

**REPUBLIC OF KENYA**

**COMPETENCY BASED MODULAR CURRICULUM**

**FOR**

**RIGGING**

**LEVEL 3**

**PROGRAMME ISCED CODE: 0715254A**

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# **FOREWORD**

The provision of quality education and training is fundamental to the Government’s overall strategy for social and economic development. Quality education and training contribute to the achievement of Kenya’s development blueprint and sustainable development goals.

Reforms in the education sector are necessary to achieve Kenya Vision 2030 and meet the provisions of the Constitution of Kenya 2010. The education sector had to be aligned to the Constitution, and this resulted in the formulation of the Policy Framework for Reforming Education and Training in Kenya (Sessional Paper No. 14 of 2012). A key feature of this policy is the radical change in the design and delivery of TVET training. This policy document requires that training in TVET be competency-based, curriculum development be industry-led, certification be based on demonstration of competence, and the mode of delivery allow for multiple entry and exit in TVET programmes.

These reforms demand that Industry takes a leading role in curriculum development to ensure the curriculum addresses its competence needs. It is against this background that this curriculum has been developed. For trainees to build their skills on foundational hands-on activities of the occupation, units of learning are grouped in modules. This has eliminated duplication of content and streamlined exemptions based on skills acquired as a trainee progresses in the up-skilling process, while at the same time allowing trainees to be employable in the shortest time possible through the acquisition of part qualifications.

It is my conviction that this curriculum will play a great role in developing competent human resources for the Rigging Sector’s growth and development.

**PRINCIPAL SECRETARY**

**STATE DEPARTMENT FOR TVET**

**MINISTRY OF EDUCATION PREFACE**

Kenya Vision 2030 aims to transform Kenya into a newly industrializing middle-income country, providing high-quality life to all its citizens by the year 2030. Kenya intends to create globally competitive and adaptive human resource base to meet the requirements of a rapidly industrializing economy through lifelong education and training. TVET has a responsibility to facilitate the process of inculcating knowledge, skills, and worker behaviour necessary for catapulting the nation to a globally competitive country, hence the paradigm shift to embrace Competency-Based Education and Training (CBET).

TVET Act, CAP 210A and Sessional Paper No. 1 of 2019 on Reforming Education and Training in Kenya for Sustainable Development emphasized the need to reform curriculum development, assessment, and certification. This called for a shift to CBET to address the mismatch between skills acquired through training and skills needed by industry, as well as increase the global competitiveness of the Kenyan labour force.

This curriculum has been developed in adherence to the Kenya National Qualifications Framework and CBETA standards and guidelines. The curriculum is designed and organized into Units of Learning with Learning Outcomes, suggested delivery methods, learning resources, and methods of assessing the trainee’s achievement. In addition, the units of learning have been grouped in modules to concretize the skills acquisition process and streamline upskilling.

I am grateful to all expert trainers and everyone who played a role in translating the Occupational Standards into this competency-based modular curriculum.

# **ACKNOWLEDGMENT**

This curriculum has been designed for competency-based training and has independent units of learning that allow the trainee flexibility in entry and exit. In developing the curriculum, significant involvement and support were received from expert trainers, institutions and organizations.

I recognize with appreciation the role of the Rigging National Sector Skills Committee (NSSC) in ensuring that competencies required by the industry are addressed in the curriculum. I also thank all stakeholders in the Rigging sector for their valuable input and everyone who participated in developing this curriculum.

I am convinced that this curriculum will go a long way in ensuring that individuals aspiring to work in the rigging Sector acquire competencies to perform their work more efficiently and effectively.

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# **ACRONYMS**

KCPE Kenya Certificate of Primary Education

KNQA Kenya National Qualifications Framework

PPE Personal Protective Equipment

TVETA Technical and Vocational Education and Training Authority

# **KEY TO ISCED UNIT CODE**



# **COURSE OVERVIEW**

This curriculum is designed to prescribe learning outcomes, content, assessment methods and resources required to train the qualification of Rigger Level 3. These requirements are necessary for successful training of Pre- Rigging Activities and Rigging Activities. The curriculum consists core units of learning as indicated hereafter.

**Units of Learning**

|  |  |  |  |
| --- | --- | --- | --- |
| **Unit of Learning Code** | **Unit of Learning Title** | **Duration**  **in**  **Hours** | **Credit Factor** |
| 0715 251 01A | Pre- Rigging Activities | 130 | 13 |
| 0715 251 02A | Rigging Activities | 170 | 17 |
|  | Industrial Attachment | 240 | 24.0 |
| **GRAND TOTAL** | | **540** | **54.0** |

**Entry requirements**

An individual entering this course should have any of the following minimum requirements:

1. Kenya Certificate of Primary Education (KCPE)

**Or**

1. Equivalent qualifications as determined by relevant regulatory body

**Trainer qualification**

A trainer for any of the units of competency in this course must:

1. Possession of at least Rigger level 5 Qualification or in related trade area;
2. License by TVETA
3. Registered by Engineer Board of Kenya (E.B.K) or Kenya Engineering Technology Registration Board (KETRB).

