

**REPUBLIC OF KENYA**

**COMPETENCY BASED CURRICULUM**

**FOR**

**EARTH MOVING OPERATIONS**

**LEVEL 3**



TVET CDACC

P.O. BOX 15745-00100

NAIROBI

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##

# FOREWORD

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

Reforms in the education sector are necessary for the achievement of Kenya Vision 2030 and meeting the provisions of the Constitution of Kenya 2010. The education sector had to be aligned to the Constitution and this resulted to the formulation of the Policy Framework for Reforming Education and Training. A key feature of this policy is the radical change in the design and delivery of the TVET training. This policy document requires that training in TVET be competency based, curriculum development be industry led, certification be based on demonstration of competence and mode of delivery allows for multiple entry and exit in TVET programmes.

These reforms demand that Industry takes a leading role in curriculum development to ensure the curriculum addresses its competence needs. It is against this background that this Curriculum has been developed.

It is my conviction that this curriculum will play a great role towards development of competent human resource for the Heavy and Light Machine Operations sector’s growth and sustainable development.

**PRINCIPAL SECRETARY, VOCATIONAL AND TECHNICAL TRAINING**

**MINISTRY OF EDUCATION**

# PREFACE

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

The Technical and Vocational Education and Training Act No. 29 of 2013 on Reforming Education and Training in Kenya, emphasized the need toreform curriculum development, assessment and certification. This called for a shift to CBET to address the mismatch between skills acquired through training and skills needed by industry as well as increase the global competitiveness of Kenyan labour force.

TVET Curriculum Development, Assessment and Certification Council (TVET CDACC) in conjunction with Heavy and Light Machine Operations Sector Skills Advisory Committee (SSAC) have developed this curriculum.

This curriculum has been developed following the CBET framework policy; the CBETA Standards and guidelines provided by the TVET Authority and the Kenya National Qualification framework designed by the Kenya National Qualification Authority.

The curriculum is designed and organized with an outline of learning outcomes; suggested delivery methods, training/learning resources and methods of assessing the trainee’s achievement. The curriculum is competency-based and allows multiple entry and exit to the course.

I am grateful to the Council Members, Council Secretariat, Heavy and Light Machine Operations SSAC, expert workers and all those who participated in the development of this curriculum.

**Prof. CHARLES M. M. ONDIEKI, PhD, FIET (K), Con. Eng. Tech.**

**CHAIRMAN, TVET CDACC**

# ACKNOWLEDGEMENT

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

I recognize with appreciation the role of the SSAC in ensuring that competencies required by the industry are addressed in this curriculum. I also thank all the stakeholders in the Heavy and Light Machine Operations sector for their valuable input and all those who participated in the process of developing this curriculum.

I am convinced that this curriculum will go a long way in ensuring that workers in Heavy and Light Machine Operations sector will acquire competencies that will enable them to perform their work more efficiently.

**DR. LAWRENCE GUANTAI M’ITONGA, PhD**

**COUNCIL SECRETARY/CEO**

**TVET CDACC**

**TABLE OF CONTENTS**

[FOREWORD III](#_Toc48206637)

[PREFACE IV](#_Toc48206638)

[ACKNOWLEDGEMENT V](#_Toc48206639)

[ACRONYMS VII](#_Toc48206640)

[KEY TO UNIT CODE VIII](#_Toc48206641)

[COURSE OVERVIEW IX](#_Toc48206642)

[BASIC UNITS OF LEARNING 1](#_Toc48206643)

[COMMUNICATION SKILLS 2](#_Toc48206644)

[NUMERACY SKILLS 4](#_Toc48206645)

[DIGITAL LITERACY 6](#_Toc48206646)

[ENTREPRENEURIAL SKILLS 8](#_Toc48206647)

[EMPLOYABILITY SKILLS 11](#_Toc48206648)

[ENVIRONMENTAL LITERACY 14](#_Toc48206649)

[OCCUPATIONAL SAFETY AND HEALTH PRACTICES 16](#_Toc48206650)

[CORE UNITS OF LEARNING 18](#_Toc48206651)

[GRADER OPERATION 19](#_Toc48206652)

[EXCAVATOR OPERATION 22](#_Toc48206653)

[DOZER OPERATION 25](#_Toc48206654)

[BACKHOE OPERATION 28](#_Toc48206655)

[FORKLIFT OPERATION 31](#_Toc48206656)

