***Mapped to LSC/N4008, v1.0***

**Terminal Outcomes:**

* Detail the steps to be followed for training of crew on deck operations as per SOP

|  |  |
| --- | --- |
| Duration: *15:00* | Duration: *15:00* |
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| * Discuss the correct usage of hand signals, flags, alarms
* Describe the usage of navigational aids such as maps, compass, GPS etc.
* Detail the nautical and navigational terms
* Detail the PPE, safety, security and precautions to be used as per requirement
* Discuss inventory auditing procedure
* Calculate food, water, consumable, spare, and other equipment to be stocked
* Detail process to secure cargo through effective lashing and stowage
* Explain hazardous cargo segregation and storage procedure
* Explain safe waste disposal procedure
 | * Explain crew on using hand signals, flags, alarms
* Use navigational aids such as maps, compass, GPS etc.
* Use nautical and navigation terms
* Choose the right PPE as per requirement
* Explain inventory auditing procedure
* Compute food, water, consumable, spare, and other equipment to be stocked
* Demonstrate process to secure cargo through effective lashing and stowage
* Perform segregation and storage of hazardous cargo as per appropriate procedure
* Perform safe water disposal procedure
 |
| **Classroom Aids** |
| Charts, Models, Video presentation, Flip Chart, Whiteboard/Smart Board, Marker, Board eraser |
| **Tools, Equipment and Other Requirements**  |
| Navigation charts and aids, PPE, SOP, MIS reports, computer, projector, stationery, worksheets etc. |

## Module 11: Engine operation and trouble shooting

***Mapped to LSC/N4204, v1.0***

**Terminal Outcomes:**

* Detail the various steps to be followed for effective engine room operations

|  |  |
| --- | --- |
| Duration: *15:00* | Duration: *15:00* |
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| * Detail engine room operations and standard inspections to ensure normal operations
* Describe functions of various gauges, meters and other measuring equipment
* Detail the process of engine start, operation and shutoff
* Discuss Planned Maintenance Schedule process
* Detail troubleshooting process for different engine room equipment
* Describe SOEP (Shipboard oil pollution emergency plan) and its execution
* Document inventory of spares, consumables
* Record Planned Maintenance and Breakdown Maintenance
 | * Perform engine room operations and inspections as per SOP
* Check gauges, metres and other measuring equipment for proper functioning
* Perform engine operations, start, shutoff as per SOP
* Prepare planned maintenance schedule process
* Demonstrate troubleshooting process for different engine room equipment
* Demonstrate SOEP (Shipboard oil emergency plan)
* Report inventory of spares, consumables
* Document planned maintenance and breakdown maintenance
 |
| **Classroom Aids** |
| Charts, Models, Video presentation, Flip Chart, Whiteboard/Smart Board, Marker, Board eraser |
| **Tools, Equipment and Other Requirements**  |
| PPE, Engine equipment, simulator, tools and tackles, equipment manuals, SOP, computer, projector, stationery, worksheets etc. |

## Module 12: Overhauling of engine and auxiliary equipment

***Mapped to LSC/N4203, v1.0***

**Terminal Outcomes:**

* Detail the various steps to be followed for effective overhauling of engine and auxiliary equipment

|  |  |
| --- | --- |
| Duration: *15:00* | Duration: *15:00* |
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| * Discuss inspection procedure of safety devices in engine and auxiliary equipment
* Detail inspection methods to check aberration from normal operational parameters
* Describe the procedure of engine dismantling, repair and assembly process
* Detail the tests and inspections to be done on pipelines, valves and other engine room equipment
* Detail procedure to undertake overhauling of auxiliary units like filters, centrifugal separators, joints etc
* Discuss troubleshooting process during overhauling
* Prepare reports on overhauling and maintenance process
 | * Inspect safety devices in engine and auxiliary equipment
* Perform inspection to check aberration from normal operational parameters
* Demonstrate engine dismantling, repair and assembly process
* Perform tests and inspections on pipleines, valves and other engine room equipment as per procedure
* Execute overhauling of auxiliary units like filters, centrifugal separators, joints etc.
* Demonstrate troubleshooting process during overhauling
* Document overhauling and maintenance process
 |
| **Classroom Aids** |
| Charts, Models, Video presentation, Flip Chart, Whiteboard/Smart Board, Marker, Board eraser |
| **Tools, Equipment and Other Requirements**  |
| PPE, Engine and associated equipment, tools and tackles, maintenance equipment, equipment manual, SOP, computer, projector, stationery, worksheets etc |

