Competency Based Curriculum (CBC)

Crane Operation

Level-3

Logistic Sector

Curriculum Code:CBC-LS-CO-L3-EN-V1

National Skills Development Authority
Chief Advisor's Office
Government of the People's Republic of Bangladesh

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The curriculum is designed based on NSDA approved **Crane Operation, Level – 3,** Occupation Competency Standards. It covers the information required to implement the **Crane Operation, Level - 3** standard. It is an important supporting document for trainers, assessors and curriculum developers.

This document has been developed by NSDA with the support of ISC representatives'/industry representatives from relevant sectors, academia, curriculum specialists, expert trainers and professionals.

All Government-Private-NGO training institutes of the country recognized by NSDA can use this curriculum to implement skill-based training of **Crane Operation, Level –3** course.

Introduction

The importance of skill-based training in socio-economic development of the country is immense. Demand oriented training is an important area for increasing productivity, creating employment and alleviating poverty. Skill development training institutes established at public and private level in Bangladesh are providing skill development training commercially. It is important to have uniform training curriculum based on occupation to improve and harmonize the overall quality of training conducted in all these training institutions. NSDA as provided in the National Skill Development Authority Act, 2018 is formulating uniform curriculum for training programs conducted across the country in various occupations/trades.

Competency standards for various occupations (level based) are being formulated by NSDA with the aim of creating skilled manpower as per the demand of domestic and international labor market.

Skilled and trained trainers are essential for providing training and assessment according to competency standards. For this purpose, the curriculum of **Crane Operation, Level -3** has been formulated through an expert committee consisting of ISC/Industry representatives from respective sectors, academia, curriculum specialists, expert trainers and professionals. This curriculum includes essential course design, course structure, course delivery methods, equipment and facilities inventory, and physical facilities. Apart from this, the assessment criteria of trainees, assessment procedure, qualification level and certification process have been inserted.

This curriculum is an NSDA-approved document that describes the overall contents of the training implementation of **Crane Operation, Level –3** as per industry demand-based competency standards. The trainees of **Crane Operation, Level –3** course can develop themselves as skilled and qualified **Crane Operator** by following properly.

Competency Based Learning Materials (CBLM) and Assessment tools are developed following this document. Assessment and certification of trainees will also follow this curriculum.

List of Abbreviations

CS	- Competency Standard
ISC	- Industry Skills Council
FPS	- Foot, Pound and Second
LISC	- Logistic Industry Skills Councils
NSDA	- National Skills Development Authority
BNQF	- Bangladesh National Qualification Framework
OSH	- Occupational Safety and Health
PPE	- Personal Protective Equipment
SS	- Stainless Steel
SCVC	- Standards and Curriculum Validation Committee
STP	- Skills Training Provider
SOP	- Standard Operating Procedure
UoC	- Unit of Competency
CO	- Crane Operation
LS	- Logistic Sector
CAD & CAM	- Computer Aided Design & Computer Aided Manufacturing
4 iR	- 4th Industrial Revolution

Table of Content

Course Design

Name of Course: Crane Operation

Skill Level : National Skills Certificate(NSC)-3

Nominal Hours : 360 Hours

On the Job : **160 Hours**

Total : **520 Hours**

List of Unit of Competency

Generic Unit of Competency

1 Perform Computations Using Basic Mathematical Concepts
2 Apply Occupational Safety and Health (OSH) Procedure in the Workplace

Sector Specific Unit of Competency

1. Use hand Tools and Power Tools

Occupation Specific Unit of Competency

1. Interpret the Operations of Crane
2. Perform Pre and Post Operation Works for Lifting
3. Operate Crane
4. Perform Basic Preventive Maintenance of Crane

Description of Course

It is a skill-based training course designed to develop the knowledge, skills and workplace attitude required for the Solar Electrical System Installation and Maintenance in Light Engineering Sector. The curriculum covers various skills such as, perform computations using basic mathematical concepts, apply occupational safety and health (OSH) procedure in the workplace, use hand tools and power tools, interpret the operations of crane, perform pre and post operation works for lifting, operate crane and perform basic preventive maintenance of crane

Learning Outcome of the Course

Successful completion of this course will lead to certification in **Crane Operation**, Level-3 under the Bangladesh National Qualification Framework (BNQF). Also, the course has the following functional, economic, and social learning outcomes.

Work Oriented Learning Outcome

1. Can work effectively as a **Crane Operator**
2. Occupational Safety and Health Regulations (OSH) may apply

Financial Learning Outcome

1. Job opportunities will be created as **Crane Operator** in country and abroad.
2. Can contribute to socio-economic development by participating in skill development activities

Social Learning Outcome

1. Social status will increase by achieving personal development
2. The share of skilled human resources will increase in line with changing technology
3. The number of skilled and trained **Crane Operator** will increase in the society

Course Structure

Generic Unit of Competency - 30Hrs.

Sl. No.	Unit of Competency	Module Title	Learning Outcome	Nominal Hours
1	Perform Computations Using Basic Mathematical Concepts	Performing Computations Using Basic Mathematical Concepts	1. Identify calculation requirements in the workplace 2. Select appropriate mathematical methods for the calculation. 3. Use tool/instrument to perform calculations	15
2	Apply Occupational Safety and Health (OSH) Procedure in the Workplace	Applying Occupational Safety and Health (OSH) Procedure in the Workplace	1. Identify OSH policies and procedures 2. Follow OSH procedures 3. Report hazards and risks 4. Respond to emergencies 5. Maintain personal well-being	15

Sector Specific Unit of Competency – 20 Hrs.

Sl. No.	Unit of Competency	Module Title	Learning Outcome	Nominal Hours
1	Use hand tools and power tools	Using hand tools and power tools	1. Identify and inspect hand and power tools 2. Use hand tools safely 3. Operate power tools safely 4. Clean and maintain hand and power tools	20

Occupation Specific Unit of Competency–330 Hours

Sl. No.	Unit of Competency	Module Title	Learning Outcome	Nominal Hours
1.	Interpret the operations of crane	Interpreting the operations of crane	1. Interpret Crane operation 2. Recognize the uses of Crane 3. Identify the key components of Crane 4. Maintain compliance issues of workplace 5. List the job responsibilities of Crane operator	20
2.	Perform pre and post operation works for lifting	Performing pre and post operation works for lifting	1. Identify common safety issues and risks 2. Prepare for work 3. Conduct pre check of equipment 4. Apply post- operation procedures 5. Prepare report	50
3.	Operate crane	Operating crane	1. Load and unload crane 2. Travel crane 3. Identify and interpret load chart 4. Conduct lifting and transferring operation 5. Maintain machine.	190
4.	Perform basic preventive maintenance	Performing basic preventive maintenance	1. Test functionality of tools and equipment 2. Perform adjustment/s replacements 3. Perform basic preventive maintenance servicing (PMS) 4. Identify and assess faults 5. Prepare equipment reports	50
			Total Hours	**310**
			ON the Job Training	**160**
			Total Nominal Learning Hours	**520**

Analysis of Competency

Generic Unit of Competency	Number of Module
1. Perform Computations Using Basic Mathematical Concepts	01
2. Apply Occupational Safety and Health (OSH) Procedure in the Workplace	01
Sector SpecificUnit of Competency	
3. Use hand Tools and Power Tools	01
Occupation SpecificUnit of Competency	
4. Interpret the Operations of Crane	01
5. Perform Pre and Post Operation Works for Lifting	01
6. Operate Crane	01
7. Perform Basic Preventive Maintenance of Crane	01
Total	**07**

