**REPUBLIC OF KENYA**

**COMPETENCY BASED CURRICULUM**

**FOR**

**ENVIRONMENTAL MANAGEMENT**

**LEVEL 6**

easytvet.com

TVET CDACC
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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 in the formulation of the Policy Framework for Reforming Education and Training (Sessional Paper No. 14 of 2012). 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 Environmental 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 and the Sessional Paper No. 14 of 2012 on Reforming Education and Training in Kenya, emphasized the need to reform curriculum development, assessment and certification. This called for a shift to CBET to address the mismatch between skills acquired through training and skills needed by industry as well as increase the global competitiveness of Kenyan labour force.

TVET Curriculum Development, Assessment and Certification Council (TVET CDACC) in conjunction with Environment 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 Methods of Instruction, 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, Environment SSAC, expert workers and all those who participated in the development of this curriculum.



**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 Environment Sector Skills Advisory Committee (SSAC) in ensuring that competencies required by the industry are addressed in this curriculum. I also thank all stakeholders in the Environment 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 Environment sector will acquire competencies that will enable them to perform their work more efficiently.

**COUNCIL SECRETARY/CEO**

**TVET CDACC**

# Table of Contents

# ACRONYMS

BC        : Basic Competency
CC        : Common Competency
CDACC    : Curriculum Development, Assessment and Certification Council
CLTS     : Community Led Total Sanitation
CPU      : Central Processing Unit
CR        : Core Competency
CU        : Curriculum
ENV      : Environment
ICT       : Information Communication Technology
KCPE    : Kenya Certificate of Primary Education
KCSE    : Kenya Certificate of secondary Education
KNQA   : Kenya National Qualifications Authority
MEAs    : Multilateral Environmental Agreements
MGT    : Management
NEMA   : National Environmental Management Authority
OS        : Occupational Standards
OSHA   : Occupation Safety and Health Act
OSHS   : Occupation Safety and Health Standards
PC        : Personal Computer
PPE      : Personal Protective Equipment
PTD     : Participatory Technologies Development
SOPs    : Standard Operating Procedures
SSAC    : Sector Skills Advisory Committee
TVET    : Technical and Vocational Education Training
WRA    : Water Resource Authority

# KEY TO UNIT CODE

## ENV/ CU/ MGT/ BC /01 /6/A

Industry or sector

Curriculum

Occupational area

Type of Unit

Unit number

Competency level

Version Control
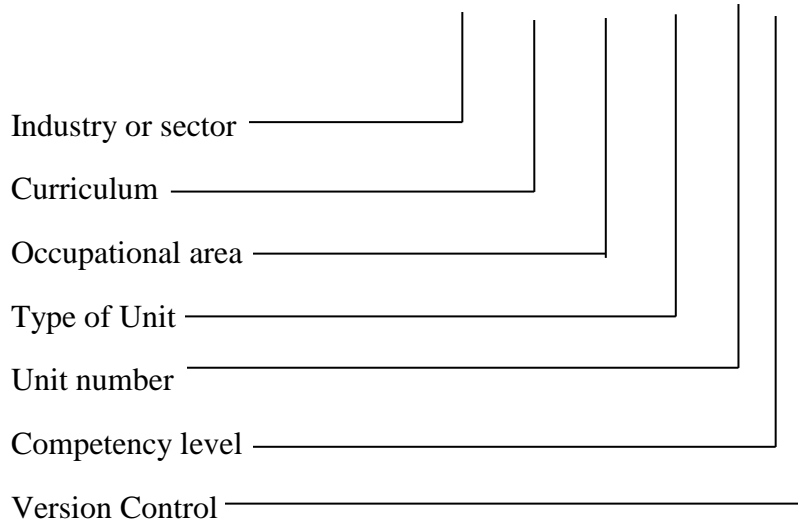
# COURSE OVERVIEW

Environmental Manager Level 6 qualification consists of units of learning that a person must achieve to manage disaster and risk, manage water resources, manage environmental pollution and waste, manage marine and wetland resources, manage rangeland and wildlife resources and manage energy resources. It also enables an individual to manage forest resources, apply environmental law, manage greenhouses and manage fisheries resources

The units of learning leading to Environmental Manager Level 6 qualification include the following competencies:

**Basic Units of Learning**

| Unit Code | Unit Title | Duration in Hrs | Credit Factors |
|---|---|---|---|
| ENV/CU/MGT/BC/01/6/A | Communication skills | 40 | 4 |
| ENV/CU/MGT/BC/02/6/A | Numeracy | 60 | 6 |
| ENV/CU/MGT/BC/03/6/A | Digital literacy | 60 | 6 |
| ENV/CU/MGT/BC/04/6/A | Entrepreneurship | 100 | 10 |
| ENV/CU/MGT/BC/05/6/A | Employability skills | 80 | 8 |
| ENV/CU/MGT/BC/06/6/A | Occupational safety and health practices | 40 | 4 |
| | **TOTAL** | **380** | **38** |

**Common Units of Learning**

| Unit Code | Unit Title | Duration in Hrs | Credit Factors |
|---|---|---|---|
| ENV/CU/MGT/CC/01/6/A | Research project | 180 | 18 |
| ENV/CU/MGT/CC/02/6/A | Safety and survival techniques | 60 | 6 |
| ENV/CU/MGT/CC/04/6/A | Participatory community development and capacity building | 80 | 8 |
| ENV/CU/MGT/CC/03/6/A | Climate change and global warming | 60 | 6 |
| ENV/CU/MGT/CC/05/6/A | Land use planning and management | 70 | 7 |
| ENV/CU/MGT/CC/06/6/A | Project planning and | 80 | 8 |

| Unit Code | Unit Title | Duration in Hrs | Credit Factors |
|---|---|---|---|
| | management | | |
| ENV/CU/MGT/CC/07/6/A | Basic Principles of Environment | 90 | 9 |
| ENV/CU/MGT/CC/08/6/A | Environmental and social impact assessment | 90 | 9 |
| | **TOTAL** | **710** | **71** |

**Core Units of Learning**

| Unit Code | Unit Title | Duration in Hrs | Credit Factors |
|---|---|---|---|
| ENV/CU/MGT/CR/01/6/A | Disaster and risk management | 90 | 9 |
| ENV/CU/MGT/CR/02/6/A | Water resources management | 60 | 6 |
| ENV/CU/MGT/CR/03/6/A | Environmental pollution and waste management | 100 | 10 |
| ENV/CU/MGT/CR/03/6/A | Marine and wetland resources management | 90 | 9 |
| ENV/CU/MGT/CR/04/6/A | Rangeland and wildlife resources management | 110 | 11 |
| ENV/CU/MGT/CR/05/6/A | Energy resources management | 80 | 8 |
| ENV/CU/MGT/CR/07/6/A | Forest resources management | 70 | 7 |
| ENV/CU/MGT/CR/08/6/A | Environmental law | 80 | 8 |
| ENV/CU/MGT/CR/09/6/A | Greenhouses management | 70 | 7 |
| ENV/CU/MGT/CR/10/6/A | Fisheries resource management | 80 | 8 |
| | Industrial Attachment | 480 | 48 |
| | TOTAL | **1310** | **131** |
| | **GRAND TOTAL** | **2400** | **240** |

The total duration of the course is **2400** hours which include 480 hours of industrial attachment.

**Entry Requirements**

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

a) Kenya Certificate of Secondary Education (KCSE) mean grade C- (minus)

**Or**

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

**Industrial attachment**

An individual enrolled in this course will be required to undergo an attachment for a period of three months. An individual enrolled in one of the core units of learning will be required to undergo a one month's attachment.

**Trainer qualification**

A trainer for this course should have a higher qualification than the level of this course

**Assessment**

The course will be assessed at two levels: internally and externally. Internal assessment is continuous and is conducted by the trainer who is monitored by an accredited internal verifier while external assessment is the responsibility of TVET CDACC.

**Certification**

An individual will be awarded a Certificate of Competency on demonstration of competence in a unit of competency. To be awarded Certificate in Environmental Management Certificate Level 6, an individual must demonstrate competence in all the units of competency.

These certificates will be issued by TVET CDACC in conjunction with training provider.

# BASIC UNITS OF LEARNING

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# COMMUNICATION SKILLS

## UNIT CODE: ENV/CU/MGT/BC/01/6/A

### Relationship to Occupational Standards
This unit addresses the Unit of Competency: Demonstrate Communication Skills

### Duration of Unit: 40 hours

### Unit Description
This unit covers the competencies required to demonstrate communication skills .It involves, meeting communication needs of clients and colleagues; developing communication strategies, establishing and maintaining communication pathways, conducting interviews, facilitating group discussion and representing the organization.