## Module 13: Training of crew on engine operations

***Mapped to LSC/N4205, v1.0***

**Terminal Outcomes:**

* Detail the various steps to be followed for effective training of crew on engine operations

|  |  |
| --- | --- |
| Duration: *15:00* | Duration: *15:00* |
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| * Discuss engine room operations
* Explain safety precautions to be undertaken for chemical, thermal, oil spill, fuel bunkering etc.
* Detail the use of firefighting equipment
* Describe inspection and monitoring procedure for normal operations
* Discuss the usage of tools, tackles and maintenance equipment
* Describe preventive maintenance and troubleshooting process
* Detail engine dismantling, repair and assembly procedure
* Discuss ballast system operation procedure
* Describe fitting and welding equipment operations as per SOP
* Describe hazardous cargo segregation and storage procedure
* Detail safe waste disposal procedure
 | * Explain crew on engine room operations
* Demonstrate safety precautions to be undertaken for chemical, thermal, oil spill, fuel bunkering etc.
* Demonstrate usage of firefighting equipment
* Explain inspection and monitoring procedure for normal operations
* Demonstrate usage of tools, tackles and maintenance equipment
* Illustrate preventive maintenance and troubleshooting process
* Demonstrate engine dismantling, repair and assembly procedure
* Explain ballast system operation procedure
* Perform fitting and welding equipment operation as per SOP
* Explain hazardous cargo segregation and storage procedure
* Explain safe waste disposal procedure
 |
| **Classroom Aids** |
| Charts, Models, Video presentation, Flip Chart, Whiteboard/Smart Board, Marker, Board eraser |
| **Tools, Equipment and Other Requirements**  |
| Engine and associated equipment, tools and tackles, maintenance equipment, equipment manual, SOP, computer, projector, stationery, worksheets etc |

## Module 14: Tug vessel operations

***Mapped to LSC/N4106, v1.0***

**Terminal Outcomes:**

* Detail the various steps to be followed for effective tug vessel operations

|  |  |
| --- | --- |
| Duration: *30:00* | Duration: *30:00* |
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| * Describe tug operation procedure for single and multiple tugs
* Detail fitness testing procedure for tug vessel and its power systems as per regulatory requirements
* Prepare tow plan based on load to be pulled, time of operation, tide level etc.
* Explain the precautions to be undertaken before tug operations
* Explain the methodology for computing displacement and speed of tug operations
* Detail parameters to be monitored during tugging operations
* Describe single and multiple tug operation
* Describe the various emergency situations that might arise and contingency plan for them
 | * Perform tug operation for single and multiple tugs as per SOP
* Demonstrate fitness testing procedure for tug vessel and its power systems as per regulatory requirement
* Draft tow plan based on load to be pulled, time of operation, tide level, weather conditions, coastal berths, bends etc.
* Illustrate precautions to be followed before tug operations
* Compute displacement and speed of tug operations
* Perform mentoring of parameters during tugging operations
* Demonstrate single and multiple tug operation
* Prepare contingency plan for the various emergency situations that might arise
 |
| **Classroom Aids** |
| Charts, Models, Video presentation, Flip Chart, Whiteboard/Smart Board, Marker, Board eraser |
| **Tools, Equipment and Other Requirements**  |
| Tug vessel and towing equipment cum accessories, navigational aids, simulator, computer, projector, stationery, worksheets, etc |

## Module 15: Profit and loss accounting and management

***Mapped to LSC/N9603, v1.0***

**Terminal Outcomes:**

* Demonstrate the process of profit and loss account management and cost accounting

|  |  |
| --- | --- |
| Duration: *30:00* | Duration: *30:00* |
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| * Describe P&L analysis process
* Explain budgeting and monitoring process
* Explain methods to analyse variance between budget and actual expenditure
* Compare budget with actual physical output
* Detail the procedure for making budget amendments
* List the risk management procedures
* Detail the procedure for performing Activity Based Costing (ABC)
* Discuss the audit process to identify reasons for deviation from costing
* Explain the process to rationalize cost by undertaking improvement activities
 | * Perform P&L analysis
* Perform budgeting and monitoring process
* Analyse variance between budget and actual expenditure
* Cross check budget with actual physical output
* Prepare budget amendments
* Demonstrate risk management procedures
* Perform Activity Based Costing (ABC)
* Perform audit to identify reasons for deviation from costing
* Implement improvement activities to rationalize cost
 |
| **Classroom Aids** |
| Charts, Models, Video presentation, Flip Chart, Whiteboard/Smart Board, Marker, Board eraser |
| **Tools, Equipment and Other Requirements**  |
| MS Officecompressor, condenser, evaporator, temperature and humidity sensor, simulator, tools and tackles, consumables, cold storage equipment, gas leak detectors, electrical systems, start relays and defrost timers, pressure pumps, etc. |