Course Delivery

1. Face to Face
2. Self Paced Learning
3. On the job
4. Off the job

Course Training Method

A variety of methods can be applied to course training depending on the students' learning interests and abilities. Instructors should select appropriate methods to train students. Some of the common methods used during skills training are:

1. Lecture
2. Presentation
3. Discussion
4. Demonstration
5. Guided Practice
6. Individual Pactice
7. Project Work
8. Problem Solving
9. Brainstorming

Module of Instruction

- Generic
- Sector Specific and
- Occupation Specific

Generic Modules

Unit of Competency	**Perform Computations Using Basic Mathematical Concepts**
Unit Code	**GU-01-L2-V1**
Module Title	Performing Computations Using Basic Mathematical Concepts
Module Descriptor	This unit covers the knowledge, skills and attitudes required to perform computations using basic mathematical concepts It specifically includes the tasks of identifying calculation requirements in the workplace, selecting appropriate mathematical methods for the calculation and selecting tool/instrument to perform calculations.
Nominal Hours	**15 Hours**
Learning Outcome	After completing the practice of the module, the trainees will be able to perform the following jobs: 1. Identify calculation requirements in the workplace 2. Select appropriate mathematical methods for the calculation. 3. Use tool/instrument to perform calculations

Learning Outcome -1: Identify calculation requirements in the workplace	
Assessment Criteria	1. Job requirements are identified 2. Measurements are selected in accordance with job requirement 3. Calculation requirements are identified from workplace information
Conditions and Resources	• Workplace or Simulated Workplace • CBLM • Handout • Job Order • Drawing and design • Instructions • Multimedia Projector • Paper, Pen, Pencil and Eraser • Internet Facilities • White Board and marker
Contents	1. Measurements 1.1 Length 1.2 Width 1.3 Weight 1.4 Tolerance 2. Units of measurements 3. Workplace information 3.1 Job Order 3.2 Design 3.3 Working drawing 3.4 Instruction
Job/ Task/ Activity	1. Identify units of measuremenmt 2. Measure leanth, width and weight 3. Identify data from workplace information
Training Method	• Discussion • Presentation • Demonstration • Guided Practice • Individual Practice • Project Work • Problem Solving • Brainstorming
Assessment Method	• Written Test • Demonstration • Oral questioning

Learning Outcome -2: Select appropriate mathematical methods for the calculation	
Assessment Criteria	1. Mathematical methods are identified 2. Appropriate method is selected to carry out the calculation requirements 3. Tolerance and clearance limits are identified and adjusted according to the job requirements
Conditions and Resources	• Workplace or Simulated Workplace • CBLM • Handout • Multimedia Projector • Paper, Pen, Pencil and Eraser • Internet Facilities • White Board and marker
Contents	1 Appropriate mathematical methods 1.1 Addition 1.2 Subtraction 1.3 Division 1.4 Multiplication 1.5 Conversion 1.6 Percentage and ratio calculation
Job/ Task/ Activity	1. Carry out mathematical calculations 2. Identify and adjust tolerance
Training Method	• Discussion • Presentation • Demonstration • Guided Practice • Individual Practice • Project Work • Problem Solving • Brainstorming
Assessment Method	• Written Test • Demonstration • Oral questioning

Learning Outcome -3: Use tool/instrument to perform calculations	
Assessment Criteria	1. Work instructions are confirmed and applied to the job in hand 2. Materials to be measured are identified as per job specification 3. Appropriate tool/ instrument is selected based on materials to be measured
Conditions and Resources	• Workplace or Simulated Workplace • CBLM • Handout • Multimedia Projector • Paper, Pen, Pencil and Eraser • Internet Facilities • Appropriate tool/ instrument for calculation
Contents	1 Tools/Instrument 1.1 Calculator 1.2 Scale 1.3 Measuring tape 1.4 Marker 2 Work instructions Addition 3 Appropriate tool/ instrument selection technique
Job/ Task/ Activity	1. Identify materials to be measured 2. Use tools/instrument for measurement
Training Method	• Discussion • Presentation • Demonstration • Guided Practice • Individual Practice • Project Work • Problem Solving • Brainstorming
Assessment Method	• Written Test • Demonstration • Oral questioning

Unit of Competency	**Apply Occupational Safety and Health (OSH) Procedure in the Workplace**
Unit Code	**GU-02-L1-V1**
Module Title	**Applying Occupational Safety and Health (OSH) Procedure in the Workplace**
Module Descriptor	This module covers the knowledge, skills and attitudes required to apply occupational safety and health (OSH) procedure in the workplace. It specifically includes identifying OSH policies and procedures, following OSH procedures, reporting hazards and risks, responding to emergencies, and maintaining personal well-being.
Nominal Hours	**15Hours**
Lerning Outcome	After completing the practice of the module, the trainees will be able to perform the following jobs: 1. Identify OSH policies and procedures 2. Follow OSH procedures 3. Report hazards and risks 4. Respond to emergencies 5. Maintain personal well-being
Learning Outcome -1: Identify OSH policies and procedures	
Assessment Criteria	1. OSH policies and safe operating procedures are accessed and stated 2. Safety signs and symbols are identified and followed 3. Emergency response, evacuation procedures and other
Conditions and Resources	• Workplace or Simulated Workplace • Materials and equipment for OSH • Safety sign and symbols • OSH policies • CBLM • Handout • Multimedia Projector • Paper, Pen, Pencil and Eraser • Internet Facilities • White Board and marker • Audio video device
Contents	1. OSH policies 2. Safe operating procedures 3. Safety signs and symbols 4. Emergency response, evacuation procedures and other contingency measures
Job/ Task/ Activity	1. State occupational safety and health policy 2. Identify safety signs and symbols

Training Method	• Discussion • Presentation • Demonstration • Guided Practice • Individual Practice • Project Work • Problem Solving • Brainstorming
Assessment Method	1. Written Test 2. Demonstration 3. Oral questioning

Learning Outcome -2: Follow OSH procedures	
Assessment Criteria	1. Personal protective equipment (PPE) is selected and collected as required 2. Personal protective equipment (PPE) is correctly used in accordance with organization OSH procedures and practices 3. A clear and tidy workplace is maintained as per workplace standard 4. PPE is maintained to keep them operational and compliant with OSH regulations
Conditions and Resources	• Workplace or Simulated Workplace • Necessary PPE • CBLM • Handout • Multimedia Projector • Paper, Pen, Pencil and Eraser • Internet Facilities • White Board and marker • Audio video device
Contents	1. Personal Protective Equipment (PPE) 2. OSH procedures and practices 3. Clear and tidy workplace 4. Maintainence of PPE
Job/ Task/ Activity	1. Select, collect and use personal protective equipment (PPE) 2. Perform cleaning and make tidy your workplace 3. Maintain Personal Protective Equipment (PPE)

Training Method	1. Discussion 2. Presentation 3. Demonstration 4. Guided Practice 5. Individual Practice 6. Project Work 7. Problem Solving 8. Brainstorming
Assessment Method	1. Written Test 2. Demonstration 3. Oral questioning

Learning Outcome -3: **Report Hazards and Risks**	
Assessment Criteria	1. Hazards and risks are identified, assessed and controlled 2. Incidents arising from hazards and risks are reported to designated authority
Conditions and Resources	• Workplace or Simulated Workplace • CBLM • Handout • Multimedia Projector • Paper, Pen, Pencil, • Internet Facilities • White Board and marker • Necessary PPE
Contents	1. Identifying, assessing and controllinghazards and risks 2. Incidents arising from hazards and risks
Job/ Task/ Activity	1. Identify and assess hazards and risks 2. Report incidents arising from hazards and risks to appropriate authorities
Training Method	• Discussion • Presentation • Demonstration • Guided Practice • Individual Practice • Project Work • Problem Solving • Brainstorming
Assessment Method	1. Written Test 2. Demonstration 3. Oral questioning