### Summary of Learning Outcomes
1. Meet communication needs of clients and colleagues
2. Develop communication strategies
3. Establish and maintain communication pathways
4. Promote use of communication strategies
5. Conduct interview
6. Facilitate group discussion
7. Represent the organization

### Learning Outcomes, Content and Suggested Assessment Methods

| Learning Outcome | Content | Suggested Assessment Methods |
|---|---|---|
| 1. Meet communication needs of clients and colleagues | <ul><li>Communication process</li><li>Modes of communication</li><li>Medium of communication</li><li>Effective communication</li><li>Barriers to communication</li><li>Flow of communication</li><li>Sources of information</li><li>Organizational policies</li><li>Organization requirements for written and electronic communication methods</li></ul> | <ul><li>Interview</li><li>Written texts</li></ul> |

| | | • Report writing | |
| | | • Effective questioning techniques (clarifying and probing) | |
| | | • Workplace etiquette | |
| | | • Ethical work practices in handling communication | |
| | | • Active listening | |
| | | • Feedback | |
| | | • Interpretation | |
| | | • Flexibility in communication | |
| | | • Types of communication strategies | |
| | | • Elements of communication strategy | |
| 2. Develop communication strategies | • Dynamics of groups<br>• Styles of group leadership<br>• Openness and flexibility in communication<br>• Communication skills relevant to client groups | • Interview<br>• Written texts |
| 3. Establish and maintain communication pathways | • Types of communication pathways | • Interview<br>• Written texts |
| 4. Promote use of communication strategies | • Application of elements of communication strategies<br>• Effective communication techniques | • Interview<br>• Written texts |
| 5. Conduct interview | • Types of interview<br>• Establishing rapport<br>• Facilitating resolution of issues<br>• Developing action plans | • Interview<br>• Written texts |
| 6. Facilitate group discussion | • Identification of communication needs<br>• Dynamics of groups<br>• Styles of group leadership<br>• Presentation of information | • Interview<br>• Written texts |

| | | |
|---|---|---|
| | • Encouraging group members participation<br>• Evaluating group communication strategies | |
| 7. Represent the organization | • Presentation techniques<br>• Development of a presentation<br>• Multi-media utilization in presentation<br>• Communication skills relevant to client groups | • Interview<br>• Written texts |

**Suggested Methods of Instructions**
- Discussion
- Role playing
- Simulation
- Direct instruction

**Recommended Resources**
- Desktop computers/laptops
- Internet connection
- Projectors
- Telephone

# NUMERACY SKILLS

## UNIT CODE: ENV/CU/MGT/BC/02/6/A

**Relationship to Occupational Standards**
This unit addresses the Unit of Competency: Demonstrate Numeracy Skills.

**Duration of Unit:** 60 hours

**Unit Description**
This unit describes the competencies required to demonstrate numeracy skills. It involves applying a wide range of mathematical calculations for work; applying ratios, rates and proportions to solve problems; estimating, measuring and calculating measurement for work; using detailed maps to plan travel routes for work; using geometry to draw and construct 2D and 3D shapes for work; collecting, organizing and interpreting statistical data; using routine formula and algebraic expressions for work and using common functions of a scientific calculator.

**Summary of Learning Outcomes**
1. Apply a wide range of mathematical calculations for work
2. Apply ratios, rates and proportions to solve problems
3. Estimate, measure and calculate measurement for work
4. Use detailed maps to plan travel routes for work
5. Use geometry to draw and construct 2D and 3D shapes for work
6. Collect, organize and interpret statistical data
7. Use routine formula and algebraic expressions for work
8. Use common functions of a scientific calculator