## Module 16: Ship and yard planning

***Mapped to LSC/N3511, v1.0***

**Terminal Outcomes:**

* Detail the various steps to be followed for effective ship and yard planning

|  |  |
| --- | --- |
| Duration: *30:00* | Duration: *30:00* |
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| * Discuss the process of storage allocation based on goods/container category
* Calculate cargo ageing in yard to take corrective action
* Develop cargo movement plan
* List the cargo movement operational metrics
* Explain the yard inspection process for segregation of bays and cargo storage as per plan
* Explain the yard inspection process for adherence to cleanliness, safety precaution and PPE usage
* Explain hazardous cargo segregation and storage procedure
* List the various cargo movement documentation
 | * Analyse yard usage
* Allocate storage space based on goods/container category
* Compute cargo ageing in yard to take corrective action
* Devise cargo movement plan
* Measure cargo movement operational metrics
* Record cargo movement transactions
* Report cargo movement metrics, damages, plan vs performance, accidents, ageing etc.
* Inspect yard for segregation of bays and cargo storage as per plan
* Inspect yard for adherence to cleanliness, safety precaution and PPE usage
* Demonstrate hazardous cargo segregation and storage procedure
* Prepare cargo movement documentation
 |
| **Classroom Aids** |
| Charts, Models, Video presentation, Flip Chart, Whiteboard/Smart Board, Marker, Board eraser |
| **Tools, Equipment and Other Requirements**  |
| Stationery, SOP, RFID scanner, bar code scanner, markers, PPEs, ERP, computer, display board, printer, MHEs, etc |

## Module 17: Employability Skills

***Mapped to*** ***DGT/VSQ/N0102, v1.0***

**Terminal Outcomes:**

* Discuss the Employability Skills required for jobs in various industries
* Explain the constitutional values, including civic rights and duties, citizenship, responsibility towards society and personal values and ethics such as honesty, integrity, caring and respecting others that are required to become a responsible citizen
* Discuss how to identify opportunities for potential business, sources of funding and associated financial and legal risks with its mitigation plan

|  |  |
| --- | --- |
| Duration: *30:00* | Duration: *30:00* |
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| * Discuss the Employability Skills required for jobs in various industries
* List different learning and employability related GOI and private portals and their usage
* Explain the constitutional values, including civic rights and duties, citizenship, responsibility towards society and personal values and ethics such as honesty, integrity, caring and respecting others that are required to become a responsible citizen
* Discuss importance of relevant 21st century skills.
* Describe the benefits of continuous learning.
* Explain the importance of active listening for effective communication
* Discuss the significance of working collaboratively with others in a team
* Discuss the significance of escalating sexual harassment issues as per POSH act.
* List the common components of salary and compute income, expenditure, taxes, investments etc.
* Discuss the legal rights, laws, and aids
* Describe the role of digital technology in today’s life
* Discuss the significance of displaying responsible online behaviour while browsing, using various social media platforms, e-mails, etc., safely and securely
* Explain the types of entrepreneurship and enterprises
* Discuss how to identify opportunities for potential business, sources of funding and associated financial and legal risks with its mitigation plan
* Describe the 4Ps of Marketing-Product, Price, Place and Promotion and apply them as per requirement
* Detail the significance of analyzing different types and needs of customers
* Explain the significance of identifying customer needs and responding to them in a professional manner.
* Discuss the significance of maintaining hygiene and dressing appropriately
* Explain the significance of maintaining hygiene and confidence during an interview
* List the steps for searching and registering for apprenticeship opportunities
 | * Practice different environmentally sustainable practices.
* Exhibit 21st century skills like Self-Awareness, Behaviour Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn etc. in personal or professional life.
* Demonstrate to use basic English sentences for everyday conversation in different contexts, in person and over the telephone
* Read and interpret text written in basic English
* Write a short note/paragraph / letter/e -mail using basic English
* Create a career development plan with well-defined short- and long-term goals
* Communicate effectively using verbal and nonverbal communication etiquette.
* Demonstrate how to behave, communicate, and conduct oneself appropriately with all genders and PwD
* Outline the importance of selecting the right financial institution, product, and service
* Demonstrate how to carry out offline and online financial transactions, safely and securely
* Operate digital devices and use the associated applications and features, safely and securely
* Create sample word documents, excel sheets and presentations using basic features
* Utilize virtual collaboration tools to work effectively
* Devise a sample business plan, for the selected business opportunity
* Create a professional Curriculum Vitae (CV)
* Use various offline and online job search sources such as employment exchanges, recruitment agencies, and job portals respectively
* Perform a mock interview
 |
| **Classroom Aids** |
| Charts, Models, Video presentation, Flip Chart, Whiteboard/Smart Board, Marker, Board eraser, UPS, LCD Projector, Computer Tables & chairs |
| **Tools, Equipment and Other Requirements**  |
| Computer (PC) with latest configurations – and Internet connection with standard operating system and standard word processor and worksheet software (Licensed) (all software should either be latest version or one/two version below), Scanner cum Printer |