Learning Outcome -4: **Respond to Emergencies**	
Assessment Criteria	1. Alarms and warning devices are responded 2. Workplace emergency procedures are followed 3. Contingency measures during workplace accidents, fire and other emergencies are recognized and followed in accordance with organization procedures 4. Frist aid procedures is applied during emergency situations
Conditions and Resources	• Workplace or Simulated Workplace • CBLM • Handout • Multimedia Projector • Paper, Pen, Pencil and Eraser • Internet Facilities • White Board and marker • Audio video device • Necessary tools • Necessary PPE
Contents	1. Alarms and warning devices andworkplace emergency procedures 2. Contingency measures during workplace accidents, fire and other emergencies 3. Frist aid procedures
Job/ Task/ Activity	1. Follow the signals of alarm and warning devices 2. Determine contingency management during workplace accidents, fires and other emergencies 3. Administer first aid
Training Method	• Discussion • Presentation • Demonstration • Guided Practice • Individual Practice • Project Work • Problem Solving • Brainstorming
Assessment Method	1. Written Test 2. Demonstration 3. Oral questioning

Learning Outcome -5: **Maintain Personal Well-being**	
Assessment Criteria	1. OSH policies and procedures are adhered OSH awareness programs are participated as per workplace guidelines and procedures 2. Corrective actions are implemented to correct unsafe condition in the workplace 3. "Fit to work" records are updated and maintained according to workplace requirements
Conditions and Resources	• Workplace or Simulated Workplace • CBLM • Handout • Computer/Laptop • Multimedia Projector • Paper, Pen, Pencil and Eraser • Internet Facilities • White Board and marker • Audio video device
Contents	1. OSH policies and procedures 2. OSH awareness programs 3. Corrective actions for unsafe condition 4. "Fit to work" records
Job/ Task/ Activity	1. Identify Occupational Safety and Health policies and procedures 2. Identify and apply corrective actions to correct unsafe conditions 3. Maintain "Fit for work" record
Training Method	• Discussion • Presentation • Demonstration • Guided Practice • Individual Practice • Project Work • Problem Solving • Brainstorming
Assessment Method	1. Written Test 2. Demonstration 3. Oral questioning

Sector Specific Module

Unit of Competency	**Use Hand tools and Power Tools**
Unit Code	**SU-LS-02-L1-V1**
Module Title	Using hand tools and power tools
Module Descriptor	This unit covers the knowledge, skills and attitudes required to use hand tools and power tools It specifically includes -identify and inspect hand and power tools, use hand tools safely, operate power tools safely and clean and maintain hand and power tools
Nominal Hours	**20 Hours**
Learning Outcome	After completing the practice of the module, the trainees will be able to perform the following jobs: 1. Identify and inspect hand and power tools 2. Use hand tools safely 3. Operate power tools safely 4. Clean and maintain hand and power tools

Learning Outcome -1: Identify and inspect hand and power tools	
Assessment Criteria	1. Safe work practice is observed and Personal Protective Equipment (PPE) is worn as per workplace requirement 2. Appropriate hand tools and power tools are identified as per workplace requirement 3. Application of hand and power tools is recognized 4. Usability of hand and power tools is checked and verified
Conditions and Resources	• Workplace or Simulated Workplace • Hand tools • Power tools • CBLM • Handout • Paper, Pen, Pencil and Eraser • White Board and marker

Contents	1. PPE 1.1 Safety helmets 1.2 Apron/Boiler suit 1.3 Earplugs 1.4 Safety goggles 1.5 Hand gloves 1.6 Safety boots 1.7 Rain coat 1.8 Face mask 2. Hand tools 2.1 Ball peen hammer 2.2 Soft hammer 2.3 Bench vice 2.4 Flat File 2.5 Center punch 2.6 Spanner set 2.7 Adjustable wrenches 2.8 Nose pliers 2.9 Combination pliers 2.10 Neon tester 2.11 Allen key set 2.12 C-clamp 2.13 Scriber 2.14 Screwdrivers Set (Phillips and flat) 2.15 Socket spanner set 2.16 Filter opener 2.17 Meter scale 2.18 Measuring tape 2.19 Steel rule 2.20 Spirit level 2.21 Hydraulic meter gauge set 2.22 Radio communication hand set 3. Selection of power tools 3.1 Blower machine 3.2 Air compressor with air gun 3.3 Tyer pressure gauge 3.4 Pneumatic screwdriver
Job/ Task/ Activity	1. Identify hand tools and power tools as per task 2. Check and verify usibility of hand tools and power tools as per task
Training Method	• Discussion • Presentation • Demonstration • Guided Practice • Individual Practice • Project Work • Problem Solving • Brainstorming

Assessment Method	• Written Test • Demonstration • Oral questioning

Learning Outcome -2: Use hand tools safely	
Assessment Criteria	1. Appropriate hand tools are selected as per job requirement 2. Safety precautions are ensured before using hand tools 3. Unsafe or faulty hand tools are identified and marked for repair 4. Use hand tools properly and safely to perform a work activity
Conditions and Resources	• Workplace or Simulated Workplace • Hand tools • CBLM • Handout • Paper, Pen, Pencil and Eraser • Internet Facilities • White Board and marker
Contents	1. Selection criteria of hand tools as per job requirements 2. Using technique of hand tools as per standard 3. Identification procedure of faulty hand tools 4. Safe practices rules for use hand tools
Job/ Task/ Activity	1. Select hand tools as per job requirements 2. Use hand tools as per standard 3. Identify faulty hand tools
Training Method	• Discussion • Presentation • Demonstration • Guided Practice • Individual Practice • Project Work • Problem Solving • Brainstorming
Assessment Method	• Written Test • Demonstration • Oral questioning

Learning Outcome -3: Operate power tools safely	
Assessment Criteria	1. Appropriate power tools are selected as per job requirement 2. Power supply outlet and electrical cord are inspected and

	confirmed safe for use following established workplace safety requirements 3. Safety precautions are ensured before using power tools following the manufacturer's operating specifications 4. The proper sequence of operation is applied for using power tools 5. Unsafe or faulty power tools are identified and marked for repair 6. Operate power tools safely to perform a work activity.
Conditions and Resources	• Workplace or Simulated Workplace • Power tools • Service manual • CBLM • Handout • Multimedia Projector • Paper, Pen, Pencil and Eraser • Internet Facilities • White Board and marker • Audio video device
Contents	1. Power tools 1.1 Blower machine 1.2 Air compressor with air gun 1.3 Tyer pressure gauge 1.4 Pneumatic screwdriver 2. Power tools safe operation procedure
Job/ Task/ Activity	1. Select power tools as per job requirement 2. Use power tools as per manufacturer's operating specifications 3. Identify and mark unsafe and faulty power tools 4. Operate power tools safely to perform a work activity
Training Method	• Discussion • Presentation • Demonstration • Guided Practice • Individual Practice • Project Work • Problem Solving • Brainstorming
Assessment Method	• Written Test • Demonstration • Oral questioning • Portfolio

Learning Outcome -4: Clean and maintain hand and power tools	
Assessment Criteria	1. Dust and foreign matter are removed from hand and power tools following workplace standards 2. Condition of hand and power tools is checked after use and reported to authorised personnel 3. Appropriate lubricant is applied after use and before storage 4. Defective hand and power tools are inspected and repaired or replaced 5. Hand and power tools are stored and secured following workplace requirements
Conditions and Resources	• Workplace or Simulated Workplace • Power tools • Hand tools • Service manual • CBLM • Handout • Multimedia Projector • Paper, Pen, Pencil and Eraser • Internet Facilities • White Board and marker • Audio video device
Contents	1. Maintenance technique of hand tools and power tools
Job/ Task/ Activity	1. Maintain hand tools and power tools 2. Demonstrate technique of storing hand tools and power tools
Training Method	• Discussion • Presentation • Demonstration • Guided Practice • Individual Practice • Project Work • Problem Solving • Brainstorming
Assessment Method	• Written Test • Demonstration • Oral questioning • Portfolio