**Industry Training**

An individual enrolled in this course will be required to undergo Industry training for a minimum period of 240 hours in rigging sector. The industrial training may be taken after completion of all units for those pursuing the full qualification or be distributed equally in each unit for those pursuing part qualification. In the case of dual training model, industrial training shall be as guided by the dual training policy.

**Assessment**

1. An individual enrolled in this course shall be assessed for competence through formative and summative assessments.
2. During formative assessment all performance criteria shall be assessed based on performance criteria weighting.
3. Number of formative assessments shall minimally be equal to the number of elements in a unit of competency.
4. During summative assessment basic and common units may be integrated in the core units or assessed as discrete units.
5. Theoretical and practical weighting for each unit of learning shall be as follows:
   1. 10:90 for the units in modules I
6. Formative and summative assessments shall be weighted at 60% and 40% respectively in the overall unit of learning score
7. Assessment performance rating for each unit of competency shall be as follows:

|  |  |
| --- | --- |
| **MARKS** | **COMPETENCE RATING** |
| 80 -100 | Attained Mastery |
| 65 - 79 | Proficient |
| 50 - 64 | Competent |
| 49 and below | Not Yet Competent |
| Y | Assessment Malpractice/irregularities |

1. Assessment for Recognition of Prior Learning (RPL) may lead to award of part and/or full qualification.

**Certification**

A candidate will be issued with a Certificate of Competency upon demonstration of competence in a core Unit of Competency. To be issued with KenyaNational TVETCertificate in Rigging level 3 the candidate must demonstrate competence in all the Units of Competency as given in the qualification pack. A Statement of Attainment certificate may be issued upon demonstration of competence in a certifiable element within a unit.

The certificates will be issued by the ……….

**PRE- RIGGING ACTIVITIES**

**UNIT CODE:** 0715 251 01A

**Duration of Unit:** 130 Hours

**Relationship to Occupational Standards**

This unit addresses the unit of Competency: Perform Pre- Rigging Activities.

**UNIT DESCRIPTION**

This unit of learning covers the learning outcomes, content, assessment methods, methods of delivery and resources required to train perform pre-rigging activities. The outcome shall enable the learner to conduct rigging planning, carry out rigging site preparation and conduct rigging load assessment.

**Summary of Learning Outcomes**

By the end of this unit of learning, the trainee will be able to:

|  |  |  |
| --- | --- | --- |
| **S/NO** | **Learning Outcomes** | **DURATION (HOURS)** |
|  | Conduct Rigging Planning | 40 |
|  | Carry Out Rigging Site Preparation | 50 |
|  | Conduct Rigging Load Assessment | 40 |
|  | **TOTAL** | **130** |