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

| Learning Outcome | Content | Suggested Assessment Methods |
|---|---|---|
| 1. Apply a wide range of mathematical calculations for work | • Fundamentals of mathematics<br>  • Addition, subtraction, multiplication and division of positive and negative numbers<br>  • Algebraic expressions manipulation | • Written tests<br>• Assignments<br>• Supervised exercises |

| | | • Forms of fractions, decimals and percentages<br>• Expression of numbers as powers and roots | |
|---|---|---|---|
| 2. | Apply ratios, rates and proportions to solve problems | • Rates, ratios and proportions<br>   • Meaning<br>   • Conversions into percentages<br>   • Direct and inverse proportions determination<br>   • Performing calculations<br>   • Construction of graphs, charts and tables<br>   • Recording of information | • Written tests<br>• Assignments<br>• Supervised exercises |
| 3. | Estimate, measure and calculate measurement for work | • Units of measurements and their symbols<br>• Identification and selection of measuring equipment<br>• Conversion of units of measurement<br>• Perimeters of regular figures<br>• Areas of regular figures<br>• Volumes of regular figures<br>• Carrying out measurements<br>• Recording of information | • Assignments<br>• Supervised exercises<br>• Written tests |
| 4. | Use detailed maps to plan travel routes for work | • Identification of features in routine maps and plans<br>• Symbols and keys used in routine maps and plans<br>• Identification and interpretation of orientation of map to North<br>• Demonstrate understanding of direction and location<br>• Apply simple scale to estimate length of objects, or distance to location or object<br>• Give and receive directions | • Written<br>• Practical test |

| | | using both formal and informal language | |
|---|---|---|---|
| | | • Planning of routes | |
| | | • Calculation of distance, speed and time | |
| 5. | Use geometry to draw and construct 2D and 3D shapes for work | • Identify two dimensional shapes and routine three dimensional shapes in everyday objects and in different orientations | |
| | | • Explain the use and application of shapes | |
| | | • Use formal and informal mathematical language and symbols to describe and compare the features of two dimensional shapes and routine three dimensional shapes | |
| | | • Identify common angles | |
| | | • Estimate common angles in everyday objects | |
| | | • Evaluation of unknown angles | |
| | | • Use formal and informal mathematical language to describe and compare common angles | |
| | | • Symmetry and similarity | |
| | | • Use common geometric instruments to draw two dimensional shapes | |
| | | • Construct routine three dimensional objects from given nets | |
| 6. | Collect, organize and interpret statistical data | • Classification of data | • Assignments |
| | |    • Grouped data | • Supervised exercises |
| | |    • Ungrouped data | • Written tests |
| | | • Data collection | |
| | |    • Observation | |

| | • Recording |
|---|---|
| | • Distinguishing between sampling and census |
| | • Importance of sampling |
| | • Errors in sampling |
| | • Types of sampling and their limitations e.g. |
| |     • Stratified random |
| |     • Cluster |
| |     • Judgmental |
| | • Tabulation of data |
| |     • Class intervals |
| |     • Class boundaries |
| |     • Frequency tables |
| |     • Cumulative frequency |
| | • Diagrammatic and graphical presentation of data e.g. |
| |     • Histograms |
| |     • Frequency polygons |
| |     • Bar charts |
| |     • Pie charts |
| |     • Cumulative frequency curves |
| | ❑ Interpretation of data |

| 7. Use routine formula and algebraic expressions for work | • Solving linear equations<br>• Linear graphs<br>    • Plotting<br>    • Interpretation<br>• Applications of linear graphs<br>• Curves of first and second degree<br>    • Plotting<br>    • Interpretation | • Assignments<br>• Supervised exercises<br>• Written tests |
|---|---|---|
| 8. Use common functions of a scientific calculator | • Identify and use keys for common functions on a calculator<br>• Calculate using whole numbers, money and routine decimals | •<br>• Written<br>• Practical test |

| | |
|---|---|
| | • and percentages<br>• Calculate with routine fractions and percentages<br>• Apply order of operations to solve multi-step calculations<br>• Interpret display and record result | |

**Suggested Methods of Instructions**
- Group discussions
- Demonstration by trainer
- Practical work by trainee
- Exercises

**Recommended Resources**
- Calculators
- Rulers, pencils, erasers
- Charts with presentations of data
- Graph books
- Dice

# DIGITAL LITERACY

## UNIT CODE: ENV/CU/MGT/BC/03/6/A

### Relationship to Occupational Standards
This unit addresses the Unit of Competency: Demonstrate Digital Literacy

### Duration of Unit: 60 hours

### Unit Description
This unit describes competencies required to demonstrate digital literacy. It involves in identifying computer software and hardware, applying security measures to data, hardware, software in automated environment, computer software in solving task, internet and email in communication at workplace, desktop publishing in official assignments and preparing presentation packages.