Occupation Specific Module

Unit of Competency	**Interpret the Operations of Crane**
Unit Code	**OU-LS-CO-01-L3-V1**
Module Title	Interpreting the operations of crane
Module Descriptor	This unit covers the knowledge, skills and attitudes required interpret the operations of crane It specifically includes the tasks of interpreting crane operation, recognizing the uses of crane, identifying the key components of crane, maintaining compliance issues of workplace, listing the job responsibilities of crane operator
Nominal Hours	**20 Hours**
Learning Outcome	After completing the practice of the module, the trainees will be able to perform the following jobs: 1. Interpret Crane operation 2. Recognize the uses of Crane 3. Identify the key components of Crane 4. Maintain compliance issues of workplace 5. List the job responsibilities of Crane operator

Learning Outcome -1: Interpret Crane operation	
Assessment Criteria	1. Crane is identified 2. Types of cranes are interpreted 3. Crane operation is illustrated 4. Safety practices of Crane operation are recognized
Conditions and Resources	• Workplace or Simulated Workplace • Crane • CBLM • Handout • Multimedia Projector • Paper, Pen, Pencil and Eraser • White Board and marker
	1. Types of cranes 1.1 Mobile Cranes 1.2 Tower Cranes 1.3 Crawler Crane 1.4 Overhead Cranes 1.5 Floating Cranes 1.6 Telescopic Cranes 1.7 Stacker crane 1.8 Aerial work platform 1.9 Loader Cranes (Knuckle Boom Cranes)/jib crane 2. Crane operation 2.1 Obtain Proper Training and Certification • Enroll in a Certified Training Program • Understand Regulations • Obtain Certification and License 2.2 Pre-Operation Inspection • Visual Inspection: • Operational Checks: 2.3 Assess the Work Area • Identify Hazards • Establish Safe Zones • Ground Conditions • Setting outriggers to the loads 2.4 Understand Load Charts and Capacities • Read the Load Chart • Calculate Load Weight • Do Not Exceed Load Limits 2.5 Rigging the Load • Use Proper Equipment • Inspect Rigging Gear

	• Secure the Load • Use Tag Lines 2.6 Communicate Effectively • Use Standard Signals • Assign a Signal Person • Maintain Clear Communication 2.7 Operating the Crane • Start Slowly • Smooth Movements • Monitor Conditions • Avoid Sudden Movements 2.8 Setting Down the Load • Choose a Safe Landing Area • Properly slings, hooks and other rigging equipment with the loads • Lower Slowly • Unrig Safely 2.9 Post-Operation Procedures • Secure the Crane • Inspect for Damage • Report Issues • Perform Maintenance 3. Safety practices of Crane operation 3.1 Training and Certification 3.2 Pre-Operation Inspections 3.3 Load Handling and Rigging 3.4 Safety Devices and Controls 3.5 Environmental Considerations 3.6 Safe Work Practices 3.7 Operational Safety 3.8 Lockout/Tagout Procedures 3.9 Post-Operation Procedures 3.10 Emergency Preparedness 3.11 Compliance with Regulations Technological integration

Job/ Task/ Activity	1. Identify cranes 2. List the types of cranes 3. Illustrate cranes operation 4. Recognize safety practice of crane operation

Training Method	• Discussion • Presentation • Demonstration • Guided Practice • Individual Practice • Project Work • Problem Solving • Brainstorming
Assessment Method	• Written Test • Demonstration • Oral questioning • Portfolio

Learning Outcome -2: Recognize the uses of Crane	
Assessment Criteria	1. Uses of Crane are identified 2. Benefits of Crane are interpreted 3. Challenges of Crane Operation are listed
Conditions and Resources	• Workplace or Simulated Workplace • Cranes • CBLM • Handout • Multimedia Projector • Paper, Pen, Pencil and Eraser • Internet Facilities • White Board and marker • Audio video device
Contents	1. Uses of Crane Solar 1.1. Warehousing and Distribution 1.2. Manufacturing 1.3. Construction 1.4. Shipping and Receiving 1.5. Agriculture 1.6. Logistics and Transportation 1.7. Airports 1.8. Dockyards and Ports 1.9. Mining and Resource Extraction 1.10. Oil and Gas Industry 1.11. Power Line Installation 1.12. Wind Turbine Construction 1.13. Demolition 1.14. Entertainment and Events 1.15. Emergency and Rescue Operations 1.16. Waste Management and Recycling

	1.17. Installation of Large Sculptures 2. Benefits of Crane 2.1 Increased Efficiency 2.2 Safety 2.3 Cost-Effectiveness 2.4 Enhanced Storage Capabilities 2.5 Heavy Lifting Capabilities 2.6 Easy handling 2.7 Environmental Benefits 2.8 Increased Productivity 2.9 Precision and Accuracy 2.10 Capability to Handle Extreme Loads 2.11 Time-Saving 2.12 Enhanced Reach and Mobility 2.13 Environmental Benefits 2.14 Scalability 2.15 Improved Site Organization 2.16 Contribution to Complex Projects 2.17 Enhanced Capability in Adverse Conditions 3. Challenges of Crane Operation 3.1 Safety Risks 3.2 Public safety risk 3.3 Operator Training and Competence 3.4 Maintenance and Mechanical Issues 3.5 Hazardous goods handling 3.6 Operational Efficiency 3.7 Compliance and Regulations 3.8 Weather conditions 3.9 Site conditions 3.10 Load management 3.11 Miss communication 3.12 Human factors
Job/ Task/ Activity	1. Identify use of cranes 2. Interpret benefits of cranes 3. Lists the challenges of crane operation;
Training Method	• Discussion • Presentation • Demonstration • Guided Practice • Individual Practice • Project Work • Problem Solving • Brainstorming
Assessment Method	• Written Test • Demonstration • Oral questioning • Portfolio

Learning Outcome -3: Identify the key components of Crane	
Assessment Criteria	1. Key components of Crane are identified and listed 2. Operations of each component are recognized
Conditions and Resources	• Workplace or Simulated Workplace • Crane • CBLM • Handout • Multimedia Projector • Paper, Pen, Pencil and Eraser • Internet Facilities • White Board and marker • Audio video device
Contents	1. Key components of crane 1.1 Overhead Guard 1.2 Steer Wheels 1.3 Hydraulics 1.4 Lights and Signals 1.5 Instrument cluster 1.6 Battery 1.7 Engine 1.8 Boom 1.9 Mast or Tower 1.10 Slewing Unit 1.11 Counterweight 1.12 Load Hook 1.13 Hoist 1.14 Trolley (for certain types of cranes like gantry and overhead cranes) 1.15 Outriggers 1.16 Operator's Cab 1.17 Power Supply System 1.18 Safety Devices 1.19 Base and Support Structure 1.20 Sheaves and Pulleys 1.21 Rotating Platform (Superstructure) 1.22 Foundation or Support Base (for fixed cranes)
Job/ Task/ Activity	1. List the key components of cranes 2. Identify key components of cranes

Training Method	• Discussion • Presentation • Demonstration • Guided Practice • Individual Practice • Project Work • Problem Solving • Brainstorming
Assessment Method	• Written Test • Demonstration • Oral questioning • Portfolio