**Learning outcome, content and Suggested Assessment Methods**

| **Learning Outcome** | **Content** | **Suggested Methods of Assessment** |
| --- | --- | --- |
| 1. Conduct rigging planning | * 1. Rigging terms and definitions   2. Rigging operations      1. Importance of rigging in lifting and hoisting operations.      2. Types of rigging operations.         1. Rigging Load handling         2. Lifting operations         3. Equipment Assembly         4. Equipment Disassembly         5. Load handling   3. Rigging resources      1. Rigging equipment and gear         1. Lifting Slings            1. Wire rope slings            2. Synthetic slings (Webbing slings)            3. Chain slings            4. Round slings         2. Shackles            1. Bow shackles            2. D-Shackles            3. Pin shackles         3. Hooks            1. Lifting hooks            2. Grab Hooks         4. Lifting beams and spreaders            1. Lifting beams            2. Spreaders bars         5. Hoist            1. Chain hoists            2. Wire rope hoists            3. Lever hoists         6. Cranes            1. Overhead cranes            2. Tower cranes            3. Crawler cranes         7. Pulley system (Block and Tackle)            1. Single pulley            2. Block –and – Tackle            3. Winches         8. Slings and lifting points            1. Eye bolts            2. Lifting Lugs         9. Taglines      2. Rigging support accessories         1. Ladders         2. Scaffolds         3. Steppers         4. Safety barriers         5. Traffic control barriers         6. Warning signage         7. Access roads         8. Stairways         9. Ramps         10. Concrete foundations         11. Crane pads         12. Compacted ground         13. Material storage area         14. Backup power systems      3. Rigging personnel         1. Equipment operator         2. Signalling personnel         3. Slinging personnel      4. Rigging equipment selection         1. Load Characteristics         2. Environment         3. Capacity         4. Regulatory Compliance         5. Inspection and Maintenance   4. Rigging safety procedures      1. Safe work procedures      2. Hazard identification procedures      3. Standard Operating procedures      4. Emergency Response Procedures   5. Work permit      1. Importance of work permit      2. Types of work permits         1. Confined space entry permit         2. Hazardous material handling permit         3. Working at heights permit         4. Radiation work permits         5. Hot/cold works permit | * Practical * Project * Portfolio of evidence * Third party report * Written test * Oral questioning |
| 1. Carry out rigging site preparation | * 1. Rigging site safety      1. Personal protective Equipment         1. Safety helmets         2. Safety goggles         3. Face shields         4. Earplugs         5. Ear muffs         6. Dust masks/Respirators         7. Rigging gloves         8. Safety boots         9. Reflector jackets         10. Overalls      2. Importance of donning PPEs         1. Head protection         2. Eye and face protection         3. Hand and arm protection         4. Foot protection         5. Protection against inhalation of harmful substances         6. Full-body protection systems      3. Rigging site hazard Assessment         1. Physical/Environmental hazards            1. Weather conditions            2. Wind            3. Rain            4. Snow            5. Lightning            6. Extreme heat/cold         2. Ground conditions            1. Uneven terrain            2. Poor soil integrity            3. Obstructions         3. Poor visibility            1. Low light conditions            2. Night work         4. Wet Environment            1. Water bodies            2. Flooding            3. Damp surfaces         5. Natural disasters            1. Earthquakes            2. Wildfires         6. Air quality            1. Dust and particles            2. Fumes and gases         7. Noise pollution         8. Wildlife and insect bites      4. Chemical hazards         + 1. Corrosive cleaning detergents           2. Flammable materials      5. Electrical hazards         + 1. Proximity to power lines           2. Electromagnetic interference           3. Poor electrical connections      6. Psychosocial hazards         + 1. Fatigue           2. Stress and pressure           3. Fear           4. Poor communication or misunderstanding   2. Rigging site preparation      1. Site inspection and assessment         1. Terrain         2. Weather         3. Identifying obstacles and restrictions         4. Power lines         5. Weather conditions e.g. rain, temperatures      2. Site clearing         1. Purpose and significance of site clearing      3. Site Layout         1. Planning the Rigging Area Layout         2. Establishing Safety Zones         3. Traffic and Pedestrian Management      4. Site Demarcation      5. Grounds works      6. Equipment mobilization | * Practical * Project * Portfolio of evidence * Third party report * Written test * Oral questioning |
| 1. Conduct rigging load assessment | * 1. Load condition      1. Load labelling      2. Status of the load      3. Hazardous status      4. Precautions of handling   2. Load shape      1. Symmetrical Loads      2. Asymmetrical Loads      3. Long, Cylindrical, or Pipe-Shaped Loads      4. Flat or Rectangular Loads      5. Irregularly shaped loads   3. Rigging attachments points      1. Types of rigging attachment points and their functions.         1. Eye bolts/ Lift eyes         2. Lifting lugs         3. Swivel Hoist rings         4. Weld on lifting points         5. Mounting brackets         6. Lift rings         7. Beam clamps         8. Hook and shackle points         9. Corners and edges of loads      2. The importance of proper attachment point selection      3. Safe and unsafe attachment points      4. Safe work practices for using attachment points      5. Correct attachment point procedures   4. Rigging load stability      1. Selection of Slinging Method         1. Factors Affecting Sling Selection         2. Load type (e.g., uniform, irregular, fragile)         3. Load weight and size         4. Sling angle and configuration         5. Environmental factors (e.g., weather, corrosive materials)      2. Load Balancing      3. Safety considerations         1. Side-loading and overloading of slings         2. Proper sling angles to ensure safe working loads (SWL)         3. Inspection of slings for wear, damage, or defects before use      4. Sling Angle, Load Distribution         1. Understanding Sling Angles         2. Load Distribution and Balance   5. Rigging load assessment record preparation      1. Date of assessment      2. Load details      3. Rigging equipment      4. Site assessment      5. Lifting method |  |

**Suggested Delivery Methods**

* Group discussions
* Demonstration by the trainer
* Online video clips
* Power point presentation