# **ACRONYMS**

A Control Version

BC Basic competency

CC Common competency

CDACC Curriculum Development, Assessment and Certification Council

CR Core competency

CU Curriculum

EMO Earth Moving Operations

ENG Engineering

K.C.P.E. Kenya Certificate of Primary Education

K.C.S.E. Kenya Certificate of Secondary Education

KNQA Kenya National Qualification Authority

KNQF Kenya National Qualification Framework

PPE Personal Protective Equipment

SOP Standard Operating Procedures

TVET Technical and Vocational Education and Training

# KEY TO UNIT CODE

  **ENG / CU/EMO/BC/01/ 3/A**

Industry or sector

Occupational Standards

Occupational area

Type of competency

Competency number

Competency level

Version Control

# COURSE OVERVIEW

**Description of the course**

This course is designed to equip individuals with competencies required for earth moving operations.

The course consists of basic and core units of learning as indicated below:

**Basic Units of Learning**

|  |  |  |  |
| --- | --- | --- | --- |
| **Unit Code** | **Unit Title** | **Duration in Hours** | **CREDIT FACTORS**  |
| ENG/CU/EMO/BC/01/3/A | Communication Skills | 15 | 1.5 |
| ENG/CU/EMO/BC/02/3/A | Numeracy skills  | 15 | 1.5 |
| ENG/CU/EMO/BC/03/3/A | Digital Literacy | 20 | 2 |
| ENG/CU/EMO/BC/04/3/A | Entrepreneurial Skills | 40 | 4 |
| ENG/CU/EMO/BC/05/3/A | Employability Skills | 20 | 2 |
| ENG/CU/EMO/BC/06/3/A | Environmental Literacy | 15 | 1.5 |
| ENG/CU/EMO/BC/07/3/A | Occupational Safety and Health Practices | 15 | 1.5 |
|  | **Total** | **140** | **14** |

**Core units of learning**

|  |  |  |  |
| --- | --- | --- | --- |
| **Unit Code** | **Unit Title** | **Duration in Hours** | **CREDIT FACTORS**  |
| ENG/CU/EMO/CR/01/3/A | Grader operation | 60 | 6 |
| ENG/CU/EMO/CR/02/3/A | Excavator operation | 60 | 6 |
| ENG/CU/EMO/CR/03/3/A | Dozer operation | 30 | 3 |
| ENG/CU/EMO/CR/04/3/A | Backhoe operation | 30 | 3 |
| ENG/CU/EMO/CR/05/3/A | Forklift operation | 30 | 3 |
|  | Industrial attachment  | 160 | 16 |
|  | **Total** | 370 | 37 |
| **GRAND TOTAL** | **510** | **51** |

The core units of learning are independent of each other and may be taken independently.

The total duration for this course is 510 hoursincluding industrial attachment.

**Entry Requirements**

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

1. Completion of KNQA Level 1 or 2

**Or**

1. Equivalent qualifications as determined by Kenya National Qualifications Authority (KNQA)

**Industrial attachment**

It is envisaged that the trainee will have undergone an industrial training and assessment with a recognised industry as a prerequisite for completion of this training course.

An individual enrolled in this course will be required to undergo a one-month industrial attachment at the end of the course.

**Assessment**

The course will be assessed at two levels: internal and external.

1. **Internal assessment**: conducted continuously by the trainer (internal assessor) who is monitored by an accredited internal verifier.
2. **External assessment**: conducted by an external assessor who is monitored by an accredited external verifier.

The assessors and verifiers are registered by TVET CDACC which also coordinates external assessment.

**Certification**

A candidate will be issued with a Certificate of competency on demonstration of competence in a unit of competency. To attain the qualification Earth Moving Operations Level 3, the candidate must demonstrate competence in all the units of competency as given in qualification pack.

 These certificates will be awarded by TVET CDACC in conjunction with the training providers.

# BASIC UNITS OF LEARNING

# COMMUNICATION SKILLS

**UNIT CODE:** ENG/CU/EMO/BC/01/3/A

**Relationship to Occupational Standards**

This unit addresses the unit of competency: Demonstrate communication skills

**Duration of Unit:** 15 hours

**Unit Description**

This unit specifies the competencies required to demonstrate communication skills. It involves, obtaining and conveying workplace information, speaking English at a basic operational level, participating in workplace meetings and discussions and completing relevant work-related documents.