Learning Outcome -4: Maintain compliance issues of workplace	
Assessment Criteria	1. Compliance issues of workplace are interpreted 2. Compliance issue is maintained as per workplace standard
Conditions and Resources	• Workplace or Simulated Workplace • Cranes • CBLM • Handout • Multimedia Projector • Paper, Pen, Pencil and Eraser • Internet Facilities • White Board and marker • Audio video device
Contents	1. Compliance issues of workplace 1.1 Occupational Safety and Health 1.2 Fire Safety 1.3 Movement way 1.4 Waste management 1.5 Hazardous materials handling 1.6 Material Handling and Storage 1.7 Emergency Preparedness
Job/ Task/ Activity	1. Interpret compliance issues of workplace;
Training Method	• Discussion • Presentation • Demonstration • Guided Practice • Individual Practice • Project Work • Problem Solving • Brainstorming
Assessment Method	• Written Test • Demonstration • Oral questioning • Portfolio

Learning Outcome -5: List the job responsibilities of crane operator	
Assessment Criteria	1. Job responsibilities of Crane Operator are recognized as per workplace standard 2. Job responsibilities of crane operator are listed
Conditions and Resources	• Workplace or Simulated Workplace • Cranes • CBLM • Handout • Multimedia Projector • Paper, Pen, Pencil and Eraser • Internet Facilities • White Board and marker • Audio video device
Contents	1. Job responsibilities of Crane Operator 1.1 Receiving assignment 1.2 Cleaning and necessary checking of equipment 1.3 Loading and Unloading 1.4 Material Handling and Storage 1.5 Maintaining Safety Protocols 1.6 Accomplish assignment 1.7 Emergency Response 1.8 Proper Takeover and handover 1.9 Maintain checklist 1.10 Operating the Crane 1.11 Pre-Operation Inspection and Maintenance 1.12 Ensuring Safety 1.13 Communication and Coordination 1.14 Documentation and Record Keeping 1.15 Load Calculation and Planning 1.16 Compliance with Regulations 1.17 Customer Interaction (if applicable) 1.18 Site Preparation 1.19 Impart training
Job/ Task/ Activity	1. Identify job responsibilities of crane operator;
Training Method	• Discussion • Presentation • Demonstration • Guided Practice • Individual Practice • Project Work • Problem Solving • Brainstorming

Assessment Method	• Written Test • Demonstration • Oral questioning • Portfolio

Unit of Competency	**Perform Pre and Post Operation Works for lifting**
Unit Code	**OU-LS-CO-02-L3-V1**
Module Title	Performing pre and post operation works for lifting
Module Descriptor	This unit covers the knowledge, skills and attitudes required to perform pre and post operations work. It includes identifying common safety issues and risks, preparing for work, conducting pre check of equipment, applying post-operation procedures and preparing report.
Nominal Hours	**50 Hours**
Learning Outcome	After completing the practice of the module, the trainees will be able to perform the following jobs: 1. Identify common safety issues and risks 2. Prepare for work 3. Conduct pre check of equipment 4. Apply post- operation procedures 5. Prepare report

Learning Outcome -1: Identify common safety issues and risks	
Assessment Criteria	1. Safety precautions are identified and followed as per occupational health and safety policy. 2. Appropriate Personal Protective Equipment (PPE) is identified and checked for usability as per Standard Operating Procedure (SOP) of the organization. 3. Potential hazards, risks and environmental issues are identified and assessed. 4. Control measures are identified and implemented to eliminate hazards and risks.
Conditions and Resources	• Workplace or Simulated Workplace • PPE • Crane • CBLM • Handout • Paper, Pen, Pencil and Eraser • White Board and marker
Contents	1 Safety precautions 1.1 Use of Personal Protective Equipment (PPE) 1.2 Inspection of working environment 1.3 Apply of policies and procedures 1.4 Apply the knowledge of Standard Operating Procedure (SOP) 1.5 Proper use of tools and equipment 2 PPE 2.1 Apron 2.2 Dust mask 2.3 Safety gloves 2.4 Safety hamlet 2.5 Safety goggles 2.6 Safety shoes 3 Potential hazards, risks and environmental issues 4 Control measures to eliminate hazards and risks.
Job/ Task/ Activity	1. Identify Safety precautions as per Occupational Safety and Health (OSH) standard 2. Identify and assess potential hazards, risks and environmental issues 3. Identify and implement control measures to eliminate hazards and risks.

Training Method	• Discussion • Presentation • Demonstration • Guided Practice • Individual Practice • Project Work • Problem Solving • Brainstorming
Assessment Method	• Written Test • Demonstration • Oral questioning • Portfolio

Learning Outcome -2: Prepare for work	
Assessment Criteria	1. Personal Protective Equipment (PPE) is worn as per job requirement. 2. Equipment is selected as per job requirement. 3. Daily job schedule is collected to perform job. 4. Hand tools and equipment are inspected before use as per standard operating procedure. 5. Necessary machine component is checked for safe operation.
Conditions and Resources	• Workplace or Simulated Workplace • Hand tools and equipment • Crane • PPE • CBLM • Handout • Paper, Pen, Pencil and Eraser • Internet Facilities • White Board and marker
Contents	1. Hand tools 1.1 Screwdriver (flat and star) 1.2 Grease gun 1.3 Adjustable wrench 1.4 Spanner set 1.5 Shackle 1.6 Hydraulic Jack 1.7 Wire rope 1.8 Brake tools 1.9 HD air brake adjusting tools 1.10 HD brake spring pliers 1.11 Battery service kit

	1.12 Battery pliers 1.13 Battery clamp puller 1.14 Terminal cleaner 2. machine component
Job/ Task/ Activity	1. Select equipment as per job requirement 2. Collect daily job schedule to perform job 3. Inspect hand tools and equipment before use as per standard operating procedure. 4. Check machine component for safe operation.
Training Method	• Discussion • Presentation • Demonstration • Guided Practice • Individual Practice • Project Work • Problem Solving • Brainstorming
Assessment Method	• Written Test • Demonstration • Oral questioning • Portfolio

Learning Outcome -3: Conduct pre check of equipment	
Assessment Criteria	1. Starting/running check is performed with checklist and in accordance with manufacturer's recommendations. 2. Brake, steering and controls are checked for normal functioning as per manufacturer's specifications. 3. System check is performed with engine off according to manufacturer's guideline. 4. Serviceable parts are checked in accordance with manufacturer's procedures. 5. Walk-around check is performed with engine on and off position. 6. Deficiencies in fluid levels are identified and refilled in accordance with crane maintenance manual. 7. Abnormal conditions are noted and reported to authorized
Conditions and Resources	• Workplace or Simulated Workplace • Crane • Equipments • Spare parts • CBLM • Handout • Paper, Pen, Pencil and Eraser • White Board and marker
Contents	1. Starting/running check 1.1 Controls • Travel • Hoist • Swing • Outrigger • Boom • Elevating/Luffing 1.2 Gauges • Hour meter • Battery charging • Pressure (oil and air) • Temperature (oil and water) • RPM • Boom angle indicator • Fuel indicator Speedometer • Hydraulic pressure 1.3 Leaks in • Fuel • Hydraulic • Lubricating • Air • Cooling