**Recommended Resources for 25 Trainees**

| **S/No.** | **Category/Item** | **Description/Specifications** | **Quantity** | **Recommended Ratio (Item: Trainee)** |
| --- | --- | --- | --- | --- |
| **A** | **Learning Materials** | | | |
|  | Textbooks | Comprehensive textbooks on Rigging Operations | 25 | 1:1 |
|  | Projector | Functional projector for displaying content during presentations | 1 | 1:25 |
|  | Computer | Functional desktop computer with online instructional content | 1 | 1:25 |
|  | White board | Quality whiteboard of approximately 6 ft by 3 ft for writing during theory instruction | 1 | 1:25 |
|  | Printer | An ink-jet, laser-jet or toner-cartridge printer for printing notes, instructions and working drawings | 1 | 1:25 |
| **B** | **Learning Facilities & Infrastructure** | | | |
|  | Lecture/Theory Room | Spacious room with seats for 25 trainees, approximately 60 sqm | 1 | 1:25 |
|  | Workshop | Hands-on training area with workbenches, tools, and safety equipment, ~80 sqm | 1 | 1:25 |
|  | Equipment store | Standard workshop store with rigging tools, equipment and accessories | 1 | 1:25 |
|  |  |  |  |  |
| **C** | **Materials and Supplies** | | | |
|  | First aid kit |  | 5 pieces | 1:5 |
|  | Dust coat/ overall | Shields skin and regular clothes from sparks | 25 | 1:1 |
|  | Gloves | Shields hands from sharp edges, heat, and chemical exposure | 25 | 1:1 |
|  | Safety boots | Protects feet from heavy objects, sharp materials, and impact. | 25 | 1:1 |
|  | Ear muffs/ ear plugs | Shields against prolonged exposure to high noise levels from machinery | 25 | 1:1 |
|  | Safety goggles | Protects eyes from flying metal particles, sparks, and dust | 25 | 1:1 |
|  | Labeling tags | For use in indexing of rigging equipment | 50 | 2:1 |
|  | Rigging equipment registers | For making entries about equipment details | 25 | 1:1 |
|  | Degreasers | Suitable for light to moderate grease removal | 5 | 1:5 |
|  | Toolbox | Metal toolbox | 5 | 1:5 |
|  | Brushes | For cleaning | 25 | 1:1 |
|  | Compressed air cans | For cleaning small crevices and removing debris | 5 | 1:5 |
|  | Lubricants | For moving parts like sheaves and pulleys. | 25 | 1:1 |
|  | Safety tags | For marking equipment as "inspected" or "out of service." | 50 | 2:1 |
|  | Brooms and cleaning stuff | Hand brooms and mops for cleaning | 25 | 1:1 |
|  | Cotton waste | Absorbent cotton waste for cleaning of oils and other dirt on machines, tools and equipment | 5 | 1:5 |
|  |  |  |  |  |
| **D** | **Tools and Equipment** | | | |
|  | Grease guns | For dispensing grease | 5 | 1:5 |
|  | Spanner sets | Assorted spanner set | 5 | 1:5 |
|  | Wrench set | Combination set | 5 | 1:5 |
|  | Screwdriver set | Combination set | 5 | 1:5 |
|  | Allen keys | Combination set | 5 | 1:5 |
|  | Steel rules | Calibrated steel rules for linear measurements | 20 | 4:5 |
|  | Vernier calipers | Calibrated Vernier calipers for linear measurements | 20 | 4:5 |
|  | Tri squares | Properly aligned steel Tri-square for checking perpendicular edges | 5 | 1:5 |
|  | Vernier height gauge and surface plates | Calibrated Vernier height gauges and surface plates for measurement of heights | 5 | 1:5 |
|  | Measuring tapes | Calibrated measuring tapes for linear measurements | 20 | 4:5 |
|  | Angle gauges | Calibrated steel rules for linear measurements | 5 | 1:5 |
|  | Scribers | Quality steel pencil scribers for marking out lines on metal surfaces | 20 | 4:5 |
|  | Dot punches | Quality steel dot punches for marking out centers | 20 | 4:5 |
|  | Calipers | Quality steel calipers for marking out arcs on metal surfaces | 5 | 1:5 |
|  | Complete combination cabinet toolbox | Assorted sets for various applications | 5 cabinets | 1:5 |
|  | Timing light | For diagnosis | 5 | 1:5 |
|  | Trolley jacks | For lifting the vehicle | 2 | 1:13 |
|  | Work benches | Stable work benches for carrying out bench work | 5 | 1:5 |
|  | Bench vices | Functional bench vices/clamps for holding work pieces during bench work | 20 | 4:5 |
|  | Tongs | Functional pairs of tongs for holding hot pieces of metal during welding | 10 | 2:5 |
|  | Wire brushes | To clean metal surfaces | 20 | 4:5 |
|  | File cards | Cleaning tool used to maintain files | 5 | 1:5 |
|  | Hoist | 1 ton | 1 | 1:25 |
| **F** | **Reference Materials** | | | |
|  | Manuals | Maintenance manuals | 25 | 1:1 |
|  | Practical Assessment Guides | Worksheets for practical assessments | 25 pcs | 1:1 |

**RIGGING ACTIVITIES**

**Unit Code:** 0715 251 02A

**Unit Duration:** 170Hours

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency**:** Conduct Rigging Activities

**Unit Description**

This unit of learning covers the learning outcomes, content, assessment methods, methods of delivery and resources required to train rigging activities. The learning outcomes involve, to carry out rigging site preparation, conduct rigging load attachment and load lifting and carry out equipment demobilization.