### Summary of Learning Outcomes
1. Identify computer software and hardware
2. Apply security measures to data, hardware, software in automated environment
3. Apply computer software in solving tasks
4. Apply internet and email in communication at workplace
5. Apply desktop publishing in official assignments
6. Prepare presentation packages

### Learning Outcomes, Content and Suggested Assessment Methods

| Learning Outcome | Content | Suggested Assessment Methods |
|---|---|---|
| 1. Identify computer hardware and software | <ul><li>Concepts of ICT</li><li>Functions of ICT</li><li>History of computers</li><li>Components of a computer</li><li>Classification of computers</li></ul> | <ul><li>Written tests</li><li>Oral presentation</li></ul> |
| 2. Apply security measures to data, hardware, software in automated environment | <ul><li>Data security and control</li><li>Security threats and control measures</li><li>Types of computer crimes</li><li>Detection and protection against computer crimes</li></ul> | <ul><li>Written tests</li><li>Oral presentation</li><li>Project</li></ul> |

| | | | Laws governing protection of ICT | |
|---|---|---|---|---|
| 3. | Apply computer software in solving tasks | • Operating system<br>• Word processing<br>• Spread sheets<br>• Data base design and manipulation<br>• Data manipulation, storage and retrieval | • Oral questioning<br>• Project |
| 4. | Apply internet and email in communication at workplace | • Computer networks<br>• Network configurations<br>• Uses of internet<br>• Electronic mail (e-mail) concept | • Oral questioning<br>• Written report |
| 5. | Apply desktop publishing in official assignments | • Concept of desktop publishing<br>• Opening publication window<br>• Identifying different tools and tool bars<br>• Determining page layout<br>• Opening, saving and closing files<br>• Drawing various shapes using DTP<br>• Using colour pellets to enhance a document<br>• Inserting text frames<br>• Importing and exporting text<br>• Object linking and embedding<br>• Designing of various publications<br>• Printing of various publications | • Oral questioning<br>• Written report<br>• Project |
| 6. | Prepare presentation packages | • Types of presentation packages<br>• Procedure of creating slides<br>• Formatting slides<br>• Presentation of slides<br>• Procedure for editing objects | • Oral questioning<br>• Written report<br>• Project |

**Suggested Methods of Instruction**

• Instructor led facilitation of theory

- Demonstration by trainer
- Practical work by trainee
- Viewing of related videos
- Project
- Group discussions

**Recommended Resources**
- Computers
- Printers
- Storage devices
- Internet access

# ENTREPRENEURSHIP SKILLS

## UNIT CODE: ENV/CU/MGT/BC/04/6/A

### Relationship to occupational standards

This unit addresses the Unit of Competency: Demonstrate Understanding of Entrepreneurship

**Duration of unit:** 100 hours

### Unit Description

This unit covers the competencies required to demonstrate understanding of entrepreneurship. It involves demonstrating understanding of an entrepreneur, entrepreneurship and self-employment. It also involves identifying entrepreneurship opportunities, creating entrepreneurial awareness, applying entrepreneurial motivation and developing business innovative strategies.

### Summary of Learning Outcomes

1. Demonstrate understanding of who an entrepreneur
2. Demonstrate knowledge of entrepreneurship and self-employment
3. Identify entrepreneurship opportunities
4. Create entrepreneurial awareness
5. Apply entrepreneurial motivation
6. Develop business innovative strategies
7. Develop Business plan

| Learning Outcome | Content | Suggested Assessment Methods |
|---|---|---|
| 1. Demonstrate knowledge of entrepreneurship and self-employment | • Importance of self-employment <br> • Requirements for entry into self-employment <br> • Role of an Entrepreneur in business <br> • Contributions of Entrepreneurs to National development | • Individual/group assignments <br> • Projects <br> • Written tests <br> • Oral questions <br> • Third party report <br> • Interviews |

