



COMPETENCY BASED CURRICULUM (MOBILE CRANE OPERATION)

CERTIFICATE-2



Published by Technical Trainers Training and Resource Center (TTTRC)
Department of Workforce Planning and Skills Development
Ministry of Education and Skills Development
Royal Government of Bhutan
Thimphu, Bhutan

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Department of Workforce Planning and Skills Development

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First Edition: 2026

ISBN 978-99980-25-00-4



དཔལ་ལྷན་འབྲུག་གཞུང་། ཤེས་རིག་དང་རིག་ཆལ་གོང་འཕེལ་ལྷན་ཁག།
ལས་མི་འཆར་གཞི་དང་རིག་ཆལ་གོང་འཕེལ་ལས་ཁུངས།
Royal Government of Bhutan
Ministry of Education and Skills Development
Department of Workforce Planning and Skills Development



Certificate No: DWPSD/CEC-MCO/2025-26/022

Curriculum Endorsement Certificate

This is to certify that the curriculum for the following course(s) developed by

Technical Trainers Training and Resource Center

has been endorsed by the department.

Course	Level
Mobile Crane Operation	BQF Certificate 2

Date of Endorsement: 1/07/2026



This certificate is valid till 30/06/2031 from the date of endorsement

Director General
Department of Workforce Planning and Skills Development

FOREWORD

Bhutan has seen a gradual increase in the requirement of skilled workers in recent years due to growth of industries. However, supply of skilled workforce that are responsive to the needs of the industry has not been able to keep in pace with the industry demand. Since the skilled workers are crucial ingredient for socio-economic development of the country, it is important to have adequate number of trained and certified workers. With growing industries, the “Mobile Crane operator” are not only the most significant occupation but also have high demand in the labour market. In an effort to meet the skilled human resources requirement, it is imperative to deliver training based on Competency Based Training system in Mobile Crane Operation to ensure quality and adequate number of work force in this sector.

To this end, the Department of Workforce Planning and Skills Development (DWPSD) is pleased to present the Competency Based Curriculum for Mobile Crane Operation BQF Certificate 2 course developed based on national competency standard. Since it is an outcome of a more participatory process of curriculum development, it is expected to provide training delivery with reformed approaches having its content being directly related to labour market needs, focusing on imparting of skills and assessment based on industry work standards. We believe that the Competency Based Curriculum will help in bridging the skill gap between industry’s needs and training institutes thereby enhance the employability of the technical graduates.

The Department acknowledges the valuable contributions made by institutes, officials, and experts from relevant industries who were involved in the design and development of this curriculum. As it is a dynamic document which may require revision based on the needs of the changing labour market, the Department look forward to receiving valuable feedbacks from the institutes and the industries to further improve and refine the curriculum

The Department hope that this document will help advance Competency Based Learning in most of the TVET Institutions.



(Phub Rinzin)

Director General

Department of Workforce Planning and Skills Development

ACKNOWLEDGEMENT

Technical Trainers Training and Resource Center, Department of Workforce Planning and Skills Development under MoESD would like to express our appreciation to the following subject experts and facilitators who have participated in the development and validation of curriculum for Mobile Crane Operation BQF Certificate 2:

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8. Ms. Daw Zam, Instructor, TTI-Samthang
9. Mr. Karma Loday, Specialist, TVET Quality Council, BQPCA

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Competency Profile
Trade: Mobile Crane Operation
Occupation: Mobile Crane Operator

Competency Area	Sub- Competency Area	Competencies/Tasks 			
A: Practice worksite Health and Safety	A1: Apply Safety measure and regulations	A1.01 Use PPE	A1.02 Assess work site	A1.03 Use fire extinguisher	A1.04 Manage emergency situations
	A2: Apply first aid	A2.01 Perform CPR	A2.02 Apply bandage	A2.03 Prepare stretcher	
	A3: Apply communication skill	A3.01 Apply audible signal	A3.02 Apply hand signal	A3.03 Follow traffic signs and symbols	A3.04 Use safety signs
B: Carryout maintenance of Mobile crane	B1: Maintain tools and equipment	B1.01 Check hand tools	B1.02 Check grease gun	B1.03 Overhaul grease gun	
	B2: Perform basic maintenance	B2.01 Change fuse	B2.02 Service battery	B2.03 Change air filter	B2.04 Change crane rigging hook
		B2.05 Change tyre	B2.06 Perform greasing	B2.07 Perform jump-start	
	B3: Perform periodic maintenance	B3.01 Change engine oil	B3.02 Change transmission oil	B3.03 Change hydraulic oil	B3.04 Change coolant
		B3.05 Change fuel filter	B3.06 Top up Diesel Exhaust Fluid (Ad-Blue)	B3.07 Change gear oil	
C: Carry out pre operation check	C1: Perform exterior check	C1.01 Perform walkaround inspection	C1.02 Check tyre pressure	C1.03 Drain water from water separator	C1.04 Check sling

	C2: Perform under hood check	C2.01 Check engine oil	C2.02 Check coolant	C2.03 Check hydraulic fluid	C2.04 Check brake fluid
		C2.05 Check transmission oil level	C2.06 Check fan belt	C2.07 Check battery electrolyte	C2.08 Check cross bearing
	C3: Perform interior check	C3.01 Check document	C3.02 Read monitor panel	C3.03 Check lighting system	
D: Carryout productive and post operation of Mobile Crane	D1: Perform hoist calculation	D1.01 Interpret load chart	D1.02 Determine crane capacity	D1.03 Perform rigging calculations	
	D2: Setup crane at site	D2.01 Evaluate risk and hazard	D2.02 Perform final site inspection	D2.03 Position crane	D2.04 Complete crane setup
		D2.05 Install hoist line			
	D3: Perform rigging	D3.01 Lubricate sling and hardware	D3.02 Identify defects in sling and hardware	D3.03 Store sling and hardware	D3.04 Select required rigging
		D3.05 Rig load			
	D4: Operate mobile crane	D4.01 Start crane (<i>check boom sensors</i>)	D4.02 Check hydraulic operation	D4.03 Check brake system	D4.04 Perform moving off
		D4.05 Perform gear shifting	D4.06 Perform reversing	D4.07 Perform Maneuvring	D4.08 Configure Load Moment Indicator (LMI)
		D4.09 Perform material loading	D4.10 Perform material unloading		

	D5: Perform post operation	D5.01 Perform stopping	D5.02 Perform parking	D5.03 Maintain log book	D5.04 Record/Update Maintenance History Card
	D6: Transport mobile crane	D6.01 Prepare travel documents	D6.02 Prepare loading ramp	D6.03 Load mobile crane	D6.04 Unload mobile crane

COURSE INFORMATION

COURSE TITLE	Mobile Crane Operation
LEVEL	BQF Certificate 2
COURSE OBJECTIVE	Upon completion of this training program, the trainees will be able to: • Practice worksite health and safety • Carryout maintenance of mobile crane • Carryout pre operation check • Carryout productive and post operation of mobile crane
COURSE DESCRIPTION	This curriculum is designed to provide knowledge, skills and attitude to trainees to be competent Mobile Crane operator in accordance with industry standards Upon completion of the course, graduates will be able to carry out maintenance of mobile crane, pre & post operation check and productive operation for mobile crane. In addition, this course will also prepare the graduates to comply with regulatory and organizational requirements for practicing Occupational Health and Safety procedures. This course also includes the soft skills components such as basic computer application, entrepreneurship, numeracy, communication and value education to supplement core competencies and enhance practical skills.
TOTAL DURATION	1186 Hours
TRAINER AND TRAINEE RATIO	1:06 (Practical) 1:20 (Theory)
ENTRY REQUIREMENT	• Completed class VI and should be above 21 years old
TVET TRAINER REQUIREMENTS	• Must have a minimum qualification of diploma in relevant field; • Must have valid Crane operator license; • Must have undergone Training of Trainers-Technical Instruction and Pedagogy; • Must have at least 3 years job/industry experience in relevant field if institute hire instructors or guest lecturer from industry.

COURSE OUTLINE

Sl. No	Subject /Module	Duration (Hours)	Content Competencies (Mapped)
1.	Core modules	376 (3 months)	CC
2.	OJT	280 (2 months)	CC
3.	Applied Dzongkha	42	SS
4.	ICT	68	SS
5.	Applied Mathematics	60	SS
6.	Technical English	82	SS
7.	Entrepreneurship	70	SS
8.	Occupational Health and Safety (OHS)	34	ES
9.	Sustainable Consumption and Production (SCP)	36	ES
10.	Professional Ethics	68	PD
11.	Assessment	70	
	Total Course Duration	1186	

Note: (*) This curriculum contains core modules which cover main competencies of Mobile Crane Operation BQF C2 and OJT component. There are separate curricula for subjects/modules for delivery of soft skills, professional development & values and environmental concern & safety. In order to achieve the qualification of Mobile Crane Operation BQF C2, the subjects and modules listed must be accomplished as per the credit hours provided.

Content Competencies:

CC-Core Competencies

SS-Soft Skills

PD-Professional Development and Values

ES-Environmental concern and Safety

COURSE STRUCTURE FOR CORE COMPETENCIES

Training Modality	Module Title	Learning outcomes	Nominal Duration (Hour)
1. Institute Training	A. Practicing Worksite Health and Safety	A1. Apply safety measure and regulations A2. Apply first aid A3. Apply communication skills	28
	B. Carrying out maintenance of mobile crane	B1. Maintain tools and equipment B2. Perform basic maintenance B3. Perform periodic maintenance	45.5
	C. Carrying out pre operation check	C1. Perform exterior check C2. Perform under hood check C3. Perform interior check	21.5
	D. Carrying out productive and post operation of mobile crane	D1. Perform hoist calculation D2. Setup crane at site D3. Perform rigging D4. Operate mobile crane D5. Perform post operation check D6. Transport mobile crane	281
2. On the Job Training	A. Practicing Worksite Health and Safety	A1. Apply safety measure and regulations A2. Apply first aid A3. Apply communication skills	280
	B. Carrying out maintenance of mobile crane	B1. Maintain tools and equipment B2. Perform basic maintenance B3. Perform periodic maintenance	
	C. Carrying out pre operation check	C1. Perform exterior check C2. Perform under hood check C3. Perform interior check	
	D. Carrying out productive and post operation of mobile crane	D1. Perform hoist calculation D2. Setup crane at site D3. Perform rigging D4. Operate mobile crane D5. Perform post operation check D6. Transport mobile crane	
Total CC Duration:			656

ASSESSMENT AND CERTIFICATION SYSTEM

ASSESSMENT

Formative assessment for every module and learning outcome will be conducted through assignments, project works, continuous assessment, demonstration of practical skills/observations, oral questioning and written test.