**Summary of Learning Outcomes**

By the end of this unit of learning, the trainee will be able to:

|  |  |  |
| --- | --- | --- |
| **S/NO** | **Learning Outcomes** | **DURATION (HOURS)** |
|  | Carry Out Rigging Equipment Set Up | 50 |
|  | Conduct Rigging Load Attachment | 50 |
|  | Conduct Load Lifting | 40 |
|  | Carry Out Lifting Equipment Demobilization | 30 |
|  | **TOTAL** | **170** |

**Learning Outcomes, Content and Suggested Assessment Methods**

| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| --- | --- | --- |
| 1. Carry out rigging site preparation | * 1. Terms and Definitions in rigging   2. Application of rigging in industry      1. Construction         1. Lifting materials         2. Tower cranes         3. Erecting structures      2. Shipping and maritime         1. Cargo loading/unloading         2. Shipyard operations         3. Salvage operations      3. Manufacturing and industry         1. Equipment installation         2. Maintenance      4. Entertainment and events         1. Stage rigging         2. Ariel performances         3. Zip lining         4. Merry go rounds      5. Oil and gas industry         1. Drilling operations         2. Offshore platforms      6. Mining         1. Equipment handling         2. Tunnel construction      7. Aerospace         1. Aircraft assembly and maintenance         2. Space operations      8. Energy sector         1. Wind turbines         2. Power plants      9. Art and sculpture installation         1. Public art         2. Museum displays      10. Rescue operations          1. Disaster recovery          2. Mountain and cave rescues      11. Agricultural sector          1. Farm equipment          2. Log handling   3. Rigging Site Safety      1. Personal protective Equipment         1. Safety helmets         2. Safety goggles         3. Face shields         4. Earplugs         5. Ear muffs         6. Dust masks/Respirators         7. Rigging gloves         8. Safety boots         9. Reflector jackets         10. Overalls   4. Rigging site hazard Identification      1. Physical/Environmental hazards         1. Weather conditions            1. Wind            2. Rain            3. Snow            4. Lightning            5. Extreme heat/cold      2. Ground conditions         + 1. Uneven terrain           2. Poor soil integrity           3. Obstructions      3. Poor visibility         + 1. Low light conditions           2. Night work      4. Wet Environment         + 1. Water bodies           2. Flooding           3. Damp surfaces      5. Natural disasters         + 1. Earthquakes           2. Wildfires      6. Air quality         + 1. Dust and particles           2. Fumes and gases      7. Noise pollution      8. Wildlife and insect bites      9. Chemical hazards         + 1. Corrosive cleaning detergents           2. Flammable materials      10. Electrical hazards          + 1. Proximity to power lines            2. Electromagnetic interference            3. Poor electrical connections      11. Psychosocial hazards          + 1. Fatigue            2. Stress and pressure            3. Fear            4. Poor communication or misunderstanding   5. Rigging site preparation      1. Site clearance         1. Obstructions         2. Potential fall hazards         3. Slippery surfaces         4. Access points         5. Hazardous material         6. Secure loose materials      2. Installation of barricades         1. Safety exclusion zones         2. Traffic barrier installation      3. Erection of signages         + 1. Hazard zones           2. Warning signs           3. Pathways/walking routes      4. Lighting set up   6. Practice      1. Conduct hazard assessment in a rigging site      2. Carry out site clearance activities | * Practical test * Project work * Written tests * Portfolio of evidence |
| 1. Conducting rigging load attachment | * 1. Nature of load      1. Shape of load         1. Symmetrical         2. Asymmetrical         3. Regularly shaped         4. Irregularly shaped         5. Cylindrical         6. Square/rectangular         7. Round         8. Flat      2. Stability of load         1. Stable         2. Unstable      3. Load composition         1. Hazardous/non hazardous         2. Solid/liquid/gas         3. Flammable/non flammable      4. Precautions for handling         1. Toxic/non toxic         2. Fragile/non fragile   2. Rigging equipment      1. Types of rigging equipment         1. Slings            1. Wire rope slings            2. Chain slings            3. Synthetic slings            4. Flat webbling slings            5. Round slings         2. Hooks            1. Lifting hooks            2. Grab hooks            3. Swivel hooks            4. Safety hooks            5. Clevis hooks            6. Eye hooks            7. Latching hooks         3. Shackles            1. Bow shackles            2. D-shackles            3. Safety shackles            4. Pin shackles         4. Turnbuckles            1. Open body turnbuckles            2. Close body turnbuckles         5. Lifting beams            1. Fixed lifting beams            2. Adjustable lifting beams            3. Spreader beams         6. Spreader bars            1. Single point spreader bars            2. Multi point spreader bars         7. Rigging plates            1. Load distribution plates            2. Connecting plates      2. Uses of rigging equipment   3. Rigging attachment points      1. Lift points      2. Lifting eyes      3. Lifting lugs      4. Pads      5. Beam clamp/hooks      6. Mounting brackets      7. Corner and edges of loads   4. Rigging methods      1. Single point rigging      2. Two-point rigging      3. Four-point rigging      4. Choker hitch rigging      5. Basket hitch rigging      6. Double basket hitch rigging   5. Types of slinging knots      1. Bowline knot      2. Clove hitch knot      3. Figure eight knot      4. Round turn and two half hitches knot      5. Prusik knot      6. Sheet bend knot      7. Munter hitch knot      8. Applications of slinging knots      9. Applications of rigging methods   6. Practice      1. Rig loads of various sizes using different slinging/rigging methods | * Practical test * Project work * Written tests * Portfolio of evidence |