| 2. Identify entrepreneurship opportunities | • Business ideas and opportunities<br>• Sources of business ideas<br>• Business life cycle<br>• Legal aspects of business<br>• Assessment of product demand<br>• Business environment<br>• Factors to consider when evaluating business environment<br>• Technology in business | • Individual/group assignments<br>• Projects<br>• Written tests<br>• Oral questions<br>• Third party report<br>• Interviews |
|---|---|---|
| 3. Create entrepreneurial awareness | • Forms of businesses<br>• Sources of business finance<br>• Factors in selecting source of business finance<br>• Governing policies on Small Scale Enterprises (SSEs)<br>• Problems of starting and operating SSEs | • Individual/group assignments<br>• Projects<br>• Written tests<br>• Oral questions<br>• Third party report<br>• Interviews |
| 4. Apply entrepreneurial motivation | • Internal and external motivation<br>• Motivational theories<br>• Self-assessment<br>• Entrepreneurial orientation<br>• Effective communications in entrepreneurship<br>• Principles of communication<br>• Entrepreneurial motivation | • Case studies<br>• Individual/group assignments<br>• Projects<br>• Written tests<br>• Oral questions<br>• Third party report<br>• Interviews |

| 5. Develop business innovative strategies | • Innovation in business<br>• Small business Strategic Plan<br>• Creativity in business development<br>• Linkages with other entrepreneurs<br>• ICT in business growth and development | • Case studies<br>• Individual/group assignments<br>• Projects<br>• Written tests<br>• Oral questions<br>• Third party report<br>• Interviews |
|---|---|---|
| 6. Develop Business Plan | • Business description<br>• Marketing plan<br>• Organizational/Management<br>• plan<br>• Production/operation plan<br>• Financial plan<br>• Executive summary<br>• Presentation of Business Plan | • Case studies<br>• Individual/group assignments<br>• Projects<br>• Written tests<br>• Oral questions<br>• Third party report<br>• Interviews |

**Suggested Methods of Instructions:**

- Direct instruction
- Project
- Case studies
- Field trips
- Discussions
- Demonstration
- Question and answer
- Problem solving
- Experiential
- Team training

**Recommended Resources**

- Case studies
- Business plan templates
- Computers
- Overhead projectors

- Internet
- Mobile phone
- Video clips
- Films
- Newspapers and Handouts
- Business Journals
- Writing materials

# EMPLOYABILITY SKILLS

## UNIT CODE: ENV/CU/MGT/BC/05/6/A

### Relationship to Occupational Standards
This unit addresses the Unit of Competency: Demonstrate Employability Skills

### Duration of Unit: 80 hours

### Unit Description
This unit covers competencies required to demonstrate employability skills. It involves conducting self-management, demonstrating interpersonal communication, critical safe work habits, leading a workplace team, planning and organizing work, maintaining professional growth and development, demonstrating workplace learning, problem solving skills and managing ethical performance.

### Summary of Learning Outcomes
1. Conduct self-management
2. Demonstrate interpersonal communication
3. Demonstrate critical safe work habits
4. Lead a workplace team
5. Plan and organize work
6. Maintain professional growth and development
7. Demonstrate workplace learning
8. Demonstrate problem solving skills
9. Manage ethical performance

### Learning Outcomes, Content and Suggested Assessment Methods

| Learning Outcome | Content | Suggested Assessment Methods |
|---|---|---|
| 1. Conduct self-management | • Self-awareness<br>• Formulating personal vision, mission and goals<br>• Strategies for overcoming life challenges<br>• Managing emotions<br>• Emotional intelligence | • Written tests<br>• Oral questioning<br>• Interviewing<br>• Portfolio of evidence<br>• Third party report |

| | | • Assertiveness versus aggressiveness<br>• Expressing personal thoughts, feelings and beliefs<br>• Developing and maintaining high self-esteem<br>• Developing and maintaining positive self-image<br>• Setting performance targets<br>• Monitoring and evaluating performance<br>• Articulating ideas and aspirations<br>• Accountability and responsibility<br>• Good work habits<br>• Self-awareness<br>• Values and beliefs<br>• Self-development<br>• Financial literacy<br>• Healthy lifestyle practices<br>• Adopting safety practices | |
|---|---|---|---|
| 2. Demonstrate interpersonal communication | • Meaning of interpersonal communication<br>• Listening skills<br>• Types of audience<br>• Public speaking<br>• Writing skills<br>• Negotiation skills<br>• Reading skills<br>• Meaning of empathy<br>• Understanding customers' needs<br>• Establishing communication networks<br>• Assertiveness<br>• Sharing information | • Written tests<br>• Oral questioning<br>• Interviewing<br>• Portfolio of evidence<br>• Third party report |
| 3. Demonstrate critical safe work habits | • Stress and stress management<br>• Time concept<br>• Punctuality and time | • Written tests<br>• Oral questioning<br>• Interviewing |