**Summary of Learning Outcomes**

1. Obtain and convey workplace information
2. Speak English at a basic operational level
3. Participate in workplace meetings and discussions
4. Complete relevant work-related documents

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Obtain and convey workplace information
 | * Communication process
* Modes of communication
* Medium of communication
* Effective communication
* Barriers to communication
* Flow of communication
* Sources of information
* Types of questions
* Organizational policies
* Workplace etiquette
* Ethical work practices in handling communication
 | * Written
* Oral questioning
* Observation
 |
| 1. Speak English at a basic operational level
 | * English grammar
	+ Nouns, verbs, adjectives, adverbs, pronouns prepositions
* English speaking
	+ Pronunciation
	+ Simple conversations
* Taking verbal instructions
* Reading and writing in English
* Forms of expression in English
 | * Written
* Oral
* Role play
 |
| 1. Participate in workplace meetings and discussions
 | * Nature of workplace meetings
* Meeting protocols
* Workplace interactions
 | * Oral questioning
* Observation
* Written tests
 |
| 1. Complete relevant work-related documents
 | * Types and purposes of workplace documents and forms
* Methods used in filling forms and documents
* Recording workplace data
* Process of distributing workplace forms and documents
* Report writing
* Types of workplace reports
 | * Written tests
* Oral questioning
* Observation
 |

**Suggested Delivery Methods**

* Discussion
* Role play
* Brainstorming
* Viewing of related videos

**Recommended Resources**

* Desktop computers/laptops
* Projectors
* Report writing templates
* Pens
* Note books

# NUMERACY SKILLS

**UNIT CODE:** ENG/CU/EMO/BC/02/3/A

**Relationship to Occupational Standards**

This unit addresses the unit of competency: Demonstrate numeracy skills

 **Duration of Unit:** 15 hours

**Unit Description**

This unit covers the competencies required to identify and undertake simple numerical processes. The person who is competent in this unit shall be able to use / work with whole numbers and money up to one hundred thousand; Locate, compare and use highly familiar measurement; Use highly familiar maps and diagrams; Identify and use some common 2D shapes; and locate specific Information in highly familiar tables, graphs and charts for work.

**Summary of Learning Outcomes**

1. Use whole numbers for work
2. Locate, compare and use highly familiar measurement for work
3. Use highly familiar maps and diagrams for work
4. Identify and use some common 2D shapes for work
5. Locate specific Information in highly familiar tables, graphs and charts for work

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

|  |  |  |
| --- | --- | --- |
| Learning Outcome | Content | Suggested Assessment Methods |
| 1. Use whole numbers for work
 | * Whole numbers
* Use of Zeros
* Use of halves
* Sizes
* Grouping of numbers
* Addition and subtraction of whole numbers
* Numerical information,
* symbols
 | * Oral questioning
* Written tests
* Practical test
* Observation
 |
| 1. Locate, compare and use highly familiar measurement for work
 | * Measurements
* Units of measurements and their use
* Digital time am and pm
* Calendars
 | * Oral
* Written
* Practical test
* Observation
 |
| 1. Use highly familiar maps and diagrams for work
 | * + Use of Maps and
* Diagrams simple
* symbols and pictorial
	+ Giving simple oral directions to locate objects
 | * Oral
* Written
* Practical test
* Observation
 |
| 1. Identify and use some common 2D shapes for work
 | * + Two dimensional shapes
	+ Describe common objects in terms of size and shape
	+ Compare objects
	+ Group common objects based on shape, size, color and features
 | * Oral
* Written
* Practical test
* Observation
 |
| 1. Locate specific Information in highly familiar tables, graphs and charts for work
 | * + Simple tables
	+ Features of simple graphs and charts
	+ Numerical information in tables, graphs & charts
 | * Oral
* Written
* Practical test
* Observation
 |

**Suggested Delivery Methods**

* Instructor led facilitation of theory.
* Practical demonstration of tasks by trainer
* Practice by trainees/ role play
* Discussion
* Observations and comments and corrections by trainers

**Recommended Resources**

* Common 2D shapes objects
* Calculator
* Basic measuring instruments
* Mathematical tables

# DIGITAL LITERACY

**UNIT CODE:** ENG/CU/EMO/BC/03/3/A

**Relationship to Occupational Standards**

This unit addresses the unit of competency: Demonstrate digital literacy

**Duration of Unit:** 20 hours

**Unit Description**

This unit covers the competencies required to effectively demonstrate digital literacy in a working environment. It entails identifying and using digital devices such as smartphones, tablets, laptops and desktop computers for purposes of communication and performing work related tasks at the work place.