	• Oil • Water • Brake fluid • Transmission fluid • Steering power oil 1.4 Electrical/switches • Lights • Horns • Wiper 1.5 Steering and brake 2. System check 2.1 Primary checking of engine 2.2 Battery (starting and charging system) 2.3 Light (lighting system) 2.4 Lube-oil (lubricating system) 2.5 Power oil 2.6 Hydraulic oil 2.7 Brake oil 2.8 Water (cooling system) 2.9 Air (intake and exhaust system) 2.10 Fuel (fuel system) 2.11 Horne 2.12 Dash board (running hour) 3. Serviceable parts 3.1 Air filter 3.2 Battery terminals/Connection 3.3 Belt 3.4 Tire inflation 3.5 Grease/lube points 3.6 Oil filter 3.7 Lube-oil/ machine oil filter 3.8 Fuel system filter 3.9 Hydraulic filter 3.10 Transmission filter 3.11 Wire rope 4. Walk-around check 4.1 Engine off • Leaks • Worn out/damaged parts • Fluid levels • Loose parts/connections • Missing parts • Tire condition 4.2 Engine on • Gauges and controls • Oil and air leaks • Safety devices • Working equipment function e.g. Boom and

	bucket • Unusual sounds • Unusual emission of smoke (blue, black and white)
Job/ Task/ Activity	1. Perform starting/running check in accordance with checklist; 2. Check brake, steering and controls for normal functioning as per manufacturer's specifications. 3. Perform system check with engine off according to manufacturer's guideline; 4. Check serviceable parts in accordance with manufacturer's procedures. 5. Perform walk-around check with engine on and off position; 6. Identify deficiencies in fluid levels and refill in accordance with crane maintenance manual 7. Note down abnormal conditions and report to authorized person
Training Method	• Discussion • Presentation • Demonstration • Guided Practice • Individual Practice • Project Work • Problem Solving • Brainstorming
Assessment Method	• Written Test • Demonstration • Oral questioning • Portfolio

Learning Outcome -4: Apply post- operation procedures	
Assessment Criteria	1. Crane is parked and turned off after operation. 2. Crane controls are set into neutral position. 3. Safety locks and brakes are all set/engaged in accordance with operator's manual. 4. Walk-around inspection check is reconducted while engine is cool down. 5. Daily Working Time Record (DWTR) or log book is submitted according to company rules and regulations.
Conditions and Resources	• Workplace or Simulated Workplace • Crane • PPE • CBLM • Handout • Multimedia Projector • Paper, Pen, Pencil and Eraser • White Board and marker
Contents	1. Procedure of post operative operation 2. Safety locks 2.1 Swing lock 2.2 House lock 2.3 Safey latches 2.4 Control lever lock 2.5 Door lock 2.6 Drum lock 2.7 Hydraulic lock 2.8 Overload protection device 2.9 Boom lock
Job/ Task/ Activity	1. Park the crane and turn-off after operation; 2. Set crane controls into neutral position; 3. Set safety locks and brakes in accordance with operator's manual; 4. Reconduct walk-around inspection check while engine is cool down 5. Submit Daily Working Time Record (DWTR) or log book according to company rules and regulations
Training Method	• Discussion • Presentation • Demonstration • Guided Practice • Individual Practice • Project Work • Problem Solving • Brainstorming

Assessment Method	• Written Test • Demonstration • Oral questioning • Portfolio

Learning Outcome -5: Prepare report	
Assessment Criteria	1. Faulty tools, equipment and machinery are identified. 2. Faulty tools and equipment are removed for service and tagged as unsafe for use. 3. Record is made of faulty tools, equipment and machinery. 4. Report is prepared and submitted to appropriate authority as per standard operating procedure
Conditions and Resources	• Workplace or Simulated Workplace • Crane • CBLM • Handout • Multimedia Projector • White Board and marker
Contents	1. Procedure of preparing report of faulty tools, equipment and machinery;
Job/ Task/ Activity	1. Identify faulty tools, equipment and machinery; 2. Prepare reporton faulty tools, equipment and machinery; 3. Submit the report to appropriate authority as per standard operating procedure;
Training Method	• Discussion • Presentation • Demonstration • Guided Practice • Individual Practice • Project Work • Problem Solving • Brainstorming
Assessment Method	• Written Test • Demonstration • Oral questioning • Portfolio

Unit of Competency	**Operate Crane**
Unit Code	**OU-LS-CO-03-L3-V1**
Module Title	Operating crane
Module Descriptor	This unit covers the knowledge, skills and attitudes required to operate crane. It includes loading and unloading crane, travelling crane, identifying load chart, conducting lifting and shifting operation and maintaining machine
Nominal Hours	**190 Hours**
Learning Outcome	After completing the practice of the module, the trainees will be able to perform the following jobs: 1. Load and unload crane 2. Travel crane 3. Identify and interpret load chart 4. Conduct lifting and transferring operation 5. Maintain machine

Learning Outcome -1: Load and unload crane	
Assessment Criteria	1. Personal Protective Equipment (PPE) is worn as per job requirement. 2. Trailer is selected for transporting crane as per job requirement. 3. Verbal instructions are followed with authorized signalman during loading and unloading process. 4. Boom and crane components are positioned and secured throughout loading and unloading process as per manufacture's manual. 5. Safety locks and controls are secured at neutral position during loading and unloading process. 6. Chassis is secured with stopper blocks and binders. 7. Unexpected situations are responded in line with company rules and regulations in a manner that minimizes risk to personnel and equipment.
Conditions and Resources	• Workplace or Simulated Workplace • Crane • PPE, Boom and crane components • Handout • Paper, Pen, Pencil and Eraser • White Board and marker

Contents	1. PPE 1.1 Apron 1.2 Dust mask 1.3 Safety gloves 1.4 Safety hamlet 1.5 Safety goggles 1.6 Safety shoes 2. Boom 2.1 Lattice 2.2 Telescopic 3. Crane components 3.1 Track link 3.2 Body frame 3.3 Boom 4. Binders. 4.1 Turnbuckles 4.2 Shackle 4.3 Wire rope sling 4.4 Chain sling 4.5 Belt 5. Unexpected situations 5.1 Sudden engine breakdown 5.2 Busted hydraulic hose and oil leakages 5.3 Broken wire rope 5.4 Sudden failure of drum brake/clutch (main and auxiliary) 5.5 Sudden malfunction of control levers 5.6 Sudden structural failure of the boom 5.7 Sudden derail of track link assembly 5.8 Sudden tipping 5.9 Sudden ground failure 5.10 Hitting high tension wire 5.11 Force majeure e.g., earthquake, fire, tornado 5.12 Operator fatigue or sickness/condition 5.13 Accidents/incidents 5.14 Weather and environmental condition

Job/ Task/ Activity	1. Select trailer for transporting crane as per job requirement 2. Follow verbal instructions with authorized signalman during loading and unloading process 3. Position boom and crane components and secure throughout loading and unloading process as per manufacture's manual; 4. Secure safety locks and controls at neutral position during

	loading and unloading process. 5. Secure chassis with stopper blocks and binders 6. Respond to unexpected situations in line with company rules and regulations
Training Method	• Discussion • Presentation • Demonstration • Guided Practice • Individual Practice • Project Work • Problem Solving • Brainstorming
Assessment Method	• Written Test • Demonstration • Oral questioning • Portfolio

Learning Outcome -2: Travel crane	
Assessment Criteria	1. Work area is inspected to identify potential hazards. 2. Mobile crane or trailer is driven by a license driver. 3. Travel speed, traffic rules and regulations is maintained. 4. Boom security is maintained during travelling as per manufacture's manual. 5. Unexpected situations are responded to minimizes risk as per company rules and regulations
Conditions and Resources	• Workplace or Simulated Workplace • Crane • CBLM • Handout • Paper, Pen, Pencil and Eraser • White Board and marker
Contents	1. Potential hazards 1.1 Other equipment 1.2 Building 1.3 Deep excavation 1.4 Fog 1.5 Electric wires/high tension wires 1.6 Protruding nails/steel bars (Wheel type) 1.7 Boulders and rocks 1.8 Muddy roads or unstable terrain 1.9 Landslide 2. Rules and regulations of travel speed, traffic 3. Procedure to respond unexpected sisuation;
Job/ Task/ Activity	1. Identify potential hazards in work area by inspection; 2. Maintain travel speed, traffic rules and regulations 3. Maintain boom security during travelling as per manufacture's manual 4. Demonstrate response to unexpected sisuation;
Training Method	• Discussion • Presentation • Demonstration • Guided Practice • Individual Practice • Project Work • Problem Solving • Brainstorming