Summative assessment after completion of each national certificate level will be conducted by TVET Quality Council, Bhutan Qualifications and professional certification authority, MoESD as per the National Competency Standards and Guidelines for National Assessment and Certification System, provided the course is accredited with TVET Quality Council, Bhutan Qualifications and professional certification authority, MoESD .

CERTIFICATION

On successful completion of every module, the institute will award a certificate of achievement to the trainees. The TVET Quality Council, Bhutan Qualifications and professional certification authority, MoESD will award a National Certificate to the trainees upon the successful completion of NC level assessment.

COURSE DELIVERY

1. Modular
2. Demonstration
3. Lecture
4. Industrial training/attachment
5. Project work
6. Problem-based learning
7. Project-based learning

RESOURCES

Materials

Pen and paper, cleaning rag, firewood, fuel, water, handkerchief, bandage, cotton, clothes, tarpaulin, poles, ropes, flip chart, hand signal posture, signalman flag, caution ribbon tape, poster, sign board, manual book, piston seal, grease, Markin clothes, petroleum jelly, O-ring, air filter, sand paper, distilled water, kerosene, tyre, jumper cable, tags, dye penetrant inspection kit and fastener, baking soda, engine oil, oil filter, transmission oil, hydraulic oil, brake fluid, coolant, fuel filter, banjo washer, DEF/AdBlue, banjo bolt, marker, washer, nuts and bolts, rust lick, inspection form, fan belt, battery, RC book, insurance certificate, log book, operator license, movement order, road worthiness certificate, bulbs, relay, fuse, file, crane load chart, crane specification, checklist, load chart, lubricants, load, taglines, Cardium compound, hoist rope/wire, cleaning agent/solvent, logbook, crane manual book and ignition key

Tools

Plier, screwdriver set, knife, whistle, sign boards (mandatory, informatory and cautionary), basic hand tool set, fuse, wire, wire brush, battery, lever, wheel wrench, sledge hammer, fuse puller, terminal expander, allen key set, oil filter wrench, oil gun, tray, oil container/empty barrel, DEF filling nozzle, vinyl tube, valve key, measuring tape, magnifying glass, tagging marker, torque wrench, mechanic hand tool set, calculator, spanner set, socket set, hammer, hack saw, ratchet, belt, roller, paint brush, flashlight and wooden wedge.

MOBILE CRANE OPERATION BQF C2

Instrument

Multimeter, hydrometer, pressure gauge and vernier caliper

Equipment

Fire extinguisher, mobile crane, hand set, bench mark, grease gun, battery charger, air compressor, grease adapter, crane rigging hook, booster battery/battery starter, work bench, G-clamp, button clamp, chain, D-shackle, hoist, rigging gears, superstructure, eye bolt, counterweight, high torsion cable, sling, hardware, rack, hooks, lifting clamps, belt, handset, outrigger pads/cribbing, tag lines and loading truck/trailer

PPE

Safety gloves, safety helmet, safety boots, safety goggles, face mask, ear muffs/ear plug, reflective jacket and work dress

Learning Materials

- Competency Based Learning Materials (CBLM)/Reference material
- Reference books
- Hand-outs
- Audio visuals

Infrastructure and training facilities

- **Theory classroom size:** Minimum of 1.5 square meter per trainee
- **Practical classroom size:** Minimum of 3 square meter per trainee. Other variables must be considered depending upon type of skill being taught and the number of trainees participating at one time

MODULE INFORMATION:
MOBILE CRANE OPERATION BQF CERTIFICATE 2

MODULE 1
ON
PRACTICING WORKSITE HEALTH AND SAFETY

MODULE INFORMATION

Occupation	Mobile Crane Operator
Competency Area	Practice worksite health and safety
Module Title	Practicing worksite health and safety
Module Code	8343- L2-M1
Module Description	This module is structured to provide learners with the knowledge, skills and right attitude required to apply safety measure and regulation, first aid and communication skills
Nominal Duration	28 Hours
Certificate Level	BQF Certificate 2
Pre-requisite	Completed VI and should be above 21 years old
Learning Outcome	1. Apply safety measure and regulations 2. Apply first aid 3. Apply communication skills

Module Title	Practicing worksite health and safety		
Module Code	8343- L2-M1		
Learning Outcome 1	Apply safety measure and regulations		
Duration	Theory: 6.5 hours	Practical:7.5 hours	Total: 14 hours
Assessment Criteria	• PPE is used as per the job requirement following standard procedure • Work site is assessed as per the job requirement following standard procedure • Fire extinguisher is used as per the job requirement following standard procedure		
Content	A1.00 Introductory knowledge • Overview of course • Roles and responsibilities of mobile crane operator • Trend and scope of mobile crane operator • Safety precautions while operating mobile crane • Introduction to crane • Types of crane based on construction and modes of operation • Components/parts of crane • Specification of crane • Working principle of crane A1.01 Using Personal Protective Equipment (PPE) Knowledge • Introduction to Occupational Health and Safety Regulations • Importance of using PPE • List of PPE and its purpose • Importance of checking the condition of PPEs Skills • Observation skills • Communication skills • Analytical skills Attitude, safety and environmental concern • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensuring to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation A1.02 Assessing worksite Knowledge • Introduction to environmental regulations • Purpose of assessing worksite		

	<i>Skills</i> • Observation skills • Communication skills • Analytical skills • Planning skills <i>Attitude, safety and environmental concern</i> • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Being a team player • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation A1.03 Using fire extinguisher <i>Knowledge</i> • Classification of fire • Definition of fire extinguisher • Purpose of using fire extinguisher • Types of fire extinguisher and its application • Methods of using fire extinguisher <i>Skills</i> • Observation skills • Communication skills • Analytical skills • Problem solving skills <i>Attitude, safety and environmental concern</i> • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Being a team player • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation • Ensuring to maintain safe distance between fire extinguisher and fire A1.04 Managing emergency situations <i>Knowledge</i> • Introduction to emergency response planning
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	• Emergency contact details • Importance of securing the incident area • Types of emergency situations Skills • Observation skills • Communication skills • Analytical skills Attitude, safety and environmental concern • Effective time management • Being vigilant and patient • Having work ethics and integrity • Being a team player • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring to use appropriate PPE • Ensuring to follow OHS rules and regulation
Learning Conditions	Learning Materials • Competency Based Learning Materials (CBLM)/Reference materials • Hand-outs • Audio Visuals • Reference books • Manuals Learning facilities and infrastructure • Classroom with adequate facilities • Information Technology (IT) lab • Library • Workshop Materials • Pen and paper, cleaning rag, firewood, fuel and water Tools • Plier, adjustable wrench and screw driver set Equipment • Fire extinguisher PPE • Safety gloves, safety helmet, safety boots, safety goggles, face mask, ear muffs/ear plug, reflective jacket and work dress

Instructional Methodologies	The trainer shall use <i>inter alia</i>, the following instructional methods: • Lecture • Interactive discussion • Demonstration • Industrial visit/training • Guided practice • Group practice with project-based learning • Individual practice with problem-based learning • Universal Design of Learning (UDL)
Method of Assessment	The trainer shall use <i>inter alia</i>, the following assessment methods: • Practical observation • Oral/viva-voce • Written test • Assignment

Module Title	Practicing worksite health and safety		
Module Code	8343- L2-M1		
Learning Outcome 2	Apply first aid		
Duration	Theory:1. 5 hours	Practical: 5.5 hours	Total: 7 hours
Assessment Criteria	● CPR is performed as per the job requirement following standard procedure ● Bandage is applied as per the job requirement following standard procedure ● Stretcher is prepared as per the job requirement following standard procedure		
Content	A2.01 Performing CPR Knowledge ● Introduction to first aid ● Definition of CPR ● Purpose of CPR ● Do's and Don'ts of CPR Skills ● Observation skills ● Communication skills ● Analytical skills ● Planning skills Attitude, safety and environmental concern ● Effective time management ● Being efficient in using resources ● Being vigilant and patient ● Having work ethics and integrity ● Being a team player ● Proper handling of tools, materials and equipment ● Having sense of ownership and accountability ● Ensuring appropriate use of PPE ● Ensuring proper disposal of waste ● Ensuring to follow environmental rules and regulations ● Ensuring to follow OHS rules and regulation A2.02 Applying bandage Knowledge ● Definition of bandage ● Types of bandages ● Purpose of sterilization ● Methods of applying bandage Skills ● Observation skills ● Communication skills ● Analytical skills ● Planning skills		

	<i>Attitude, safety and environmental concern</i> • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Being a team player • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation A2.03 Preparing stretcher <i>Knowledge</i> • Definition of stretcher • Function of stretcher • Types of Stretchers • Methods of victim/patient lifting <i>Skills</i> • Observation skills • Communication skills • Analytical skills • Planning skills <i>Attitude, safety and environmental concern</i> • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Being a team player • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation
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Learning Conditions	Learning Materials • Competency Based Learning Materials (CBLM)/ Reference materials • Hand-outs • Audio Visuals • Reference books • Manuals Learning facilities and infrastructure • Classroom with adequate facilities • Information Technology (IT) lab • Library • Workshop Materials • Pen and paper, handkerchief, bandage, cotton, clothes, tarpaulin, poles and ropes Tools • Knife PPE • Safety gloves, safety helmet, safety boots, safety goggles, face mask, ear muffs/ear plug, reflective jacket and work dress
Instructional Methodologies	The trainer shall use <i>inter alia</i>, the following instructional methods: • Lecture • Interactive discussion • Demonstration • Industrial visit/training • Guided practice • Group practice with project-based learning • Individual practice with problem-based learning • Universal Design of Learning (UDL)
Method of Assessment	The trainer shall use <i>inter alia</i>, the following assessment methods: • Practical observation • Oral/viva-voce • Written test • Assignment