# Annexure

## Trainer Requirements

|  |
| --- |
| Trainer Prerequisites |
| Minimum Educational Qualification | **Specialization** | **Relevant Industry Experience**  | **Training Experience** | **Remarks**  |
| ***Years*** | ***Specialization*** | ***Years*** | ***Specialization*** |  |
| 12th |  | 2 | Vessel operations | 1 | Vessel operations |  |

|  |
| --- |
| Trainer Certification |
| Domain Certification | **Platform Certification** |
| Certified for Job Role: “Vessel Operation Grade 2” mapped to QP: “LSC/Q4102, v2.0”. Minimum accepted score is 80% | Recommended that the Trainer is certified for the Job Role: “Trainer”, mapped to the Qualification Pack: “MEP/Q2601”. Minimum accepted score is 80% |

## Assessor Requirements

|  |
| --- |
| Assessor Prerequisites |
| Minimum Educational Qualification  | **Specialization** | **Relevant Industry Experience** | **Training/Assessment Experience** | **Remarks**  |
| ***Years*** | ***Specialization*** | ***Years*** | ***Specialization*** |  |
| 12th Pass | NA | 1 | Vessel operations | 1 | Vessel operations |  |

|  |
| --- |
| Assessor Certification |
| Domain Certification | **Platform Certification** |
| Certified for Job Role: “Vessel Operator Grade 2” mapped to QP: “LSC/Q4102, v2.0”. Minimum accepted score is 80% | Recommended that the Assessor is certified for the Job Role: “Assessor,” mapped to the Qualification Pack: “MEP/Q2601”. Minimum accepted score is 80% |

## Assessment Strategy

The emphasis is on ‘learning-by-doing' and practical demonstration of skills and knowledge based on the performance criteria. Accordingly, assessment criteria for each job role is set and made available in qualification pack.

The assessment papers for both theory and practical would be developed by Subject Matter Experts (SME) hired by Logistics Sector Skill Council or with the LSC accredited Assessment Agency as per the assessment criteria mentioned in the Qualification Pack. The assessments papers would also be checked for the various outcome-based parameters such as quality, time taken, precision, tools & equipment requirement etc.

Each NOS in the Qualification Pack (QP) is assigned a relative weightage for assessment based on the criticality of the NOS. Therein each Element/Performance Criteria in the NOS is assigned marks on relative importance, criticality of function and training infrastructure.

The following tools would be used for final assessment:

1. **Practical Assessment:** This comprises of a creation of mock environment in the skill lab which is equipped with all equipment required for the qualification pack.

Candidate's soft skills, communication, aptitude, safety consciousness, quality consciousness etc. is ascertained by observation and marked in observation checklist. The outcome is measured against the specified dimensions and standards to gauge the level of their skill achievements.

1. **Viva/Structured Interview:** This tool is used to assess the conceptual understanding and the behavioral aspects with regard to the job role and the specific task at hand. It also includes questions on safety, quality, environment, and equipment etc.
2. **On-Job Training:** OJT would be evaluated based on standard log book capturing departments worked on, key observations of learner, feedback and remarks of supervisor or mentor.
3. **Written Test:** Question paper consisting of 100 MCQs (Hard:40, Medium:30 and Easy: 30) with questions from each element of each NOS. The written assessment paper is comprised of following types of questions:
	1. True / False Statements
	2. Multiple Choice Questions
	3. Matching Type Questions.
	4. Fill in the blanks
	5. Scenario based Questions
	6. Identification Questions

**QA Regarding Assessors:**

Assessors are selected as per the “eligibility criteria” laid down by LSC for assessing each job role. The assessors selected by Assessment Agencies are scrutinized and made to undergo training and introduction to LSC Assessment Framework, competency based assessments, assessors guide etc. LSC conducts “Training of Assessors” program from time to time for each job role and sensitize assessors regarding assessment process and strategy which is outlined on following mandatory parameters:

* + 1. Guidance regarding NSQF
		2. Qualification Pack Structure
		3. Guidance for the assessor to conduct theory, practical and viva assessments
		4. Guidance for trainees to be given by assessor before the start of the assessments.
		5. Guidance on assessments process, practical brief with steps of operations practical observation checklist and mark sheet
		6. Viva guidance for uniformity and consistency across the batch.
		7. Mock assessments
		8. Sample question paper and practical demonstration

# 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 |