Assessment Method	• Written Test • Demonstration • Oral questioning • Portfolio

Learning Outcome -3: Identify and interpret load chart	
Assessment Criteria	1. Crane is identified and selected as per job requirement. 2. Load information is collected and interpreted. 3. Rigging gears are determined based on manufacturer's specifications. 4. Lifting capacity is determined as per manufacturer's specifications. 5. Lifting capacity in load chart is followed according to manufacturer's specifications 6. Loads are control by Load Moment Indicator (LMI) as per manufacturer's specifications
Conditions and Resources	• Workplace or Simulated Workplace • Crane • CBLM • Handout • Paper, Pen, Pencil and Eraser • White Board and marker
Contents	1. Crane 1.1 Mobile 1.2 Truck 1.3 Crawler 2. Rigging gears 2.1 Shackle 2.2 Web sling 2.3 Chain sling 2.4 Wire rope sling 2.5 Turn buckle 2.6 Eye bolt 2.7 Hoist hook 3. Lifting capacity 3.1 Obsolescence (expected life span) 3.2 Equipment history 3.3 Machine performance 3.4 Wear and tear 3.5 Structural reliability vs. tipping stability
Job/ Task/ Activity	1. Identify and select crane as per job requirement; 2. Determine rigging gears based on manufacturer's specifications 3. Determine lifting capacity as per manufacturer's specifications; 4. Control loads by Load Moment Indicator (LMI) as per manufacturer's specifications.

Training Method	• Discussion • Presentation • Demonstration • Guided Practice • Individual Practice • Project Work • Problem Solving • Brainstorming
Assessment Method	• Written Test • Demonstration • Oral questioning • Portfolio

Learning Outcome -4: Conduct lifting and transferring operation	
Assessment Criteria	1. Necessary attachment is adjusted as per job specification. 2. Engine RPM is set at required operating condition. 3. Hydraulic pump pressure is set as operating condition. 4. Occupation Safety and Health (OSH) is followed throughout transferring operation. 5. Travelling speed is maintained during lifting and moving operation based on manufacturer's manual. 6. Communication with Signalman is maintained throughout traveling and lifting operation
Conditions and Resources	• Workplace or Simulated Workplace • Crane • PPE • Basic test instrument • CBLM • Handout • White Board and marker
Contents	1. Necessary attachment 1.1 Shackle 1.2 Web sling 1.3 Chain sling 1.4 Wire rope sling 1.5 Eye bolt 1.6 Hoist hook 1.7 Belt 1.8 Chain 1.9 Wire and Rope 1.10 Speeders bars 2. Occupation Safety and Health (OSH) / transferring operation 1. Checking lifting/Rigging gears 2. Placing and securing all slings, ties and hooks correctly before raising the load. 3. Preventing load striking the ground, machine or any other object 4. Preventing the boom from striking any obstruction. 5. Avoiding Shock/Dynamic loading 6. Load handling is observed.
Job/ Task/ Activity	1. Adjust necessary attachment as per job specification; 2. Set engine RPM at required operating condition; 3. Set hydraulic pump pressure as operating condition; 4. Maintain travelling speed during lifting and moving operation based on manufacturer's manual; 5. Maintain communication with signalman throughout traveling

	and lifting operation
Training Method	• Discussion • Presentation • Demonstration • Guided Practice • Individual Practice • Project Work • Problem Solving • Brainstorming
Assessment Method	• Written Test • Demonstration • Oral questioning • Portfolio

Learning Outcome -5: Maintain machine	
Assessment Criteria	1. Post operation is performed as per workplace procedure. 2. Crane is cleaned as per workplace procedure. 3. Visual check of crane is performed. 4. Report is prepared and submitted as per organization standard operating procedure
Conditions and Resources	• Workplace or Simulated Workplace • Crane • PPE • Basic test instrument • CBLM • Handout • White Board and marker
Contents	1. Post operative procedures;
Job/ Task/ Activity	1. Perform post operation as per workplace procedure; 2. Clean crane as per workplace procedure; 3. Perform visual check of crane; 4. Prepare report and submit as per organization standard operating procedure;

Training Method	• Discussion • Presentation • Demonstration • Guided Practice • Individual Practice • Project Work • Problem Solving • Brainstorming
Assessment Method	• Written Test • Demonstration • Oral questioning • Portfolio

Unit of Competency	**Perform Basic Preventive Maintenance of Crane**
Unit Code	**OU-LS-CO-04-L3-V1**
Module Title	Performing basic preventive maintenance of crane
Module Descriptor	This unit covers the knowledge, skills and attitudes required to perform basic preventive maintenance of crane. It includes testing functionality of tools and equipment, performing adjustment/s replacements, performing basic preventive maintenance servicing (PMS), identifying and assessing faults and preparing reports
Nominal Hours	**50 Hours**
Learning Outcome	After completing the practice of the module, the trainees will be able to perform the following jobs: 1. Test functionality of tools and equipment 2. Perform adjustment/s replacements 3. Perform basic preventive maintenance servicing 4. Identify and assess faults 5. Prepare reports

Learning Outcome -1: Test functionality of tools and equipment	
Assessment Criteria	1. Tools and equipment are inspected prior to use as per standard operating procedure. 2. Pre-operation functional safety check procedures are followed to ensure compliance with manufacturer's specifications. 3. Damaged or faulty tools and equipment are recorded and reported to appropriate authority. 4. Equipment is tested after start-up as per standard operating procedure in ensure manufacturer specification compliance. 5. Warning and associated systems are checked for operational effectiveness
Conditions and Resources	• Workplace or Simulated Workplace • Crane • CBLM • Handout • Paper, Pen, Pencil and Eraser • White Board and marker
Contents	1 Factionality test procedure of tools and equipment
Job/ Task/ Activity	1. Inspect tools and equipment prior to use as per standard operating procedure 2. Record damaged or faulty tools and equipment and report to appropriate authority 3. Test equipment after start-up as per standard operating procedure in ensure manufacturer specification compliance
Training Method	• Discussion • Presentation • Demonstration • Guided Practice • Individual Practice • Project Work • Problem Solving • Brainstorming
Assessment Method	• Written Test • Demonstration • Oral questioning • Portfolio

Learning Outcome -2: Perform adjustment/s replacements	
Assessment Criteria	1. Minor defects are identified and remedied in accordance with company/manufacturer's procedures. 2. Tools are selected based on job requirements. 3. Major defects are identified using check list and referred to appropriate personnel for action.
Conditions and Resources	• Workplace or Simulated Workplace • Crane • CBLM • Handout • Paper, Pen, Pencil and Eraser • White Board and marker
Contents	1. Minor defects 1.1 Weak battery 1.2 Air lock 1.3 Tire inflation 1.4 Belt tension 1.5 Clogged air cleaner 1.6 Defective radiator cap 1.7 Loose clamps. Bolts and mountings 1.8 Presence of water in fuel separator 1.9 Clogged fuel filter 1.10 Clogged fuel system line 1.11 Open Hook safety lock pin 2. Major defects 2.1 Busted hydraulic hose 2.2 Hard starting engine 2.3 Excessive engine oil consumption 2.4 Leakage on • Air • Fuel • Cooling • Hydraulic system • Engine oil system • Transmission oil system • Axel/ reducer oil system 2.5 Faulty gauges 2.6 Damaged/broken pulley 2.7 Incorrect/defective Load Moment Indicator (LMI) 2.8 Defective/frayed wire rope 2.9 Busted/flat tires 2.10 Derailed track links 2.11 Excessive engine oil consumption on: • Fuel • Water • Fluid 2.12 Poor engine performance