| | | |
|---|---|---|
| | consciousness<br>• Leisure<br>• Integrating personal objectives into organizational objectives<br>• Resources mobilization<br>• Resources utilization<br>• Setting work priorities<br>• Developing healthy relationships<br>• HIV and AIDS<br>• Drug and substance abuse<br>• Managing emerging issues | • Portfolio of evidence<br>• Third party report |
| 4. Lead a workplace team | • Leadership qualities<br>• Power and authority<br>• Team building<br>• Determination of team roles and objectives<br>• Team parameters and relationships<br>• Individual responsibilities in a team<br>• Forms of communication<br>• Complementing team activities<br>• Gender and gender mainstreaming<br>• Human rights<br>• Developing healthy relationships<br>• Maintaining relationships<br>• Conflicts and conflict resolution<br>• Coaching and mentoring skills | • Written tests<br>• Oral questioning<br>• Interviewing<br>• Portfolio of evidence<br>• Third party report |
| 5. Plan and organize work | • Functions of management<br>• Planning<br>• Organizing<br>• Time management<br>• Decision making concept<br>• Task allocation<br>• Developing work plans<br>• Developing work goals/objectives and deliverables | • Written tests<br>• Oral questioning<br>• Interviewing<br>• Portfolio of evidence<br>• Third party report |

| | | • Monitoring work activities<br>• Evaluating work activities<br>• Resource mobilization<br>• Resource allocation<br>• Resource utilization<br>• Proactive planning<br>• Risk evaluation<br>• Problem solving<br>• Collecting, analysing and organising information<br>• Negotiation | |
|---|---|---|---|
| 6. | Maintain professional growth and development | • Avenues for professional growth<br>• Training and career opportunities<br>• Assessing training needs<br>• Mobilizing training resources<br>• Licenses and certifications for professional growth and development<br>• Pursuing personal and organizational goals<br>• Managing work priorities and commitments<br>• Recognizing career advancement | • Written tests<br>• Oral questioning<br>• Interviewing<br>• Portfolio of evidence<br>• Third party report |
| 7. | Demonstrate workplace learning | • Managing own learning<br>• Mentoring<br>• Coaching<br>• Contributing to the learning community at the workplace<br>• Cultural aspects of work<br>• Networking<br>• Variety of learning context<br>• Application of learning<br>• Safe use of technology<br>• Taking initiative/proactivity<br>• Flexibility<br>• Identifying opportunities<br>• Generating new ideas | • Written tests<br>• Oral questioning<br>• Interviewing<br>• Portfolio of evidence<br>• Third party report |

| | | | |
|---|---|---|---|
| | <ul><li>Workplace innovation</li><li>Performance improvement</li><li>Managing emerging issues</li><li>Future trends and concerns in learning</li></ul> | | |
| 8. Demonstrate problem solving skills | <ul><li>Critical thinking process</li><li>Data analysis tools</li><li>Decision making</li><li>Creative thinking</li><li>Development of creative, innovative and practical solutions</li><li>Independence in identifying and solving problems</li><li>Solving problems in teams</li><li>Application of problem-solving strategies</li><li>Testing assumptions</li><li>Resolving customer concerns</li></ul> | | <ul><li>Written tests</li><li>Oral questioning</li><li>Interviewing</li><li>Portfolio of evidence</li><li>Third party report</li></ul> |
| 9. Manage ethical performance | <ul><li>Meaning of ethics</li><li>Ethical perspectives</li><li>Principles of ethics</li><li>Ethical standards</li><li>Organization code of ethics</li><li>Common ethical dilemmas</li><li>Organization culture</li><li>Corruption, bribery and conflict of interest</li><li>Privacy and data protection</li><li>Diversity, harassment and mutual respect</li><li>Financial responsibility/accountability</li><li>Etiquette</li><li>Personal and professional integrity</li><li>Commitment to jurisdictional laws</li></ul> | | <ul><li>Written tests</li><li>Oral questioning</li><li>Interviewing</li><li>Portfolio of evidence</li><li>Third party report</li></ul> |

| | • Emerging issues in ethics | |
|---|---|---|

**Suggested Methods of Instructions**
- Demonstrations
- Simulation/Role play
- Group Discussion
- Presentations
- Assignments
- Q&A