Module Title	Practicing worksite health and safety		
Module Code	8343- L2-M1		
Learning Outcome 3	Apply communication skills		
Duration	Theory:2.5 hours	Practical:4.5 hours	Total: 7 hours
Assessment Criteria	• Audible signal is applied as per the job requirement following standard procedure • Hand signal is applied as per the job requirement following standard procedure • Traffic signs and symbols are followed as per the job requirement following standard procedure • Safety signs are used as per the job requirement following standard procedure		
Content	A3.01 Applying audible signal Knowledge • Introduction to audible signal • Types of audible signal • Purpose of using audible signal • Process of setting radio communication device Skills • Observation skills • Communication skills • Analytical skills • Planning skills Attitude, safety and environmental concern • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Being a team player • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensuring to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation A3.02 Applying hand signal Knowledge • Introduction to mobile crane operators hand signal • Purpose of hand signal • Types of hand signals Skills • Observation skills • Communication skills • Analytical skills		

	<i>Attitude, safety and environmental concern</i> ● Effective time management ● Being efficient in using resources ● Being vigilant and patient ● Having work ethics and integrity ● Being a team player ● Proper handling of tools, materials and equipment ● Having sense of ownership and accountability ● Ensuring appropriate use of PPE ● Ensuring proper disposal of waste ● Ensure to follow environmental rules and regulations ● Ensuring to follow OHS rules and regulation A3.03 Following traffic signs and symbols <i>Knowledge</i> ● Introduction to traffic rules and regulation ● Purpose of traffic signs and symbols ● Type of traffic signs and its purposes ● Introduction to traffic light and signals <i>Skills</i> ● Observation skills ● Communication skills ● Analytical skills <i>Attitude, safety and environmental concern</i> ● Effective time management ● Being efficient in using resources ● Being vigilant and patient ● Having work ethics and integrity ● Being a team player ● Proper handling of tools, materials and equipment ● Having sense of ownership and accountability ● Ensuring appropriate use of PPE ● Ensuring proper disposal of waste ● Ensure to follow environmental rules and regulations ● Ensuring to follow OHS rules and regulation A3.04 Using safety signs <i>Knowledge</i> ● Definition of safety sign ● Types of safety signs ● Purpose of safety signs <i>Skills</i> ● Observation skills ● Communication skills ● Analytical skills ● Planning skills
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	<i>Attitude, safety and environmental concern</i> ● Effective time management ● Being efficient in using resources ● Being vigilant and patient ● Having work ethics and integrity ● Being a team player ● Proper handling of tools, materials and equipment ● Having sense of ownership and accountability ● Ensuring appropriate use of PPE ● Ensuring proper disposal of waste ● Ensure to follow environmental rules and regulations ● Ensuring to follow OHS rules and regulation
Learning Conditions	Learning Materials ● Competency Based Learning Materials (CBLM)/ Reference materials ● Hand-outs ● Audio Visuals ● Reference books ● Manuals Learning facilities and infrastructure ● Classroom with adequate facilities ● Information Technology (IT) lab ● Library ● Workshop Materials ● Pen and paper, fuel, flip chart, hand signal posture, signalman flag, caution ribbon tape, poster, sign board and manual book Tools ● Whistle and sign boards (mandatory, informatory and cautionary) Equipment ● Mobile Crane and hand set PPE ● Safety gloves, safety helmet, safety boots, safety goggles, face mask, ear muffs/ear plug, reflective jacket and work dress
Instructional Methodologies	The trainer shall use <i>inter alia</i>, the following instructional methods: ● Lecture ● Interactive discussion ● Demonstration ● Industrial visit/training ● Guided practice ● Group practice with project-based learning ● Individual practice with problem-based learning ● Universal Design of Learning (UDL)

Method of Assessment	The trainer shall use <i>inter alia</i>, the following assessment methods: • Practical observation • Oral/viva-voce • Written test • Assignment
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MODULE 2
ON
CARRYING OUT MAINTENANCE OF MOBILE CRANE

MODULE INFORMATION

Occupation	Mobile Crane Operator
Competency Area	Carryout maintenance of mobile crane
Module Title	Carrying out maintenance of mobile crane
Module Code	8343- L2-M2
Module Description	This module is structured to provide learners with the knowledge, skills and right attitude required to maintain tools and equipment, perform basic and periodic maintenance.
Nominal Duration	45.5 Hours
Certificate Level	BQF Certificate Level 2
Pre-requisite	Must complete module 1
Learning Outcome	1.Maintain tools and equipment 2.Perform basic maintenance 3.Perform periodic maintenance

Module Title	Carrying out maintenance of mobile crane		
Module Code	8343- L2-M2		
Learning Outcome 1	Maintain tools and equipment		
Duration	Theory:1.5 hours	Practical:3 hours	Total: 4.5 hours
Assessment Criteria	● Hand tool is checked as per the job requirement following standard procedure ● Grease gun is checked as per the job requirement following standard procedure ● Grease gun is overhauled as per the job requirement following standard procedure		
Content	B1.01 Checking hand tools Knowledge ● Introduction to hand tools ● Purpose of checking hand tools ● Types of tools and its functions ● Sequence of using tools Skills ● Observation skills ● Communication skills ● Analytical skills ● Planning skills Attitude, safety and environmental concern ● Effective time management ● Being efficient in using resources ● Being vigilant and patient ● Having work ethics and integrity ● Being a team player ● Proper handling of tools, materials and equipment ● Having sense of ownership and accountability ● Ensuring appropriate use of PPE ● Ensuring proper disposal of waste ● Ensuring to follow environmental rules and regulations ● Ensuring to follow OHS rules and regulation B1.02 Checking grease gun Knowledge ● Purpose of grease gun ● Types of grease gun Skills ● Using grease gun ● Observation skills ● Communication skills ● Analytical skills Attitude, safety and environmental concern ● Effective time management ● Being efficient in using resources		

	• Being vigilant and patient • Having work ethics and integrity • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation B1.03 Overhauling grease gun <i>Knowledge</i> • Components of grease gun and its function • Purpose of overhauling grease gun • Common defects of grease gun <i>Skills</i> • Using grease gun • Observation skills • Communication skills • Analytical skills <i>Attitude, safety and environmental concern</i> • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation
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Learning Conditions	Learning Materials • Competency Based Learning Materials (CBLM)/ Reference materials • Hand-outs • Audio Visuals • Reference books • Manuals Learning facilities and infrastructure • Classroom with adequate facilities • Information Technology (IT) lab • Library • Workshop Materials • Pen and paper, Markin clothes, piston seal and grease Tools • Basic hand tool set Equipment • Bench vice and grease gun PPE • Safety gloves, safety helmet, safety boots, safety goggles, face mask, ear muffs/ear plug, reflective jacket and work dress
Instructional Methodologies	The trainer shall use <i>inter alia</i>, the following instructional methods: • Lecture • Interactive discussion • Demonstration • Industrial visit/training • Guided practice • Group practice with project-based learning • Individual practice with problem-based learning • Universal Design of Learning (UDL)
Method of Assessment	The trainer shall use <i>inter alia</i>, the following assessment methods: • Practical observation • Oral/viva-voce • Written test • Assignment

Module Title	Carrying out maintenance of mobile crane		
Module Code	8343- L2-M2		
Learning Outcome 2	Perform basic maintenance		
Duration	Theory:4.5 hours	Practical:14.5 hours	Total: 19 hours
Assessment Criteria	● Fuse is changed as per the job requirement following standard procedure ● Battery is serviced as per the job requirement following standard procedure ● Air filter is cleaned as per the job requirement following standard procedure ● Crane rigging hook is changed as per the job requirement following standard procedure ● Tyre is changed as per the job requirement following standard procedure ● Greasing is performed as per the job requirement following standard procedure ● Jump start is performed as per the job requirement following standard procedure		
Content	B2.01 Changing fuse Knowledge ● Definition of fuse ● Types of fuse ● Function of fuse ● Importance of using correct fuse rating Skills ● Using Multimeter ● Observation skills ● Communication skills ● Analytical skills Attitude, safety and environmental concern ● Effective time management ● Being efficient in using resources ● Being vigilant and patient ● Having work ethics and integrity ● Being a team player ● Proper handling of tools, materials and equipment ● Having sense of ownership and accountability ● Ensuring appropriate use of PPE ● Ensuring proper disposal of waste ● Ensuring to follow environmental rules and regulations ● Ensuring to follow OHS rules and regulation ● Ensuring to use correct ampere rating of fuse B2.02 Servicing battery Knowledge ● Function of battery ● Types of battery ● Components of battery and its functions		

	• Methods of taking care of battery • Causes of battery corrosion • Methods of cleaning corrosion Skills • Using multimeter • Observation skills • Communication skills • Analytical skills • Planning skills Attitude, safety and environmental concern • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Being a team player • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation B2.03 Servicing air filter Knowledge • Definition of air filter • Types of air filter • Function of air filter • Methods of cleaning air filter Skills • Using air compressor • Observation skills • Communication skills • Analytical skills • Problem solving skill • Planning skills Attitude, safety and environmental concern • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation
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	B2.04 Changing crane rigging hook Knowledge • Purpose of crane rigging hooks • Types of hooks and their application • Importance of lockout/tagout procedure Skills • Interpreting drawing • Using lifting device • Observation skills • Communication skills • Analytical skills • Planning skills Attitude, safety and environmental concern • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Being a team player • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation • Ensuring to follow manufacturer guidelines while installing hook B2.05 Changing tyre Knowledge • Definition of tyre • Types of tyre • Function of tyre • Specifications of tyre • Purpose of Tyre Wear Indicator (TWI) • Types of Tyre tread pattern • Importance of maintaining correct tyre pressure Skills • Using hydraulic/screw jack • Using tyre pressure gauge • Using air compressor • Observation skills • Communication skills • Analytical skills Attitude, safety and environmental concern • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity
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	• Being a team player • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation B2.06 Performing greasing Knowledge • Function of grease • Types of grease • Purpose of greasing Skills • Using grease gun • Observation skills • Communication skills • Analytical skills • Planning skills Attitude, safety and environmental concern • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Being a team player • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation B2.08 Performing jump start Knowledge • Definition of jump start • Purpose of jump start • Methods of Jump start • Circuit diagram of jump start Skills • Basic electrical skills • Using battery starter/booster • Interpreting circuit diagram • Observation skills • Communication skills • Analytical skills • Planning skills
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	<i>Attitude, safety and environmental concern</i> • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Being a team player • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation
Learning Conditions	Learning Materials • Competency Based Learning Materials (CBLM)/ Reference materials • Hand-outs • Audio Visuals • Reference books • Manuals Learning facilities and infrastructure • Classroom with adequate facilities • Information Technology (IT) lab • Library • Workshop Materials • Pen and paper, fuse, wire, Markin clothes, petroleum jelly, grease, fuel, O-ring, air filter, sand paper, distilled water, kerosene, tyre, jumper cable, tags, dye penetrant inspection kit, fastener and baking soda Tools • Basic hand tool set, wire brush, pliers, battery, lever, wheel wrench, sledge hammer, fuse puller and terminal expander Instrument • Multimeter, hydrometer and pressure gauge Equipment • Mobile crane, battery charger, air compressor, grease gun, grease adapter, crane rigging hook and booster battery/battery starter PPE • Safety gloves, safety helmet, safety boots, safety goggles, face mask, ear muffs/ear plug, reflective jacket and work dress