**Summary of Learning Outcomes**

1. Identify computer hardware and software
2. Apply security measures to data, hardware and software
3. Apply computer software in solving tasks
4. Apply internet and email in communication at workplace

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Identify computer hardware and software
 | * Definition of a computer
* Functions of a computer
* Components of a computer
* Classification of computers
* Computer software
 | * Written
* Oral
* Observation
 |
| 1. Apply security measures to data, hardware and software
 | * Data security and control
* Security threats and control measures
* Types of computer crimes
* Detection and protection against computer crimes
 | * Written tests
* Oral presentation
* Observation
 |
| 1. Apply computer software in solving tasks
 | * Operating systems
* Word processing
* Spread sheets
* Data base
 | * Oral questioning
* Observation
* Practical
 |
| 1. Apply internet and email in communication at workplace
 | * Computer networks
* Uses of internet
* Electronic mail (e-mail) concept
 | * Oral questioning
* Observation
* Oral presentation
* Written report
 |

**Suggested Delivery Methods**

* Instructor led facilitation of theory
* Demonstration by trainer
* Practical work by trainee
* Viewing of related videos
* Group discussions

**Recommended Resources**

**Tools and equipment**

* Desk top computers
* Laptop computers
* Other digital devices
* Printers
* Storage devices
* Internet access
* Computer software

# ENTREPRENEURIAL SKILLS

**UNIT CODE:** ENG/CU/EMO/BC/03/3/A

**Relationship to occupational standards**

This unit addresses the unit of competency: Demonstrate entrepreneurial skills

**Duration of unit:** 40 hours

**Unit description**

This unit describes the competencies required to demonstrate entrepreneurial competencies. It includes, acquiring and developing entrepreneurial culture, identifying entrepreneurial opportunities, starting a small business, running and growing a small business.

**Summary of Learning Outcomes**

1. Acquire and develop entrepreneurial culture
2. Identify entrepreneurial opportunities
3. Start a small business
4. Run a small business
5. Grow a small business

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Acquire and develop entrepreneurial culture
 | * Definition of entrepreneur
* Importance of entrepreneurship
* Common terminologies in entrepreneurship
* Entrepreneurship and employment creation
* Formal and informal employment
* Habits that promote entrepreneurial development
* Cultural factors that inhibit entrepreneurship
 | * Observation
* Individual/group assignments
* Written
* Oral
 |
| 1. Identify entrepreneurial opportunities
 | * Types, characteristics, qualities & role of entrepreneurs
* SWOT analysis
* Generating Business ideas
* Business opportunities
* Evaluation of business opportunities
 | * Observation
* Individual/group assignments
* Written
* Oral
 |
| 1. Prepare a business plan
 | * Types of business plan
* Components of a business plan
* Importance of a business plan
* Forms of business ownership
* Importance of location of a small business
* Resources required to start a small business
 | * Observation
* Individual/group assignments
* Written
* Oral
 |
| 1. Start a small business
 | * Factors to consider when starting a small business
* Legal requirement for starting a small business
* Procedure of starting a small business
* The dos and don’ts of starting a small business
* Challenges faced when starting a small business and mitigating factors
* Launch of a small business
 | * Oral
* Observation
* Individual/group assignments
* Written
 |
| 1. Run a small business
 | * Organizational structure of a small business
* Managing small business finances
* Book keeping
* Business support services
* Marketing for small businesses
* Basic IT application in small business
 | * Observation
* Individual/group assignments
* Written
 |
| 1. Grow a small business
 | * Methods of growing/expanding a small business
* Resources for growing small business
* Small business growth plan
* ICT and business growth
 | * Observation
* Individual/group assignments
* Written
 |

**Suggested Delivery Methods**

* Instructor led facilitation of theory
* Demonstration by trainer
* Practice by trainee
* Role play
* Case study

**Recommended Resources**

* Case studies for small businesses
* Business plan template
* Laptop/ desktop computer
* Internet
* Telephone
* Writing materials

# EMPLOYABILITY SKILLS

**UNIT CODE:** ENG/CU/EMO/BC/05/3/A

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Demonstrate employability skills

**Duration of Unit:** 20 hours

**Unit Description**

This unit covers competencies required to demonstrate employability skills. It involves conducting self-management, demonstrating critical safe work habits, demonstrating workplace learning and workplace ethics.