	2.13 Weak brakes 2.14 Bad noise from axel, transmission, engine, boom etc. 2.15 Short circuit problem 2.16 Pin bush problem 2.17 Load system problem 2.18 Defective electrical components • Charging • Lighting • Starting • Monitoring/gauges 3. Appropriate personnel 3.1 Equipment supervisor/Foreman 3.2 Chief mechanic 3.3 Equipment maintenance personnel
Job/ Task/ Activity	1. Select tools based on job requirements. 2. Identify minor defects and repair in accordance with company/manufacturer's procedures. 3. Identify major defects using check list and refer to appropriate personnel for action
Training Method	• Discussion • Presentation • Demonstration • Guided Practice • Individual Practice • Project Work • Problem Solving • Brainstorming
Assessment Method	• Written Test • Demonstration • Oral questioning • Portfolio

Learning Outcome -3: Perform basic preventive maintenance servicing	
Assessment Criteria	1. OS parts/standards are identified and serviced according to manufacturer's recommendations. 2. Fluids and lubricants are used based on manufacturer's manual. 3. Basic hand tools and equipment and consumable materials are identified and used in accordance with job requirements. 4. Basic preventive maintenance servicing (PMS) is carried out in accordance with manufacturer's recommendations and/or site requirements/ conditions.
Conditions and Resources	• Workplace or Simulated Workplace • Crane • CBLM • Handout • Paper, Pen, Pencil and Eraser • White Board and marker
Contents	1. Operator Serviceable (OS) parts 1.1 Battery clamps 1.2 Belts 1.3 Filters • Air cleaner • Water fuel separator/drain valve 1.4 All fluid caps 1.5 All grease points and fittings 1.6 Wire rope grease/lubricants 1.7 Battery distilled water 1.8 Chain grease 1.9 All caps (e.g., water, oil, fluid, fuel) 2. Fluids and lubricants 2.1 Engine oil 2.2 Hydraulic oil 2.3 Brake fluid 2.4 Multi-purpose grease 2.5 Coolant/Anticoat 2.6 Battery solutions 2.7 Transmission oil 2.8 Fuel 2.9 Gear oil 2.10 Power steering oil 2.11 Add blue 2.12 Cleaning solutions • Detergent soap • Degreaser 3. Basic hand tools and equipment 3.1 Hand tools • Wrenches • Pliers

	• Paint brush • Grease gun • Hammer • Vice grip • Measuring tape (instrument) • Steel brush • Screw driver (positive and negative) • Screw driver (Philips and flat tip) • Tire gauge (instrument) • Mud removing tools 3.2 Equipment • High pressure washer • Air compressor 4. Basic preventive maintenance servicing (PMS) 4.1 Check battery clamps 4.2 Check fan belt conditions (cracked or worn-out) 4.3 Adjust belt tensions (if necessary) 4.4 Clean/Replace filters • Air cleaner • Water separator • Fuel filter • Engine oil filter • Hydraulic oil filter • Transmission filter 4.5 Replace defective fluid caps 4.6 Grease all fittings on lube points 4.7 Grease wire ropes 5. প্রয়োজনীয়তা 5.1 Instructions 5.2 Signages 5.3 Work schedules 5.4 Work bulletin boards 5.5 Charts 5.6 Memos 5.7 Maps 5.8 Dusty 5.9 Windy 5.10 Poor lighting 5.11 Vertical clearance 5.12 Overhead cable 5.13 Toxic/hazardous fumes
Job/ Task/ Activity	1. Identify OS parts/standards and service according to manufacturer's recommendations; 2. Use fluids and lubricants based on manufacturer's manual; 3. Identify and use basic hand tools and equipment and consumable materials in accordance with job requirements; 4. Carry out basic preventive maintenance servicing (PMS) in accordance with manufacturer's recommendations and/or site requirements/ conditions.

Training Method	• Discussion • Presentation • Demonstration • Guided Practice • Individual Practice • Project Work • Problem Solving • Brainstorming
Assessment Method	• Written Test • Demonstration • Oral questioning • Portfolio

Learning Outcome -4: Identify and assess faults	
Assessment Criteria	1. Faults are identified, and assessment is made of potential impact on work and operation of equipment. 2. Identified faults that may affect safe operation of equipment and completion of work are recorded.
Conditions and Resources	• Workplace or Simulated Workplace • Crane • CBLM • Handout • Paper, Pen, Pencil and Eraser • White Board and marker
Contents	1 Faults 2.1 Corrosion 2.2 Misalignment 2.3 Bearing failure 2.4 Metal fatigue 2.5 Pump failure 2.6 Electrical 2.7 Mechanical 2.8 Wear and tear 2.9 Hydraulic system 2.10 Break rigging gear 2.11 Engine failure 2.12 Transmission failure 2.13 Winch failure 2.14 Axel failure 2.15 Boom section failure 2 Faults identification and assessment procedure;

Job/ Task/ Activity	1. Identify and assess faults is made of potential impact on work and operation of equipment.
Training Method	• Discussion • Presentation • Demonstration • Guided Practice • Individual Practice • Project Work • Problem Solving • Brainstorming
Assessment Method	• Written Test • Demonstration • Oral questioning • Portfolio

Learning Outcome -5: Prepare reports	
Assessment Criteria	1. Daily checklist form is accomplished in accordance with manufacturer's/company requirements. 2. Minor/major equipment defects are reported to appropriate personnel. 3. Inspection and testing results are recorded and reported as per standard operating procedure. 4. Equipment identified as faulty is removed from service and tagged as unsafe for use.
Conditions and Resources	• Workplace or Simulated Workplace • Crane • CBLM • Handout • Paper, Pen, Pencil and Eraser • White Board and marker
Contents	1. Report preparing procedure of equipment defects, inspection and test results
Job/ Task/ Activity	1. Report minor/major equipment defects to appropriate personnel. 2. Record and report inspection and testing results as per standard operating procedure 3. Remove equipment identified as faulty from service and tag as unsafe for use

Training Method	• Discussion • Presentation • Demonstration • Guided Practice • Individual Practice • Project Work • Problem Solving • Brainstorming
Assessment Method	• Written Test • Demonstration • Oral questioning • Portfolio

Competency based curriculum (CBC)

The CBC is also termed as Competency Based Curriculum and is developed based on NCS and labour market needs.

CBT curricula are designed considering the following principles.

- Identification of competencies in consultation with experts from industries and training institutes
- Adopting 21st century pedagogy and methodology
- Training must be in line with labour market need and industrial standard
- Creating training modality to experience real working situation through platform such as OJT and Industrial visit

What is Competency-Based Curriculum (CBC)

- A competency-based curriculum is a framework or guide for the subsequent detailed development of competencies, associated methodologies, training and assessment resources.

- The CBC specifies the outcomes which are consistent with the requirements of the workplace as agreed through the industry or community consultations.

- CBC can be developed immediately when competency standards exist.

- When competency standards do not exist, curriculum developers need to clearly define the learning outcomes to be attained. The standard of performance required must be appropriate to industry and occupational needs through the industry/enterprise or specified client group consultations.

Validation of Competency Based Curriculum

The Competency Based Curriculum for National Skills Certificate in Crane Operation; Level-03 is validated by NSDA on 30 December 2025.

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