Instructional Methodologies	The trainer shall use <i>inter alia</i>, the following instructional methods: • Lecture • Interactive discussion • Demonstration • Industrial visit/training • Guided practice • Group practice with project-based learning • Individual practice with problem-based learning • Universal Design of Learning (UDL)
Method of Assessment	The trainer shall use <i>inter alia</i>, the following assessment methods: • Practical observation • Oral/viva-voce • Written test • Assignment

Module Title	Carrying out maintenance of mobile crane		
Module Code	8343- L2-M2		
Learning Outcome 3	Perform periodic maintenance		
Duration	Theory:4.5 hours	Practical:17.5 hours	Total: 22 hours
Assessment Criteria	• Engine oil is changed as per the job requirement following standard procedure • Transmission oil is changed as per the job requirement following standard procedure • Hydraulic oil is changed as per the job requirement following standard procedure • Coolant is changed as per the job requirement following standard procedure • Fuel filter is changed as per the job requirement following standard procedure • Diesel Exhaust Gas is topped up as per the job requirement following standard procedure • Gear oil is changed as per the job requirement following standard procedure		
Content	B3.01 Changing engine oil Knowledge • Introduction to lubrication system • Components of lubrication system • Function of engine oil • Specification of engine oil • Interval of changing engine oil • Purpose of flushing oil Skills • Using oil filter wrench • Observation skills • Communication skills • Analytical skills • Planning skills Attitude, safety and environmental concern • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Being a team player • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of old engine oil and filter • Ensuring to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation		

	B3.02 Changing transmission oil Knowledge • Purpose of transmission oil • Specification of transmission oil • Properties of transmission oil • Interval of changing transmission oil Skills • Using oil dispenser • Observation skills • Communication skills • Analytical skills • Planning skills Attitude, safety and environmental concern • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Being a team player • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of old transmission oil • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation B3.03 Changing hydraulic oil Knowledge • Purpose of hydraulic oil • Specification of hydraulic oil • Properties of hydraulic oil • Interval of changing hydraulic oil Skills • Using oil dispenser • Observation skills • Communication skills • Analytical skills • Planning skills Attitude, safety and environmental concern • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Being a team player • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of hydraulic oil and filter
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	• Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation B3.04 Changing coolant <i>Knowledge</i> • Purpose of coolant • Types of coolant • Components of cooling system and its functions • Coolant mixing ratio • Interval of changing coolant <i>Skills</i> • Observation skills • Communication skills • Analytical skills • Planning skills <i>Attitude, safety and environmental concern</i> • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Being a team player • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation B3.05 Changing fuel filter <i>Knowledge</i> • Components of fuel system • Function of fuel filter • Types of fuel filter • Importance of bleeding <i>Skills</i> • Observation skills • Communication skills • Analytical skills • Planning skills <i>Attitude, safety and environmental concern</i> • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Being a team player • Proper handling of tools, materials and equipment • Having sense of ownership and accountability
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	• Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation B3.06 Top up Diesel Exhaust Fluid (DEF) Knowledge • Purpose of DEF/AdBlue • Properties of DEF/AdBlue • Working principle of DEF/AdBlue in the Selective Catalytic Reduction (SCR)system Skills • Observation skills • Communication skills • Analytical skills • Planning skills Attitude, safety and environmental concern • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation B3.07 Change gear oil Knowledge • Purpose of gear oil • Specification of gear oil • Properties of gear oil • Interval of changing gear oil Skills • Using oil dispenser • Observation skills • Communication skills • Analytical skills • Planning skills Attitude, safety and environmental concern • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Proper handling of tools, materials and equipment • Having sense of ownership and accountability
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	• Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation
Learning Conditions	Learning Materials • Competency Based Learning Materials (CBLM)/ Reference materials • Hand-outs • Audio Visuals • Reference books • Manuals Learning facilities and infrastructure • Classroom with adequate facilities • Information Technology (IT) lab • Library • Workshop Materials • Pen & paper, Markin clothes, engine oil, oil filter, transmission oil, gear oil, hydraulic oil, brake fluid, coolant, distilled water, fuel, fuel filter, O-ring, DEF/AdBlue, water, banjo washer and banjo bolt Tools • Basic hand tool set, Allen key set, oil filter wrench, oil gun, oil tray, oil container/empty barrel, DEF filling nozzle and vinyl tube Equipment • Mobile Crane PPE • Safety gloves, safety helmet, safety boots, safety goggles, face mask, ear muffs/ear plug, reflective jacket and work dress
Instructional Methodologies	The trainer shall use <i>inter alia</i>, the following instructional methods: • Lecture • Interactive discussion • Demonstration • Industrial visit/training • Guided practice • Group practice with project-based learning • Individual practice with problem-based learning • Universal Design of Learning (UDL)
Method of Assessment	The trainer shall use <i>inter alia</i>, the following assessment methods: • Practical observation • Oral/viva-voce • Written test • Assignment

MODULE 3
ON
CARRYING OUT PRE OPERATION CHECK

MODULE INFORMATION

Occupation	Mobile Crane Operator
Competency Area	Carryout pre operation check
Module Title	Carrying out pre operation check
Module Code	8343- L2-M3
Module Description	This module is structured to provide learners with the knowledge, skills and right attitude required to perform exterior, under hood and interior check
Nominal Duration	21.5 Hours
Certificate Level	BQF Certificate Level 2
Pre-requisite	Completed module 2
Learning Outcome	1.Perform exterior check 2.Perform under hood check 3.Perform interior check

Module Title	Carrying out pre operation check		
Module Code	8343- L2-M3		
Learning Outcome 1	Perform exterior check		
Duration	Theory:2 hours	Practical:2.5 hours	Total: 4.5 hours
Assessment Criteria	• Walk around inspection is performed as per the job requirement following standard procedure • Tyre pressure is checked as per the job requirement following standard procedure • Water from water separator is drained as per the job requirement following standard procedure • Sling is checked as per the job requirement following standard procedure		
Content	C1.01 Performing walk around inspection Knowledge • Introduction to pre and post operation check • Purpose of walk around inspection Skills • Observation skills • Communication skills • Analytical skills • Planning skills Attitude, safety and environmental concern • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Being a team player • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensuring to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation C1.02 Checking tyre pressure Knowledge • Function of pressure gauge • Effect of under inflation and over inflation Skills • Using tyre pressure gauge • Using air compressor • Observation skills • Communication skills • Analytical skills Attitude, safety and environmental concern • Effective time management • Being efficient in using resources		

	• Being vigilant and patient • Having work ethics and integrity • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation C1.03 Draining water from water separator Knowledge • Function of water separator • Importance of draining out water from fuel Skills • Observation skills • Communication skills • Analytical skills • Planning skills Attitude, safety and environmental concern • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Being a team player • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation C1.04 Checking sling Knowledge • Purpose of checking sling • Relation between Working Load Limit (WLL) to sling strength and safe load capacity • Common defects, causes and remedies of sling Skills • Interpreting load chart • Reading vernier caliper • Observation skills • Communication skills • Analytical skills • Planning skills Attitude, safety and environmental concern • Effective time management • Being efficient in using resources
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	• Being vigilant and patient • Having work ethics and integrity • Being a team player • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation • Ensuring proper handling of measuring instrument, magnifying glass and flashlight
Learning Conditions	Learning Materials • Competency Based Learning Materials (CBLM)/ Reference materials • Hand-outs • Audio Visuals • Reference books • Manuals Learning facilities and infrastructure • Classroom with adequate facilities • Information Technology (IT) lab • Library • Workshop Materials • Pen & paper, Markin clothes, marker, washer, nuts & bolts, rust lick and inspection form Tools • Mechanic hand tool set, valve key, wire bush, measuring tape, magnifying glass, tagging marker and torque wrench Instrument • Pressure gauge and vernier caliper Equipment • Mobile crane, work bench and air compressor PPE • Safety gloves, safety helmet, safety boots, safety goggles, face mask, ear muffs/ear plug, reflective jacket and work dress
Instructional Methodologies	The trainer shall use <i>inter alia</i>, the following instructional methods: • Lecture • Interactive discussion • Demonstration • Industrial visit/training • Guided practice • Group practice with project-based learning • Individual practice with problem-based learning • Universal Design of Learning (UDL)

Method of Assessment	The trainer shall use <i>inter alia</i>, the following assessment methods: • Practical observation • Oral/viva-voce • Written test • Assignment
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Module Title	Carrying out pre operation check		
Module Code	8343- L2-M3		
Learning Outcome 2	Perform under hood check		
Duration	Theory:4 hours	Practical:8 hours	Total: 12 hours
Assessment Criteria	• Engine oil is checked as per the job requirement following standard procedure • Coolant is checked as per the job requirement following standard procedure • Hydraulic fluid is checked as per the job requirement following standard procedure • Brake oil checked as per the job requirement following standard procedure • Transmission oil level is checked as per the job requirement following standard procedure • Fan belt is checked as per the job requirement following standard procedure • Electrolyte is checked as per the job requirement following standard procedure • Cross bearing is checked as per the job requirement following standard procedure		
Content	C2.01 Checking engine oil Knowledge • Importance of checking engine oil Skills • Observation skills • Communication skills • Analytical skills • Planning skills Attitude, safety and environmental concern • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Being a team player • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of old engine oil and filter • Ensuring to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation C2.02 Checking coolant Knowledge • Importance of checking coolant Skills • Observation skills		