**Summary of Learning Outcomes**

1. Conduct self-management
2. Demonstrate critical safe work habits
3. Demonstrate workplace learning
4. Demonstrate workplace ethics

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Conduct self-management
 | * Self-awareness
* Formulating personal vision, mission and goals
* Strategies for overcoming life challenges
* Emotional intelligence
* Assertiveness
* Developing and maintaining high self-esteem
* Developing and maintaining positive self-image
* Accountability and responsibility
* Good work habits
* Self-awareness
* Financial literacy
* Healthy lifestyle practices
 | * Observation
* Written
* Oral interview
* Third party report
 |
| 1. Demonstrate critical safe work habits
 | * Stress and stress management
* Punctuality and time consciousness
* Interpersonal communication
* Sharing information
* Resources utilization
* HIV and AIDS
* Drug and substance abuse
* Handling emerging issues
 | * Observation
* Written
* Oral interview
* Third party report
 |
| 1. Demonstrate workplace learning
 | * Personal training needs identification and assessment
* Cultural aspects of work
* Application of learning
* Safe use of technology
* Identifying opportunities
* Workplace innovation
* Handling emerging issues
* Future trends and concerns in learning
 | * Observation
* Oral interview
* Written
* Third party report
 |
| 1. Demonstrate workplace ethics
 | * Meaning of ethics
* Ethical perspectives
* Values and beliefs
* Organization code of ethics
* Common ethical dilemmas
* Organization culture
* Corruption, bribery and conflict of interest
* Privacy and data protection
* Harassment and mutual respect
* Financial responsibility/accountability
* Etiquette
* Emerging issues in ethics
 | * Observation
* Oral interview
* Written
* Third party report
 |

**Suggested Methods of Delivery**

* Instructor lead facilitation of theory
* Demonstrations
* Simulation/Role play
* Group Discussion
* Presentations
* Projects
* Case studies
* Assignments

**Recommended Resources**

* Computers
* Stationery
* Charts
* Video clips
* Audio tapes
* Radio sets
* TV sets
* LCD projectors

# ENVIRONMENTAL LITERACY

**UNIT CODE**: ENG/CU/EMO/BC/06/3/A

**Relationship to Occupational Standards**:

This unit addresses the unit of competency: Demonstrate environmental literacy

**Duration of Unit:** 15 hours

**Unit Description**

This unit describes the competencies required by a worker to control environmental hazard, control environmental pollution and comply with workplace sustainable resource use.

**Summary of Learning Outcomes**

1. Control environmental hazard
2. Control environmental Pollution
3. Demonstrate sustainable resource use

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** |  **Content** | **Suggested Assessment Methods** |
| 1. Control environmental hazard
 | * Environmental Management and Coordination Act 1999
* Solid Waste Act
* Storage of environmentally hazardous materials
* Disposal of hazardous wastes
* Types and uses of PPEs in line with environmental regulations
* Occupational Safety and Health Act 2007
 | * Written questions
* Oral questions
* Observation of work procedures
 |
| 1. Environmental Pollution Control
 | * Types of pollution
* Environmental pollution control and management
* Procedures for waste management
 | * Written questions
* Oral questions
* Observation of work procedures
 |
| 1. Demonstrate sustainable resource use
 | * Types of resources
* Sustainable resource use and management
* Principles of 3Rs (Reduce, Reuse, Recycle)
 | * Written questions
* Oral questions
* Observation of work procedures
 |

**Suggested Delivery Methods**

* Instructor led facilitation of theory
* Discussion
* Demonstration by trainer
* Practice by trainee
* Observations and comments and corrections by trainers

**Recommended Resources**

* Standard operating and/or other workplace procedures manuals
* Specific job procedures manuals
* Solid Waste Act
* Environmental Management and Coordination Act 1999
* Machine/equipment manufacturer’s specifications and instructions
* Personal Protective Equipment (PPE)

# OCCUPATIONAL SAFETY AND HEALTH PRACTICES

**UNIT CODE:** ENG/CU/EMO/BC/07/3/A

**Relationship to Occupational Standards**

This unit addresses the unit of competency: Demonstrate safety and health practices

**Duration of Unit:** 15 hours

**Unit Description**

This unit describes the competencies required by a worker in an industry to practice and promote safety and health at work.