| 1. Conduct load lifting | * 1. Load lifting hazards      1. Physical/Environmental hazards         1. Weather conditions            1. Wind            2. Rain            3. Snow            4. Lightning            5. Extreme heat/cold         2. Ground conditions            1. Uneven terrain            2. Poor soil integrity            3. Obstructions         3. Poor visibility            1. Low light conditions            2. Night work         4. Wet Environment            1. Water bodies            2. Flooding            3. Damp surfaces         5. Natural disasters            1. Earthquakes            2. Wildfires         6. Air quality            1. Dust and particles            2. Fumes and gases         7. Noise pollution         8. Wildlife and insect bites      2. Chemical hazards         + Hazardous load         + Flammable materials      3. Electrical hazards         + Proximity to power lines         + Electromagnetic interference         + Poor electrical connections      4. Psychosocial hazards         + Fatigue         + Stress and pressure         + Phobia         + Poor communication or misunderstanding      5. Mechanical/Load related hazards         + Heavy loads         + Loads with sharp edges         + Unbalanced load   2. Load lifting hazards control measures      1. Elimination         1. Falling objects            1. Secure loads            2. Use safety nets/catch platforms            3. Establish exclusion zones            4. Fall protection systems         2. Electrical hazards            1. Maintain safe distance            2. Use insulated tools         3. Environmental hazards            1. Monitor weather conditions      2. Substitution         1. Select alternative load lifting technology         2. Select alternative rigging methods      3. Engineering controls         1. Use equipment within capacity         2. Correct load and equipment labelling         3. Load instability            1. Check load centre of gravity            2. Stabilize load            3. Correct sling angles            4. Use tag lines         4. Equipment Mechanical failure            1. Replace damaged equipment            2. Maintenance and lubrication         5. Proper lighting      4. Administrative controls         1. Training on proper load lifting techniques         2. Supervision of standard work procedures         3. Use Trained/certified riggers         4. Erection warning signs         5. Clear communication procedure         6. Pre-task briefings         7. Designated duty allocation         8. Acquisition of work permits      5. Use of PPE         1. Safety helmets         2. Safety goggles         3. Face shields         4. Earplugs         5. Ear muffs         6. Dust masks/Respirators         7. Rigging gloves         8. Safety boots         9. Reflector jackets         10. Overalls   3. Rigging communication signals      1. Hand signals         1. Stop/hold         2. Lower load         3. Lift load         4. Swing load         5. Move load slowly         6. Move load in a specific direction         7. Boom up         8. Boom down         9. Hoist load         10. Clear the load      2. Radio communication         1. Elements            1. Clear radio protocols         2. Command structure         3. Role clarification         4. Backup communication         5. Communication Etiquette      3. Whistle signals      4. Visual signals         1. Flags         2. Lights      5. Signages   4. Test lifting procedure   5. Practice      1. Relay appropriate lifting signals to a lifting equipment operator | * Practical test * Project work * Written tests * Portfolio of evidence |
| 1. Carry out lifting equipment demobilization | * 1. Lifting equipment demobilization hazards   2. Physical/Environmental hazards      1. Weather conditions         1. Wind         2. Rain         3. Snow         4. Lightning         5. Extreme heat/cold      2. Ground conditions         1. Uneven terrain         2. Poor soil integrity         3. Obstructions      3. Poor visibility         1. Low light conditions         2. Night work      4. Wet Environment         1. Water bodies         2. Flooding         3. Damp surfaces      5. Natural disasters         1. Earthquakes         2. Wildfires      6. Air quality         1. Dust and particles         2. Fumes and gases      7. Noise pollution      8. Wildlife and insect bites      9. Chemical hazards         1. Hazardous chemicals         2. Corrosive materials         3. Pesticides         4. Flammable materials      10. Electrical hazards          1. Proximity to power lines          2. Electromagnetic interference          3. Poor electrical connections      11. Psychosocial hazards          1. Fatigue          2. Sickness          3. Stress and pressure          4. Fear          5. Lack of confidence          6. Poor communication or misunderstanding   3. Lifting equipment demobilization hazards control measures      1. Elimination         1. Falling objects         2. Use safety nets/catch platforms         3. Establish exclusion zones         4. Fall protection systems      2. Electrical hazards         1. Maintain safe distance         2. Use insulated tools      3. Environmental hazards         1. Monitor weather conditions      4. Substitution         1. Select alternative equipment demobilisation technology      5. Engineering controls         1. Use right demobilisation tools within capacity         2. Correct equipment labelling         3. Equipment Mechanical failure         4. Proper lighting      6. Administrative controls         1. Training on proper equipment demobilization techniques         2. Supervision of standard work procedures         3. Use Trained/certified riggers         4. Erection warning signs         5. Clear communication procedure         6. Pre-task briefings         7. Designated duty allocation         8. Acquisition of work permits      7. Use of PPE         1. Safety helmets         2. Safety goggles         3. Face shields         4. Earplugs         5. Ear muffs         6. Dust masks/Respirators         7. Rigging gloves         8. Safety boots         9. Reflector jackets         10. Overalls      8. Lifting equipment demobilization         1. Procedure            1. Disconnection of rigging            2. Disassembly of equipment            3. Packing and securing            4. Rigging load lifting area clearing      9. Removal of barricades         + 1. Safety exclusion zones           2. Traffic barrier installation      10. Removal of signages          + 1. Hazard zones            2. Warning signs            3. Pathways/walking routes      11. Removal of temporary lighting set up      12. Movement of rigging equipment from site   4. Storage of rigging equipment      1. General Principles         1. Dry, clean and ventilated area         2. Designated storage space         3. Off the ground         4. Cleaning and lubrication         5. Segregation of equipment by type      2. Protection from elements         1. Rain         2. Snow         3. Ultraviolet radiation      3. Storage of slings         1. Wire rope slings         2. Synthetic slings         3. Chain slings      4. Storage of other hardware         1. Shackles         2. Hooks      5. Storage of rigging hooks, blocks and pulleys   5. Practice      1. Demobilize a chain block set      2. Store slings hooks and shackles appropriately | * Practical test * Project work * Written tests * Portfolio of evidence |