	• Communication skills • Analytical skills • Planning skills <i>Attitude, safety and environmental concern</i> • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Being a team player • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation C2.03 Checking hydraulic oil <i>Knowledge</i> • Effect of high & low level of hydraulic oil • Importance of checking hydraulic oil <i>Skills</i> • Observation skills • Communication skills • Analytical skills • Planning skills <i>Attitude, safety and environmental concern</i> • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Being a team player • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation C2.04 Checking brake fluid <i>Knowledge</i> • Introduction to brake fluid • Types of brake fluid • Purpose of checking brake fluid <i>Skills</i> • Observation skills • Communication skills • Analytical skills
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	• Planning skills <i>Attitude, safety and environmental concern</i> • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation C2.05 Checking transmission oil level <i>Knowledge</i> • Purpose of checking transmission oil level <i>Skills</i> • Observation skills • Communication skills • Analytical skills • Planning skills <i>Attitude, safety and environmental concern</i> • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation C2.06 Checking fan belt <i>Knowledge</i> • Definition of fan belt • Function of fan belt • Type of fan belt • Purpose of checking fan belt tension • Effect of improper belt tension • Fan belt care methods <i>Skills</i> • Observation skills • Communication skills • Analytical skills • Planning skills
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	<i>Attitude, safety and environmental concern</i> • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Being a team player • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation • Ensuring to check fan belt before starting the engine C2.07 Checking battery electrolyte <i>Knowledge</i> • Definition of electrolyte • Methods of checking electrolyte • Purpose of checking electrolyte • Purpose of adding distilled water <i>Skills</i> • Observation skills • Communication skills • Analytical skills • Planning skills <i>Attitude, safety and environmental concern</i> • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Being a team player • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation C2.08 Checking cross bearing <i>Knowledge</i> • Purpose of cross bearing • Types of cross bearing • Importance of servicing cross bearing <i>Skills</i> • Observation skills • Communication skills • Analytical skills
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	• Planning skills Attitude, safety and environmental concern • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation
Learning Conditions	Learning Materials • Competency Based Learning Materials (CBLM)/ Reference materials • Hand-outs • Audio Visuals • Reference books • Manuals Learning facilities and infrastructure • Classroom with adequate facilities • Information Technology (IT) lab • Library • Workshop Materials • Pen & paper, cleaning rag , engine oil, coolant, distilled water, hydraulic oil, brake fluid, grease, fan belt and battery Tools • Basic hand tool set and lever Equipment • Mobile crane and grease gun PPE • Safety gloves, safety helmet, safety boots, safety goggles, face mask, ear muffs/ear plug, reflective jacket and work dress
Instructional Methodologies	The trainer shall use <i>inter alia</i>, the following instructional methods: • Lecture • Interactive discussion • Demonstration • Industrial visit/training • Guided practice • Group practice with project-based learning • Individual practice with problem-based learning • Universal Design of Learning (UDL)

Method of Assessment	The trainer shall use <i>inter alia</i>, the following assessment methods: • Practical observation • Oral/viva-voce • Written test • Assignment • Project work
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Module Title	Carrying out pre operation check		
Module Code	8343- L2-M3		
Learning Outcome 3	Perform interior check		
Duration	Theory:1.5 hours	Practical:3.5 hours	Total: 5 hours
Assessment Criteria	- Document is checked as per the job requirement following standard procedure - Monitor panel is read as per the job requirement following standard procedure - Lighting system is checked as per the job requirement following standard procedure		
Content	C3.01 Checking document Knowledge - Type of documents ✓ Driving license ✓ Log book ✓ Movement/deployment order ✓ Insurance Certificate ✓ Machine registration certificate ✓ Road worthiness certificate - Fines and penalty for late documentation Skills - Observation skills - Communication skills - Analytical skills - Planning skills - ICT skills Attitude, safety and environmental concern - Effective time management - Being efficient in using resources - Being vigilant and patient - Having work ethics and integrity - Being a team player - Proper handling of tools, materials and equipment - Having sense of ownership and accountability - Ensuring appropriate use of PPE - Ensuring to follow environmental rules and regulations - Ensuring to follow OHS rules and regulation C3.02 Reading monitor panel Knowledge - Introduction to monitor panel - Types of monitor panel - Introduction to Load Moment Indicator (LMI) system - Function of monitor panel - Illustration of control panel		

	<i>Skills</i> ● Interpreting Load Moment Indicator (LMI) ● Observation skills ● Communication skills ● Analytical skills ● Planning skills <i>Attitude, safety and environmental concern</i> ● Effective time management ● Being efficient in using resources ● Being vigilant and patient ● Having work ethics and integrity ● Proper handling of tools, materials and equipment ● Having sense of ownership and accountability ● Ensuring appropriate use of PPE ● Ensuring proper disposal of waste ● Ensure to follow environmental rules and regulations ● Ensuring to follow OHS rules and regulation C3.03 Checking lighting system <i>Knowledge</i> ● Introduction to lighting system ● Purpose of lighting system ● Types of light and its function <i>Skills</i> ● Using multimeter ● Observation skills ● Communication skills ● Analytical skills ● Planning skills <i>Attitude, safety and environmental concern</i> ● Effective time management ● Being efficient in using resources ● Being vigilant and patient ● Having work ethics and integrity ● Proper handling of tools, materials and equipment ● Having sense of ownership and accountability ● Ensuring appropriate use of PPE ● Ensuring proper disposal of waste ● Ensure to follow environmental rules and regulations ● Ensuring to follow OHS rules and regulation
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Learning Conditions	Learning Materials • Competency Based Learning Materials (CBLM)/ Reference materials • Hand-outs • Audio Visuals • Reference books • Manuals Learning facilities and infrastructure • Classroom with adequate facilities • Information Technology (IT) lab • Library • Workshop Materials • Pen & paper, RC book, insurance certificate, log book, operator license, movement order, road worthiness certificate, bulbs, relay, fuse and file Tools • Mechanic hand tool set and lever Equipment • Mobile Crane PPE • Safety gloves, safety helmet, safety boots, safety goggles, face mask, ear muffs/ear plug, reflective jacket and work dress
Instructional Methodologies	The trainer shall use <i>inter alia</i>, the following instructional methods: • Lecture • Interactive discussion • Demonstration • Industrial visit/training • Guided practice • Group practice with project-based learning • Individual practice with problem-based learning • Universal Design of Learning (UDL)
Method of Assessment	The trainer shall use <i>inter alia</i>, the following assessment methods: • Practical observation • Oral/viva-voice • Written test • Assignment

MODULE 4
ON
CARRYING OUT PRODUCTIVE AND POST OPERATION OF
MOBILE CRANE

MODULE INFORMATION

Occupation	Mobile Crane Operator
Competency Area	Carryout productive and post operation of mobile crane
Module Title	Carrying out productive and post operation of mobile crane
Module Code	8343- L2-M4
Module Description	This module is structured to provide learners with the knowledge, skills and right attitude required to perform hoist calculation, setup crane at site, perform rigging, operate mobile crane, perform post operation and transport mobile crane.
Nominal Duration	281 Hours
Certificate Level	BQF Certificate 2
Pre-requisite	Completed class X
Learning Outcome	1.Perform hoist calculation 2.Setup crane at site 3.Perform rigging 4.Operate mobile crane 5.Perform post operation 6.Transport mobile crane

Module Title	Carrying out productive and post operation of mobile crane		
Module Code	8343- L2-M4		
Learning Outcome 1	Perform hoist calculation		
Duration	Theory:6 hours	Practical:3 hours	Total: 9 hours
Assessment Criteria	- Load chart is interpreted as per the job requirement following standard procedure - Crane capacity is determined as per the job requirement following standard procedure - Rigging calculation is performed as per the job requirement following standard procedure		
Content	D1.01 Interpreting load chart Knowledge - Introduction to crane load chart - Components of load chart and its purposes - Terminologies used in load chart - Relation between boom length, radius and load weight - Unit conversion - Calculation of Net Allowable Load Skills - Interpreting load chart - Numeracy skills - Observation skills - Communication skills - Analytical skills Attitude, safety and environmental concern - Effective time management - Being efficient in using resources - Being vigilant and patient - Having work ethics and integrity - Proper handling of tools, materials and equipment - Having sense of ownership and accountability - Ensuring appropriate use of PPE - Ensuring proper disposal of waste - Ensuring to follow environmental rules and regulations - Ensuring to follow OHS rules and regulation D1.02 Determining crane capacity Knowledge - Crane bending moment - Introduction to hoist calculation - Tyes of hoist (AH and MH) - Factors affecting crane capacity - Calculation of Net Load Capacity Skills - Interpreting load chart - Numeracy skills - Observation skills - Communication skills		

	- Analytical skills Attitude, safety and environmental concern - Effective time management - Being efficient in using resources - Being vigilant and patient - Having work ethics and integrity - Being a team player - Proper handling of tools, materials and equipment - Having sense of ownership and accountability - Ensuring appropriate use of PPE - Ensuring proper disposal of waste - Ensure to follow environmental rules and regulations - Ensuring to follow OHS rules and regulation D1.03 Performing rigging calculation Knowledge - Introduction to rigging - Introduction to sling and hardware - Types and application of slings and their hardware - Sling angles and effect on capacities - Factors affecting Working Load Limits (WLL) Skills - Interpreting load chart - Numeracy skills - Observation skills - ICT skills - Communication skills - Analytical skills Attitude, safety and environmental concern - Effective time management - Being efficient in using resources - Being vigilant and patient - Having work ethics and integrity - Proper handling of tools, materials and equipment - Having sense of ownership and accountability - Ensuring appropriate use of PPE - Ensuring proper disposal of waste - Ensure to follow environmental rules and regulations - Ensuring to follow OHS rules and regulation
Learning Conditions	Learning Materials - Competency Based Learning Materials (CBLM)/ Reference materials - Hand-outs - Audio Visuals - Reference books - Manuals Learning facilities and infrastructure - Classroom with adequate facilities - Information Technology (IT) lab