**Summary of Learning Outcomes**

1. Prepare to apply workplace safety and health practices
2. Compliance with occupational safety and health Act

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Prepare to apply workplace safety and health practices
 | * Awareness of legislation that outlines the minimum standards for occupational safety and health requirements/ regulations
* Benefits of implementing an occupational safety and health program
* Safety requirements/ regulations of own work and of other workers
* Workplace standards and procedures for incidents and emergencies
* Prevention and Control Measures for accidents, injuries and sickness
 | * Oral questions
* Written questions
* Observation of work procedures
 |
| 2. Compliance with occupational safety and health Act | * Safety instructions and safety signs
* Safe handling of tools, equipment and materials
* Use of safe guards and safety devices
* Reporting of hazards, incidents, injuries and sickness in the workplace
 | * Written questions
* Oral questions
* Observation of work procedures
 |

**Suggested Delivery Methods**

* Instructor led facilitation of theory
* Practical demonstration of tasks by trainer
* Practice by trainee
* Observations and comments and corrections by trainers

**Recommended Resources**

* Occupational safety and health standards
* Standard operating and/or other workplace procedures manuals
* Specific job procedures manuals
* Client/supplier instructions
* Organizational or external personnel
* Machine/equipment manufacturer’s specifications and instructions
* Quality standards

# CORE UNITS OF LEARNING

# GRADER OPERATION

**UNIT CODE:** ENG/CU/EMO/CR/01/3/A

**Relationship to Occupational Standards**

This unit addresses the unit of competency: Operate a grader

**Duration of Unit: 60 hours**

**Unit Description**

This unit describes competencies required to **operate a grader**. It involves planning for work activities, preparing work area, fitting and removing attachments, performing start-up and shutdown procedures and conducting grader operations

**Summary of Learning Outcomes**

1. Plan for work activities
2. Prepare work area
3. Fit and remove attachments
4. Perform start-up and shutdown procedures
5. Conduct grader operations

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Plan for work activities
 | * Source of work instructions
	+ Plans
	+ Manufacturer specifications
	+ Traffic control requirements
	+ Quality requirements
	+ Task risk assessment forms
* Types of grader
* Safety requirements for grader operations
* Grader operation procedure
 | * Written tests
* Oral
* Practical
 |
| 1. Prepare work area
 | * Preparation of work site
* Equipment inspection
* Equipment preparation
* Safety working area
* Environmental protection
 | * Written tests
* Oral
* Practical
 |
| 1. Fit and remove attachments
 | * Graders attachments
* Grader attachment operation procedure
* Basic Grader attachments maintenance (Minor checks)
 | * Written tests
* Oral
* Practical
 |
| 1. Perform start-up and shutdown procedures
 | * Pre operational check list
* Routine operator maintenance procedure
* Start-up and shutdown procedures
* Post operational check list
* Grader parking techniques
* Basic grader maintenance
* Housekeeping procedures
 | * Written tests
* Oral
* Practical
 |
| 1. Conduct grader operations
 | * Grader operation procedures
* Transportation of grader to and from site
* Loading and offloading grader from low-bed truck
* Safe working procedures
 | * Written tests
* Oral
* Practical
 |

**Suggested Delivery Methods**

* Demonstration by trainer
* Practical work by trainee
* Demonstration videos
* Projector
* Group discussions
* Demonstrate grader prototype

**Recommended Resources**

* Operators manual
* Internet
* Trainer notes
* Instruction materials
* Flip chart
* Computer/Laptops, projectors
* Drawing tools, equipment and materials
* Work station
* Grader and grader attachments

**Personal protective equipment (PPEs)**

* Helmet
* Dust coat
* Safety boots
* Goggles
* Dust mask
* Reflective jacket
* Gloves
* Earmuffs

# EXCAVATOR OPERATION

**UNIT CODE:** ENG/CU/EMO/CR/02/3/A

**Relationship to Occupational Standards**

This unit addresses the unit of competency: Operate an excavator

**Duration of Unit: 60 hours**

**Unit Description**

This unit describes competencies required to **operate an excavator.** It involves planning for work activities, preparing work area, fitting and removing attachments, performing start-up and shutdown procedures and conducting excavator operations

**Summary of Learning Outcomes**

1. Plan for work activities
2. Prepare work area
3. Fit and remove attachments
4. Perform start-up and shutdown procedures
5. Conduct excavator operations