**Suggested Delivery Methods**

* Demonstration
* Group discussions
* Practical work
* Industrial visits
* Online materials
* Direct instructions
* Simulation

**Recommended Resources for 25 trainees**

| **S/No.** | **Category/Item** | **Description/Specifications** | **Quantity** | **Recommended Ratio (Item: Trainee)** |
| --- | --- | --- | --- | --- |
| **A** | **Learning Materials** | | | |
|  | Online resources | Current online content on rigging activities | Enough |  |
|  | Textbooks | Comprehensive textbooks on Rigging Operations | 25 | 1:1 |
|  | Projector | Functional projector for displaying content during presentations | 1 | 1:25 |
|  | Computer | Functional desktop computer with online instructional content | 1 | 1:25 |
|  | White board | Quality whiteboard of approximately 6 ft by 3 ft for writing during theory instruction | 1 | 1:25 |
|  | Printer | An ink-jet, laser-jet or toner-cartridge printer for printing notes, instructions and working drawings | 1 | 1:25 |
|  | External Storage Media | Hard drives, flash disks, CDs, DVDs | 30 | 1:1 |
|  | Business plan templates |  | 30 | 1:1 |
|  | Newspapers and Handouts |  | 30 | 1:1 |
|  | Business Journals |  | 30 | 1:1 |
| **B** | **Learning Facilities & Infrastructure** | | | |
|  | Computer lab | Standard computer lab with computers approximately 80 sqm | 1 | 1:30 |
|  | Lecture/Theory Room | Spacious room with seats for 25 trainees, approximately 60 sqm | 1 | 1:25 |
|  | Workshop/workspace | Standard workshop/workspace with area approximately 80 sqm | 1 | 1:25 |
| **C** | **Materials and Supplies** | | | |
|  | Dust coat/ overall | Shields skin and regular clothes from sparks | 25 | 1:1 |
|  | Gloves | Shields hands from sharp edges, heat, and chemical exposure | 25 | 1:1 |
|  | Safety boots | Protects feet from heavy objects, sharp materials, and impact. | 25 | 1:1 |
|  | Ear muffs/ ear plugs | Shields against prolonged exposure to high noise levels from machinery | 25 | 1:1 |
|  | Safety goggles | Protects eyes from flying metal particles, sparks, and dust | 25 | 1:1 |
|  | Sample loads | Assorted loads with different shapes and weights for demonstration | Enough |  |
|  | Whistles | For signaling | 25 | 1:1 |
|  | Flags | Flags of assorted colors and sizes for signaling | 10 | 2:5 |
|  | Signboards | For signaling | 20 |  |
|  | Cleaning detergents | For equipment and store cleaning | Enough |  |
|  | Grease/lubricant | For cleaning and lubrication | Enough |  |
|  | Scrubbing material | For scrubbing equipment during cleaning | 5 | 1:5 |
|  | First Aid kit | Fully equipped First Aid kit for use in case of accidents | 1 | 1:25 |
|  | Brooms and cleaning stuff | Hand brooms and mops for cleaning | 10 | 2:5 |
|  | Cotton waste | Absorbent cotton waste for cleaning of oils and other dirt on machines, tools and equipment | Enough |  |