	• Library • Workshop/practical field Material • Pen & paper, markin clothes and crane load chart Tools • Calculator Equipment • Mobile crane PPE • Safety gloves, safety helmet, safety boots, safety goggles, face mask, ear muffs/ear plug, reflective jacket and work dress
Instructional Methodologies	The trainer shall use <i>inter alia</i>, the following instructional methods: • Lecture • Interactive discussion • Demonstration • Industrial visit/training • Guided practice • Group practice with project-based learning • Individual practice with problem-based learning • Universal Design of Learning (UDL)
Method of Assessment	The trainer shall use <i>inter alia</i>, the following assessment methods: • Practical observation • Oral/viva-voce • Written test • Assignment

Module Title	Carrying out productive and post operation of mobile crane		
Module Code	8343- L2-M4		
Learning Outcome 2	Setup crane at site		
Duration	Theory:5 hours	Practical:26 hours	Total: 31 hours
Assessment Criteria	• Risk and hazard is evaluated as per the job requirement following standard procedure • Final site inspection is performed as per the job requirement following standard procedure • Crane is positioned as per the job requirement following standard procedure • Crane setup is completed as per the job requirement following standard procedure • Superstructure/upper work is installed as per the job requirement following standard procedure • Counterweight is installed as per the job requirement following standard procedure • Hoist line is installed as per the job requirement following standard procedure		
Content	D2.01 Evaluating risk and hazard Knowledge • Definition of risk and hazard for crane operation • Types of risk and hazard for crane operation • Importance of assessing risk and hazard • Importance of interpreting rigging equipment capacities Skills • Observation skills • Analytical skills • Numeracy skills • Communication skills • ICT skills Attitude, safety and environmental concern • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensuring to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation • Ensure crane setup is free of any risk and hazard D2.02 Performing final site inspection Knowledge • Importance of final site inspection • Weather conditions affecting crane operation		

	Skills • Interpreting load chart • Observation skills • ICT skills • Communication skills • Analytical skills • Numeracy skills Attitude, safety and environmental concern • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation • Ensure to follow load chart to determine load capacity D2.03 Positioning crane Knowledge • Importance of crane position • Introduction to lift radius, load path, and site layout • Methods of counterweight installation and outrigger for safety Skills • Interpreting load chart • Interpreting drawing/site layout • Observation skills • Communication skills • Analytical skills • Numeracy skills Attitude, safety and environmental concern • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Being a team player • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation • Ensuring to follow load chart to determine load capacity
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	D2.04 Completing crane setup Knowledge • Checklist for crane setup • Function of Load Moment Indicator (LMI) • Importance of securing pins, bolts, and safety retainers • Function of limit switches and safety systems for crane setup • Concept and application of Center of Gravity for load balancing • Introduction to counterweight • Purpose of counterweight Skills • Using Crane Setup controls • Using Measuring and Leveling Instruments • Interpreting signal and indicators • Interpreting load chart • Interpreting drawing/layout • Observation skills • Analytical skills • Numeracy skills • Communication skills Attitude, safety and environmental concern • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation D2.05 Installing hoist line Knowledge • Definition of hoist line • Purpose of hoist line • Types of hoist line • Hoist line components and its function • Effects of wear, corrosion and fatigue on wire ropes Skills • Interpreting manufacturer manuals • Interpreting load chart • Communication skills • Observation skills • Problem solving skills Attitude, safety and environmental concern • Effective time management • Being efficient in using resources • Being vigilant and patient
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	• Having work ethics and integrity • Being a team player • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation
Learning Conditions	Learning Materials • Competency Based Learning Materials (CBLM)/ Reference materials • Hand-outs • Audio Visuals • Reference books • Manuals Learning facilities and infrastructure • Classroom with adequate facilities • Information Technology (IT) lab • Library • Workshop/practical field Materials • Pen & paper, crane specification, checklist, load chart, markin clothes, grease, lubricants, load, taglines and cardium compound Tools • Measuring tape, spanner set, pliers, screwdriver set, socket set, hammer, hack saw, ratchet, belt, allen key set, torque wrench, roller and paint brush Instrument • Multi-meter Equipment • Hand set, mobile crane, G-Clamp, button clamp, chain, D-shackle, grease gun, hoist, rigging gears and high torsion cable PPE • Safety gloves, safety helmet, safety boots, safety goggles, face mask, ear muffs/ear plug, reflective jacket and work dress
Instructional Methodologies	The trainer shall use <i>inter alia</i>, the following instructional methods: • Lecture • Interactive discussion • Demonstration • Industrial visit/training • Guided practice • Group practice with project-based learning • Individual practice with problem-based learning • Universal Design of Learning (UDL)

Method of Assessment	The trainer shall use <i>inter alia</i>, the following assessment methods: • Practical observation • Oral/viva-voce • Written test • Assignment
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Module Title	Carrying out productive and post operation of mobile crane		
Module Code	8343- L2-M4		
Learning Outcome 3	Perform rigging		
Duration	Theory:4 hours	Practical:16 hours	Total: 20 hours
Assessment Criteria	• Sling and hardware is lubricated as per the job requirement following standard procedure • Defects in sling and hardware is identified as per the job requirement following standard procedure • Sling and hardware is stored as per the job requirement following standard procedure • Required rigging is selected as per the job requirement following standard procedure • Load is rigged as per the job requirement following standard procedure		
Content	D3.01 Lubricating sling and hardware Knowledge • Function of sling and hardware • Types of slings and hardware • Types of lubricants and their application • Effects of over-lubrication or under-lubrication Skills • Observation skills • Communication skills • Analytical skills Attitude, safety and environmental concern • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensuring to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation D3.02 Identifying defects in sling and hardware Knowledge • Material used for sling and its purposes • Symptoms, causes and remedies of sling and hardware defects Skills • Using vernier caliper/measuring tape • Observation skills • Communication skills • Numeracy skills Attitude, safety and environmental concern • Effective time management • Being efficient in using resources • Being vigilant and patient		

	• Having work ethics and integrity • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation D3.03 Storing sling and hardware <i>Knowledge</i> • Importance of proper storage of slings and hardware • Concept of 5s • Methods of corrosion prevention <i>Skills</i> • Housekeeping skills • Observation skills • Communication skills • Numeracy skills <i>Attitude, safety and environmental concern</i> • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation D3.04 Selecting required rigging <i>Knowledge</i> • Importance of rigging gear selection • Introduction to tagging systems <i>Skills</i> • Interpreting load chart • Observation skills • Communication skills • Numeracy skills <i>Attitude, safety and environmental concern</i> • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations
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	• Ensuring to follow OHS rules and regulation D3.05 Rigging load Knowledge • Types of rigging gears • Types of knots and hitches • Importance of maintaining center of gravity Skills • Interpreting load chart • Rigging skills • Numeracy skills • Communication skills • Observation skills Attitude, safety and environmental concern • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation • Ensuring to balance the load while lifting
Learning Conditions	Learning Materials • Competency Based Learning Materials (CBLM)/ Reference materials • Hand-outs • Audio Visuals • Reference books • Manuals Learning facilities and infrastructure • Classroom with adequate facilities • Information Technology (IT) lab • Library • Workshop/practical filed Materials • Pen & paper, lubricant or grease, cleaning agent/solvent, Markin clothes, rust lick, logbook, load and load chart Tools • Spanner set, adjustable wrench, pliers, wire brush, paint brush, magnifying glass, measuring tape and flashlight Instrument • Vernier caliper

	Equipment • Sling, hardware, rack, workbench, rigging gears, mobile crane, D-shackle, eye bolt, G-clamp, button clamp, high torsion cable, hooks, lifting clamps, chain, rigging belt and handset PPE • Safety gloves, safety helmet, safety boots, safety goggles, face mask, ear muffs/ear plug, reflective jacket and work dress
Instructional Methodologies	The trainer shall use <i>inter alia</i>, the following instructional methods: • Lecture • Interactive discussion • Demonstration • Industrial visit/training • Guided practice • Group practice with project-based learning • Individual practice with problem-based learning • Universal Design of Learning (UDL)
Method of Assessment	The trainer shall use <i>inter alia</i>, the following assessment methods: • Practical observation • Oral/viva-voce • Written test • Assignment

Module Title	Carrying out productive and post operation of mobile crane		
Module Code	8343- L2-M4		
Learning Outcome 4	Operate crane		
Duration	Theory:20.5 hours	Practical:158.5 hours	Total: 179 hours
Assessment Criteria	- Crane is started as per the standard procedure - Hydraulic operation is checked as per the job requirement following standard procedure - Brake system is checked as per the job requirement following standard procedure - Moving off is performed as per the job requirement following standard procedure - Reversing is performed as per the job requirement following standard procedure - Gear changing is performed as per the job requirement following standard procedure - Load moment indicator is configured as per the job requirement following standard procedure - Material loading is performed as per the job requirement following standard procedure - Material unloading is performed as per the job requirement following standard procedure		
Content	D4.01 Starting crane Knowledge - Methods of engine starting - Effects of double cranking - Importance of engine idling - Function of parking brake - Importance of using engine stop cable - Three-Point Climbing Method Skills - Observation skills - Communication skills - Analytical skills Attitude, safety and environmental concern - Effective time management - Being efficient in using resources - Being vigilant and patient - Having work ethics and integrity - Proper handling of tools, materials and equipment - Having sense of ownership and accountability - Ensuring appropriate use of PPE - Ensuring proper disposal of waste - Ensuring to follow environmental rules and regulations - Ensuring to follow OHS rules and regulation D4.02 Checking hydraulic operation Knowledge - Introduction to hydraulic system		