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Plan for work activities
 | * Source of work instructions
	+ Plans
	+ Manufacturer specifications
	+ Traffic control requirements
	+ Quality requirements
	+ Task risk assessment forms
* Types of excavator
* Safety requirements for excavator operations
* Excavator operation procedure
 | * Written tests
* Oral
* Practical
 |
| 1. Prepare work area
 | * Preparation of work site
* Equipment inspection
* Equipment preparation
* Safety working area
* Environmental protection
 | * Written tests
* Oral
* Practical
 |
| 1. Fit and remove attachments
 | * Excavator attachments
* Excavator attachment operation procedure
* Basic excavator attachments maintenance
 | * Written tests
* Oral
* Practical/Projects
 |
| 1. Perform start-up and shutdown procedures
 | * Pre operational check list
* Routine operator maintenance procedure
* Start-up and shutdown procedures
* Post operational check list
* Excavator parking techniques
* Basic excavator maintenance
* Housekeeping procedures
 | * Written tests
* Oral
* Practical
 |
| 1. Conduct excavator operations
 | * Excavator operation procedures
* Transportation of excavator to and from site
* Loading and offloading excavator from low-bed truck
* Safe working procedures
 | * Written tests
* Oral
* Practical
 |

**Suggested Delivery Methods**

* Demonstration by trainer
* Practical work by trainee
* Demonstration videos
* Projector
* Group discussions
* Demonstrate excavator prototype

**Recommended Resources**

* Operators manual
* Internet
* Trainer notes
* Instruction materials
* Flip chart
* Computer/Laptops, projectors
* Drawing tools, equipment and materials
* Work station
* Excavator and excavator attachments.

**Personal protective equipment (PPEs)**

* Helmet
* Dust coat
* Safety boots
* Goggles
* Dust mask
* Reflective jacket
* Gloves
* Earmuffs

# DOZER OPERATION

**UNIT CODE:** ENG/CU/EMO/CR/03/3/A

**Relationship to Occupational Standards**

This unit addresses the unit of competency: Operate a dozer

**Duration of Unit: 30 hours**

**Unit Description**

This unit describes competencies required to **operate a dozer** It involves planning for work activities, preparing work area, fitting and removing attachments, performing start-up and shutdown procedures and conducting dozer operations

**Summary of Learning Outcomes**

1. Plan for work activities
2. Prepare work area
3. Fit and remove attachments
4. Perform start-up and shutdown procedures
5. Conduct dozer operations

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Plan for work activities
 | * Source of work instructions
	+ Plans
	+ Manufacturer specifications
	+ Traffic control requirements
	+ Quality requirements
	+ Task risk assessment forms
* Types of dozer
* Safety requirements for dozer operations
* Dozer operation procedure
 | * Written tests
* Oral
* Practical
 |
| 1. Prepare work area
 | * Preparation of work site
* Equipment inspection
* Equipment preparation
* Safety working area
* Environmental protection
 | * Written tests
* Oral
* Practical
 |
| 1. Fit and remove attachments
 | * Dozer attachments
* Dozer attachment operation procedure
* Basic dozer attachments maintenance
 | * Written tests
* Oral
* Practical
 |
| 1. Perform start-up and shutdown procedures
 | * Pre operational check list
* Routine operator maintenance procedure
* Start-up and shutdown procedures
* Post operational check list
* Dozer parking techniques
* Basic dozer maintenance
* Housekeeping procedures
 | * Written tests
* Oral
* Practical
 |
| 1. Conduct dozer operations
 | * Dozer operation procedures
* Transportation of dozer to and from site
* Loading and offloading dozer from low-bed truck
* Safe working procedures
 | * Written tests
* Oral
* Practical
 |

**Suggested Delivery Methods**

* Demonstration by trainer
* Practical work by trainee
* Demonstration videos
* Projector
* Group discussions
* Demonstrate dozer prototype

**Recommended Resources**

* Operators manual
* Internet
* Trainer notes
* Instruction materials
* Flip chart
* Computer/Laptops, projectors
* Drawing tools, equipment and materials
* Work station
* Dozer and dozer attachments.

**Personal protective equipment (PPEs)**

* Helmet
* Dust coat
* Safety boots
* Goggles
* Dust mask
* Reflective jacket
* Gloves
* Earmuffs

# BACKHOE OPERATION

**UNIT CODE:** ENG/CU/EMO/CR/04/3/A

**Relationship to Occupational Standards**

This unit addresses the unit of competency: Operate a backhoe

**Duration of Unit: 30 hours**

**Unit Description**

This unit describes competencies required to **operate a backhoe**. It involves planning for work activities, preparing work area, fitting and removing attachments, performing start-up and shutdown procedures and conducting backhoe operations