|  | Cleaning detergents | General degreasers | 10 liters |  |
| Floor detergents | 10 liters |
| Hand detergents | 10 liters |
| **D** | **Rigging Equipment** | | | |
|  | Wire rope slings | Diameter:1/4 inch (6 mm) to 2 inches (50 mm)  Length:3 ft (0.9 m) to 20 ft (6 m) | 5 | 1:5 |
|  | Chain slings | Chain diameter: 1/4 inch (6 mm) to 1 inch (25 mm)  Length:3 ft (0.9 m) to 20 ft (6 m)  Single leg/double leg/three leg | 5 | 1:5 |
|  | Flat synthetic slings | Width: 1 inch (25 mm) to 4 inches (100 mm)  Length: 3 ft (0.9 m) to 30 ft (9 m)  Single ply/double ply | 5 | 1:5 |
|  | Round synthetic slings | Diameter:1/2 inch (12 mm) to 6 inches (150 mm)  Length:3 ft (0.9 m) to 30 ft (9 m) | 5 | 1:5 |
|  | Lifting hooks | Working load limit (WLL): 0.5 tons (500 kg)  Throat openings:1 inch (25 mm) to 6 inches (150 mm) | 5 | 1:5 |
|  | Grab hooks | Working load limit (WLL): 0.5 tons (500 kg)  Size: 1/4 inch (6 mm)-3/4 inch (20 mm)  Length:2.5 inches (63 mm) to 10 inches (250 mm) | 5 | 1:5 |
|  | Swivel hooks | Working load limit (WLL): 0.5 tons (500 kg)  Throat openings:1 inch (25 mm) to 6 inches (150 mm)  Length: 4 inches (100 mm) to 12 inches (300 mm) | 5 | 1:5 |
|  | Safety hooks | Working load limit (WLL): 0.5 tons (500 kg)  Throat opening: 0.5 inches (12 mm) to 6 inches (150 mm)  Length: 4 inches (100 mm) to 12 inches (300 mm) | 5 | 1:5 |
|  | Latching hooks | Working load limit (WLL): 0.5 tons (500 kg)  Throat opening: 0.5 inches (12 mm) to 5 inches (127 mm)  Length: 4 inches (100 mm) to 12 inches (300 mm) | 5 | 1:5 |
|  | Shackles | Working load limit (WLL): 0.5 tons (500 kg)  Diameter: 0.25 inches (6 mm) to 4 inches (100 mm) | 5 | 1:5 |
|  | Turnbuckles | Working load limit (WLL): 0.5 tons (500 kg)  Thread diameter:1/4" (6 mm) to 2" (50 mm)  Take-up length: 2 inches (50 mm) to 24 inches (610 mm) | 5 | 1:5 |
|  | Lifting beams | Working load limit (WLL): 0.5 tons (500 kg)  Beam lengths: 2 feet (0.6 m) to 40 feet (12 m) | 5 | 1:5 |
|  | Spreader bars | Working load limit (WLL): 0.5 tons (500 kg) | 5 | 1:5 |
|  | Rigging plates | Working load limit (WLL): 0.5 tons (500 kg) | 5 | 1:5 |
|  | Chain block | Working load limit (WLL): 0.5 tons (500 kg)  Lift height: 3 meters (10 feet) and 12 meters (40 feet) | 1 | 1:25 |
|  | Lifting/hoisting equipment | Working load limit (WLL): 0.5 tons (500 kg)  Lift height: 3 meters (10 feet) and 12 meters (40 feet) | 1 | 1:25 |
| **F** | **Reference Materials** | | | |
|  | Working drawings | Technical rigging drawings giving the specifications of the rigging to be carried out | 25 | 1:1 |
|  | Rigging plans | Rigging plans describing the procedures to be followed in carrying out rigging activities | 25 | 1:1 |
|  | Training Presentations/Slides | Digital format for shared access among trainees | 1 | 1:25 |
|  | Practical Assessment Guides | Worksheets for practical assessments | 25 | 1:1 |