	• Working principle of hydraulic system • Component of hydraulic operation system and its functions • Types and grades of hydraulic oil • Pascal's law and it's application Skills • Lever operating skills • Observation skills • Communication skills • Numeracy skills • Problem solving skills Attitude, safety and environmental concern • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation D4.03 Checking brake system Knowledge • Function of brake system • Types of brake system • Operation of brake system Skills • Interpreting air pressure • Observation skills • Communication skills • Numeracy skills Attitude, safety and environmental concern • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation D4.04 Performing moving off Knowledge • Definition of moving off • Function of accelerator and brake • Importance of checking mirror
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	• Effects of continuous travelling • Function of forward and reverse column switch • Importance of following traffic rules and regulations • Introduction to defensive driving Skills • Maneuvering skills • Observation skills • Communication skills • Analytical skills • Problem solving skills Attitude, safety and environmental concern • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation D4.05 Performing gear shifting Knowledge • Introduction to drive control ✓ Accelerator ✓ Clutch ✓ Brake • Types of gear • Methods of gear shifting Skills • Maneuvering skills • Analytical skills • Communication skills • Observation skills Attitude, safety and environmental concern • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation
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	D4.06 Performing reversing Knowledge • Safety precautions while reversing Skills • Maneuvering skills • Analytical skills • Communication skills • Observation skills Attitude, safety and environmental concern • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation D4.07 Performing maneuvering Knowledge • Rear-wheel steering mechanics • Turning radius and articulation • Traffic rules in industrial settings • Blind spots and visibility • Hazard identification Skills • Operational Skill • Communication skills • Situational Awareness and Decision-Making skills • Observation skills Attitude, safety and environmental concern • Team-Oriented Communication • Safety-First Mindset • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation D4.08 Configuring Load Moment Indicator (LMI) Knowledge • Introduction to Load Moment Indicator • Function of Load Moment Indicator (LMI) • Parameters of LMI setting Skills • Using programming digital/analog LMI system • Interpreting load chart • Interpreting drawing and specifications
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	• Analytical skills • Communication skills • Observation skills • Numeracy skills <i>Attitude, safety and environmental concern</i> • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation D4.09 Performing material loading <i>Knowledge</i> • Types of loads • Methods of loading • Importance of loads center of gravity • Introduction to stability principles • Effects of weather condition on loading material • Purpose of load balancing and rigging security • Safety precautions while loading materials <i>Skills</i> • Maneuvering skills • Interpreting load chart • Rigging skills • Analytical skills • Communication skills • Observation skills • Numeracy skills <i>Attitude, safety and environmental concern</i> • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation D4.10 Performing material unloading <i>Knowledge</i> • Purpose of outrigger • Importance of loads center of gravity
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	• Introduction to stability principles • Effects of weather condition on unloading material • Methods of unloading • Safety precautions while unloading material Skills • Maneuvering skills • Interpreting load chart • Interpreting drawing and specifications • Analytical skills • Communication skills • Observation skills • Problem solving skills Attitude, safety and environmental concern • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Being a team player • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation
Learning Conditions	Learning Materials • Competency Based Learning Materials (CBLM)/ Reference materials • Hand-outs • Audio Visuals • Reference books • Manuals Learning facilities and infrastructure • Classroom with adequate facilities • Information Technology (IT) lab • Library • Workshop/practical filed Materials • Pen & paper, fuel, brake fluid, crane manual book, markin clothes, hydraulic oil, ignition key, load chart and load Tools • Key and mechanic hand tool set Equipment • Mobile crane, hand set, D-shackle, eye bolt, G-clamp, button clamp, high torsion cable, outrigger pads/cribbing and tag lines PPE • Safety gloves, safety helmet, safety boots, safety goggles, face mask, ear muffs/ear plug, reflective jacket and work dress

Instructional Methodologies	The trainer shall use <i>inter alia</i>, the following instructional methods: • Lecture • Interactive discussion • Demonstration • Industrial visit/training • Guided practice • Group practice with project-based learning • Individual practice with problem-based learning • Universal Design of Learning (UDL)
Method of Assessment	The trainer shall use <i>inter alia</i>, the following assessment methods: • Practical observation • Oral/viva-voce • Written test • Assignment

Module Title	Carrying out productive and post operation of mobile crane		
Module Code	8343- L2-M4		
Learning Outcome 5	Perform post operation		
Duration	Theory:2.5 hours	Practical:10.5 hours	Total: 13 hours
Assessment Criteria	- Stopping is performed as per the job requirement following standard procedure - Parking is performed as per the job requirement following standard procedure - Log book is maintained as per the job requirement following standard procedure - Maintenance history card is maintained as per the job requirement following standard procedure		
Content	D5.01 Performing stopping Knowledge - Introduction to proper stopping procedure Skills - Maneuvering skills - Observation skills - Communication skills - Analytical skills - Planning skills Attitude, safety and environmental concern - Effective time management - Being efficient in using resources - Being vigilant and patient - Having work ethics and integrity - Proper handling of tools, materials and equipment - Having sense of ownership and accountability - Ensuring appropriate use of PPE - Ensuring to follow environmental rules and regulations - Ensuring to follow OHS rules and regulation D5.02 Performing parking Knowledge - Methods of parking - Process of entering and leaving the machine Skills - Maneuvering skills - Observation skills - Communication skills - Analytical skills - Planning skills Attitude, safety and environmental concern - Effective time management - Being efficient in using resources - Being vigilant and patient - Having work ethics and integrity - Proper handling of tools, materials and equipment		

	• Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation D5.03 Maintaining log book Knowledge • Purpose of Log Book • Format of log book Skills • Record keeping skills • Numeracy skills • Observation skills • Communication skills • Analytical skills • Planning skills Attitude, safety and environmental concern • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation D5.04 Updating/Recording maintenance history sheet/card Knowledge • Introduction to maintenance history card • Purpose of recording/updating crane maintenance history card • Key data to be recorded in the card • Difference between log book and Maintenance History Card Skills • Record keeping skills • Observation skills • Communication skills • Analytical skills • Planning skills Attitude, safety and environmental concern • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE
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	• Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation
Learning Conditions	Learning Materials • Competency Based Learning Materials (CBLM)/ Reference materials • Hand-outs • Audio Visuals • Reference books • Manuals Learning facilities and infrastructure • Classroom with adequate facilities • Information Technology (IT) lab • Library • Workshop Materials • Pen & paper, cleaning rag, template/format and log book Tools • Calculator Equipment • Mobile Crane PPE • Safety gloves, safety helmet, safety boots, safety goggles, face mask, ear muffs/ear plug, reflective jacket and work dress
Instructional Methodologies	The trainer shall use <i>inter alia</i>, the following instructional methods: • Lecture • Interactive discussion • Demonstration • Industrial visit/training • Guided practice • Group practice with project-based learning • Individual practice with problem-based learning • Universal Design of Learning (UDL)
Method of Assessment	The trainer shall use <i>inter alia</i>, the following assessment methods: • Practical observation • Oral/viva-voice • Written test • Assignment • Project work

Module Title	Carrying out productive and post operation of mobile crane		
Module Code	8343- L2-M4		
Learning Outcome 6	Transport mobile crane		
Duration	Theory:5 hours	Practical:24 hours	Total: 29 hours
Assessment Criteria	- Travel document is prepared as per the job requirement following standard procedure - Loading ramp is prepared as per the job requirement following standard procedure - Mobile crane is loaded as per the job requirement following standard procedure - Mobile crane is unloaded as per the job requirement following standard procedure		
Content	D6.01 Preparing travel documents Knowledge - List of documents - Purpose of documents - Importance of route information for crane transport Skills - Observation skills - Communication skills - Analytical skills - Planning skills Attitude, safety and environmental concern - Effective time management - Being efficient in using resources - Being vigilant and patient - Having work ethics and integrity - Proper handling of tools, materials and equipment - Having sense of ownership and accountability - Ensuring appropriate use of PPE - Ensuring proper disposal of waste - Ensuring to follow environmental rules and regulations - Ensuring to follow OHS rules and regulation D5.02 Preparing loading ramp Knowledge - Introduction to environmental rules and regulation - Purpose of loading ramp Skills - Maneuvering skills - Observation skills - Communication skills - Analytical skills - Planning skills Attitude, safety and environmental concern - Effective time management - Being efficient in using resources - Being vigilant and patient		

	• Having work ethics and integrity • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation D5.03 Loading Mobile crane <i>Knowledge</i> • Overview of loading • Purpose of deflating the tyre • Methods of loading • Safety precaution for loading mobile crane <i>Skills</i> • Maneuvering skills • Observation skills • Communication skills • Analytical skills <i>Attitude, safety and environmental concern</i> • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Proper handling of tools, materials and equipment • Having sense of ownership and accountability • Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation D5.04 Unloading mobile crane <i>Knowledge</i> • Definition of unloading • Methods of unloading • Safety precaution for unloading mobile crane <i>Skills</i> • Maneuvering skills • Observation skills • Communication skills • Analytical skills • Planning skills <i>Attitude, safety and environmental concern</i> • Effective time management • Being efficient in using resources • Being vigilant and patient • Having work ethics and integrity • Proper handling of tools, materials and equipment • Having sense of ownership and accountability
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	• Ensuring appropriate use of PPE • Ensuring proper disposal of waste • Ensure to follow environmental rules and regulations • Ensuring to follow OHS rules and regulation
Learning Conditions	Learning Materials • Competency Based Learning Materials (CBLM)/ Reference materials • Hand-outs • Audio Visuals • Reference books • Manuals Learning facilities and infrastructure • Classroom with adequate facilities • Information Technology (IT) lab • Library • Workshop/practical field Materials • Pen & paper, Markin clothes, RC book, insurance certificate, movement order, fuel and file Tools • Mechanic hand tool set, wooden wedge, wheel wrench and lever Equipment • Mobile crane, loading truck/trailer and air compressor PPE • Safety gloves, safety helmet, safety boots, safety goggles, face mask, ear muffs/ear plug, reflective jacket and work dress
Instructional Methodologies	The trainer shall use <i>inter alia</i>, the following instructional methods: • Lecture • Interactive discussion • Demonstration • Industrial visit/training • Guided practice • Group practice with project-based learning • Individual practice with problem-based learning • Universal Design of Learning (UDL)
Method of Assessment	The trainer shall use <i>inter alia</i>, the following assessment methods: • Practical observation • Oral/viva-voce • Written test • Assignment • Project work

ON-THE-JOB TRAINING (OJT)

COURSE	Mobile crane Operation
DESCRIPTION	The trainee will be attached with relevant industries for OJT program. During the OJT, the trainees will be exposed to real life working environment where they are expected to develop technical skills and learn positive working attitudes including life skills.
OBJECTIVE	After completion of OJT, learners will be able to • Develop critical thinking, creativity, collaboration and communication skills • Develop information, media and technology literacy • Adopt flexible and productive working attitude • Develop leadership skills • Apply initiatives • Develop social skills • Adopt OHS practices • Carry out CNC lathe operation • Carry out CNC milling operation
DURATION	280 Hours
CONDITIONS FOR OPERATION OF OJT	• The institute shall select relevant and reliable industry for OJT attachment • The trainee shall be attached in Digital and Precision technology related activity for at least 70% of the total OJT duration • The industry shall maintain daily attendance of the trainee • The trainee shall maintain OJT logbook as per the OJT guideline • The trainee is required to follow company's rule • The collaborating industry shall provide working facilities • The industry shall assess performance of trainees • The industry shall provide feedback in the logbook
EVALUATION	The industry shall evaluate the trainees on the trainee's performance through observation and use of logbook. The evaluation shall be done on the following aspects of trainees: ➤ Core skills ➤ Critical thinking ➤ Creativity ➤ Collaboration ➤ Communication ➤ Information literacy ➤ Media literacy ➤ Conversant to up-to-date technology ➤ Flexibility ➤ Leadership ➤ Initiative ➤ Productivity ➤ Social skills
REPORT	The trainee shall submit comprehensive report on OJT to the Institute

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.