**Summary of Learning Outcomes**

1. Plan for work activities
2. Prepare work area
3. Fit and remove attachments
4. Perform start-up and shutdown procedures
5. Conduct backhoe operations

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Plan for work activities
 | * Source of work instructions
	+ Plans
	+ Manufacturer specifications
	+ Traffic control requirements
	+ Quality requirements
	+ Task risk assessment forms
* Types of backhoe
* Safety requirements for backhoe operations
* Backhoe operation procedure
 | * Written tests
* Oral
* Practical
 |
| 1. Prepare work area
 | * Preparation of work site
* Equipment inspection
* Equipment preparation
* Safety working area
* Environmental protection
 | * Written tests
* Oral
* Practical
 |
| 1. Fit and remove attachments
 | * Backhoe attachments
* Backhoe attachment operation procedure
* Basic backhoe attachments maintenance
 | * Written tests
* Oral
* Practical
 |
| 1. Perform start-up and shutdown procedures
 | * Pre operational check list
* Routine operator maintenance procedure
* Start-up and shutdown procedures
* Post operational check list
* Backhoe parking techniques
* Basic backhoe maintenance
* Housekeeping procedures
 | * Written tests
* Oral
* Practical
 |
| 1. Conduct backhoe operations
 | * Backhoe operation procedures
* Transportation of backhoe to and from site
* Loading and offloading backhoe from low-bed truck
* Safe working procedures
 | * Written tests
* Oral
* Practical
 |

**Suggested Delivery Methods**

* Demonstration by trainer
* Practical work by trainee
* Demonstration videos
* Projector
* Group discussions
* Demonstrate backhoe prototype

**Recommended Resources**

* Operators manual
* Internet
* Trainer notes
* Instruction materials
* Flip chat
* Computer/Laptops, projectors
* Drawing tools, equipment and materials
* Work station
* Backhoe and backhoe attachments.

**Personal protective equipment (PPEs)**

* Helmet
* Dust coat
* Safety boots
* Goggles
* Dust mask
* Reflective jacket
* Gloves
* Earmuffs

# FORKLIFT OPERATION

**UNIT CODE:** ENG/CU/EMO/CR/05/3/A

**Relationship to Occupational Standards**

This unit addresses the unit of competency: Operate a forklift

**Duration of Unit: 30 hours**

**Unit Description**

This unit describes competencies required to **operate a forklift.** It involves planning for work activities, preparing work area, fitting and removing attachments, performing start-up and shutdown procedures and conducting forklift operations

**Summary of Learning Outcomes**

1. Plan for work activities
2. Prepare work area
3. Fit and remove attachments
4. Perform start-up and shutdown procedures
5. Conduct forklift operations

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Plan for work activities
 | * Source of work instructions
	+ Plans
	+ Manufacturer specifications
	+ Traffic control requirements
	+ Quality requirements
	+ Task risk assessment forms
* Types of forklift
* Safety requirements for forklift operations
* Grander operation procedure
 | * Written tests
* Oral
* Practical
 |
| 1. Prepare work area
 | * Preparation of work site
* Equipment inspection
* Equipment preparation
* Safety working area
* Environmental protection
 | * Written tests
* Oral
* Practical
 |
| 1. Fit and remove attachments
 | * Forklift attachments
* Forklift attachment operation procedure
* Basic forklift attachments maintenance
 | * Written tests
* Oral
* Practical
 |
| 1. Perform start-up and shutdown procedures
 | * Pre operational check list
* Routine operator maintenance procedure
* Start-up and shutdown procedures
* Post operational check list
* Forklift parking techniques
* Basic forklift maintenance
* Housekeeping procedures
 | * Written tests
* Oral
* Practical
 |
| 1. Conduct forklift operations
 | * Forklift operation procedures
* Transportation of forklift to and from site
* Loading and offloading forklift from low-bed truck
* Safe working procedures
 | * Written tests
* Oral
* Practical
 |

**Suggested Delivery Methods**

* Demonstration by trainer
* Practical work by trainee
* Demonstration videos
* Projector
* Group discussions
* Demonstrate forklift prototype

**Recommended Resources**

* Operators manual
* Internet
* Trainer notes
* Instruction materials
* Flip chart
* Computer/Laptops, projectors
* Drawing tools, equipment and materials
* Work station
* Forklift and forklift attachments

**Personal protective equipment (PPEs)**

* Helmet
* Dust coat
* Safety boots
* Goggles
* Dust mask
* Reflective jacket
* Gloves
* Earmuffs