The CBC materials are available in both printed and electronic copies.

ANNEXES

Annex I: Time Distribution

Time Distribution (Regular course)					
Mobile Crane Operation BQF C2					
Module Title	Learning outcomes	Tasks	Theory (Hours)	Practical (Hours)	Total (hours)
A: Practice worksite Health and Safety	A1: Apply Safety measure and regulations	A1.00 Introductory knowledge	3	0	3
		A1.01 Use PPE	1	1.5	2.5
		A1.02 Assess work site	1	2	3
		A1.03 Use fire extinguisher	0.5	2	2.5
		A1.04 Manage emergency situation	1	2	3
	Sub Total Duration		6.5	7.5	14
	A2: Apply first aid	A2.01 Perform CPR	0.5	2	2.5
		A2.02 Apply bandage	0.5	1	1.5
		A2.03 Prepare stretcher	0.5	2.5	3
	Sub Total Duration		1.5	5.5	7
	A3: Apply communication skill	A3.01 Apply audible signal	0.5	1	1.5
		A3.02 Apply hand signal	0.5	1.5	2
		A3.03 Follow traffic signs and symbols	0.5	1	1.5
		A3.04 Follow safety signs	1	1	2
	Sub Total Duration		2.5	4.5	7
	Total Duration (A)		10.5	17.5	28
B. Carryout maintenance of mobile crane	B1: Maintain tools and equipment	B1.01 Check hand tools	0.5	1	1.5
		B1.02 Check grease gun	0.5	0.5	1
		B1.03 Overhaul grease gun	0.5	1.5	2
	Sub Total Duration		1.5	3	4.5
	B2: Perform basic maintenance	B2.01 Change fuse	0.5	1	1.5
		B2.02 Service battery	1	2	3
		B2.03 Change air filter	0.5	2	2.5
		B2.04 Change crane rigging hook	0.5	3	3.5
		B2.05 Change tyre	1	3	4
		B2.06 Perform greasing	0.5	2	2.5
		B2.07 Perform jumpstart	0.5	1.5	2
	Sub Total Duration		4.5	14.5	19
	B3: Perform periodic maintenance	B3.01 Change engine oil	0.5	2	2.5
		B3.02 Change transmission oil	0.5	3	3.5
		B3.03 Change hydraulic oil	1	5	6
		B3.04 Change coolant	0.5	2	2.5
		B3.05 Change fuel filter	0.5	2	2.5
		B3.06 Top up Diesel Exhaust Fluid	0.5	1.5	2

		B3.07 Change gear oil	1	2	3
	Sub Total Duration		4.5	17.5	22
	Total Duration (B)		10.5	35	45.5
C: Carry out pre operation check	C1: Perform exterior check	C1.01 Perform walkaround inspection	0.5	0.5	1
		C1.02 Check tyre pressure	0.5	0.5	1
		C1.03 Drain water from water separator	0.5	0.5	1
		C1.04 Check sling	0.5	1	1.5
	Sub Total Duration		2	2.5	4.5
	C2: Perform under hood check	C2.01 Check engine oil	0.5	1	1.5
		C2.02 Check coolant	0.5	1	1.5
		C2.03 Check hydraulic fluid	0.5	1	1.5
		C2.04 Check brake fluid	0.5	1	1.5
		C2.05 Check transmisison oil level	0.5	1	1.5
		C2.06 Check fan belt	0.5	1	1.5
		C2.07 Check battery electrolyte	0.5	1	1.5
		C2.08 Check cross bearing	0.5	1	1.5
	Sub Total Duration		4	8	12
	C3: Perform interior check	C3.01 Check document	0.5	0.5	1
		C3.02 Read monitor panel	0.5	2	2.5
		C3.03 Check lighting system	0.5	1	1.5
	Sub Total Duration		1.5	3.5	5
	Total Duration (C)		7.5	14	21.5
D: Carryout productive and post operation for mobile crane	D1: Perform hoist calculation	D1.01 Interpret load chart	1	1	2
		D1.02 Determine crane capacity	2.5	1	3.5
		D1.03 Perform rigging calculation	2.5	1	3.5
	Sub Total Duration		6	3	9
	D2: Set up crane at site	D2.01 Evaluate risk and hazard	0.5	1	1.5
		D2.02 Perform final inspection	0.5	1	1.5
		D2.03 Position crane	1	3	4
		D2.04 Complete crane setup	1	2	3
		D2.05 Install hoist line	2	19	21
	Sub Total Duration		5	26	31
	D3: Perform rigging	D3.01 Lubricate sling and hardware	0.5	1	1.5
		D3.02 Identify defects in sling and hardware	0.5	1	1.5
		D3.03 Store sling and hardware	0.5	1	1.5
		D3.04 Select required rigging	0.5	1	1.5
		D3.05 Rig load	2	12	14
	Sub Total Duration		4	16	20
		D4.01 Start crane	0.5	1.5	2

	D4: Operate mobile crane	D4.02 Check hydraulic system	1	6	7
		D4.03 Check brake system	1	1	2
		D4.04 Perform moving off	2	12	14
		D4.05 Perform reversing	2	18	20
		D4.06 Perform gear shifting	1	6	7
		D4.07 Perform Maneuvring	2	24	26
		D4.08 Configure Load Moment Indicator (LMI)	1	2	3
		D4.09 Perform material loading	5	44	49
		D4.10 Perform material unloading	5	44	49
	Sub Total Duration		20.5	158.5	179
	D5: Perform post operation	C4.01 Perform stopping	0.5	3	3.5
		C4.02 Perform parking	1	6	7
		C4.03 Maintain log book	0.5	1	1.5
		C4.04 Record/Update maintenance history card	0.5	0.5	1
	Sub Total Duration		2.5	10.5	13
	D6: Transport mobile crane	D6.01 Prepare travel documents	0.5	1	1.5
		D6.02 Prepare loading ramp	0.5	3	3.5
		D6.03 Load mobile crane	2	10	12
		D6.04 Unload mobile crane	2	10	12
	Sub Total Duration		5	24	29
	Total Duration (D)		43	238	281
Grand Total Duration (Hours)			71.5	304.5	376

Annex I: Module Recognition**This is to verify that**

Mr/Ms.....

has completed module on

.....

Covering following learning outcomes:

1.

2.

3.

Instructor:**Head of the Department:**

.....

.....

Signature:**Signature:****Date:** / / (dd/mm/yyyy)
.....(dd/mm/yyyy)**Date:** / /**Head of the Institute:****Trained Assessor (Institute)/Exam OC:**

.....

.....

Signature:**Signature:****Date:** / ... / (dd/mm/yyyy)**Date:** / /(dd/mm/yyyy)

Annex II : Lesson Plan
Lesson Plan

Course Title:		NC Level:
Module Code:		Duration:
Module Title:		
Learning Outcome:		
Skill/Task/Topic:		
Terminal Performance Objective:		
<i>(Note: Write narrative statement extracted from TPO of Task Sheet)</i>		
Enabling Objectives (Related knowledge):		
<i>By the end of the lesson learners will be able to:</i>		
i) ii) iii)		
What (Content/Activity)	Who (T/L)	How (Methods/ Media) Duration (Min.) Questions
Introduction: Main body Conclusion		
Projects/Problems:		

Instructional Resources Plan				
Skills/Task/Topic:				
No. of Trainees:				
Sl. No.:	Instructional materials/resources	Specifications	Qty.	Remarks
Prepared by :		Signature	Date:	
Revised by:		Signature	Date:	
Approved by:		Signature	Date:	

Task sheet

TS-1/4: Practical Plan

TS-1/4: Practical Plan			
Course Title:		N C Level:	
Module code:		Duration:	
Module Title			
Learning outcome			
Skills/Task Title:		Task no:	
Terminal Performance Objective: <i>Given:</i> <i>Cue:</i> <i>Who:</i> <i>What:</i> <i>Within:</i> <i>How well:</i> - - -			
Enabling Objectives (Related Skills): <i>By the end of a lesson, the learners will be able to:</i> i) ii) iii) iv)			
Activities	Who (T/L)	How (methods/ media)	Duration
Project/Assignment: 			

TS-2/4: Tool and Equipment required:						
Sl no.	Particulars	Specifications	Qty.	Remarks		
Training Materials required:						
Sl no.	Particulars	Specifications	Qty.	Rate	Amount	Remarks
TS-3/4: Performance Guide						
Skill/Task:					Date:	
Directions: Use the following performances criteria to rate the learner. Check YES/NO to indicate whether the learner performed each step as indicated or not?						
Sl. No:	Steps				Yes	No
Note: Critical steps: All * marked steps should be carried out very carefully. For a quality performance guide, all items should be checked "YES"						

TS-4/4: Instruction and Drawing	
General Instructions for Trainees i) ii)	

iii)

iv)

Drawing (if any)**Safety Precaution**

i)

ii)

iii)

Prepared by :**Signature****Date:****Revised By:****Signature****Date:****Approved by :****Signature****Date:**

Annex III: Course Plan
Institutes letter head and Logo

(Trade)YEAR PLAN- _____ Semester _____ (Year)

Trade: NC Level:			Schedule																																								Total Hours																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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Prepared by:

Verified & Approved by:

Date:

Monthly/Weekly Plan

Month: Trade: Trainer:

Week	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Week 01							
Week 02							
Week 03							
Week 04							
Week 05							

Developed by: Approved by:

Date



For more information please contact:

Technical Trainers Training and Resource Center (TTTRC), DWPSD

Email: tttrd@moesd.gov.bt/dwpsd@moesd.gov.bt