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

# OCCUPATIONAL SAFETY AND HEALTH PRACTICES

## UNIT CODE: ENV/CU/MGT/BC/06/6/A

### Relationship to Occupational Standards
This unit addresses the unit of competency: Demonstrate occupational safety and health practices

### Duration of Unit: 40 hours

### Unit Description
This unit specifies the competencies required to demonstrate occupational health and safety practices. It involves identifying workplace hazards and risk, identifying and implementing appropriate control measures to hazards and risks and implementing OSH programs, procedures and policies/guidelines.

### Summary of Learning Outcomes
1. Identify workplace hazards and risk
2. Control OSH hazards
3. Implement OSH programs

### Learning Outcomes, Content and Suggested Assessment Methods

| Learning Outcome | Content | Suggested Assessment Methods |
|---|---|---|
| 1. Identify workplace hazards and risks | • Identification of hazards in the workplace and/or the indicators of their presence<br>• Evaluation and/or work environment measurements of OSH hazards/risk existing in the workplace<br>• Gathering of OSH issues and/or concerns | • Oral questions<br>• Written tests<br>• Portfolio of evidence<br>• Third party report |
| 2. Control OSH hazards | • Prevention and control measures e.g. use of PPE<br>• Risk assessment<br>• Contingency measures | • Oral questions<br>• Written tests<br>• Portfolio of evidence<br>• Third party |

| | | report |
|---|---|---|
| 3. Implement OSH programs | <ul><li>Company OSH program, evaluation and review</li><li>Implementation of OSH programs</li><li>Training of team members and advice on OSH standards and procedures</li><li>Implementation of procedures for maintaining OSH-related records</li></ul> | <ul><li>Oral questions</li><li>Written tests</li><li>Portfolio of evidence</li><li>Third party report</li></ul> |

**Suggested Methods of instructions**

- Assigments
- Discussion
- Q&A
- Role play
- Viewing of related videos

**Recommended Resources**

- Standard operating and/or other workplace procedures manuals
- Specific job procedures manuals
- Machine/equipment manufacturer's specifications and instructions
- Personal Protective Equipment (PPE) e.g.
    - Mask
    - Face mask/shield
    - Safety boots
    - Safety harness
    - Arm/Hand guard, gloves
    - Eye protection (goggles, shield)
    - Hearing protection (ear muffs, ear plugs)
    - Hair Net/cap/bonnet
    - Hard hat
    - Face protection (mask, shield)
    - Apron/Gown/coverall/jump suit
    - Anti-static suits
    - High-visibility reflective vest

# COMMON UNITS OF LEARNING

# RESEARCH PROJECT

**UNIT CODE: ENV/CU/MGT/CC/01/6/A**

**Relationship to Occupational Standards**

This unit addresses the unit of competency: Conduct project research

**Duration of Unit:** 180 hours

**Unit Description**

This unit describes the competencies required to prepare project proposal, collect and analyse data and prepare project report.

**Summary of Learning Outcomes**

1. Prepare project proposal
2. Collect data
3. Analyze data
4. Prepare project report

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

| Learning Outcome | Content | Suggested Assessment Methods |
|---|---|---|
| 1. Prepare project proposal | • Meaning of research and research methods<br>• Value of research to environmental studies<br>• Types of research methodologies<br>• Importance of a research project proposal<br>• Factors to consider in selecting a research project<br>• Format of project proposal<br>• Contents of a project proposal<br>• Formulation of a research project objectives | • Observation<br>• Oral questioning<br>• Projects |

| 2. Collect data | • Types of data<br>• Sources of data<br>• Methods of data collection<br>• Advantages and disadvantages of data collection methods<br>• Data collection instruments<br>• Data collection procedures<br>• Sampling techniques<br>• Data collation | • Observation<br>• Oral questioning<br>• Written tests<br>• Projects<br>• |
| --- | --- | --- |
| 3. Analyze data | • Methods of data analysis and interpretation<br>• Data processing<br>   o Software<br>• Data presentation | • Observation<br>• Oral questioning<br>• Written tests<br>• Projects<br>• Practicals |
| 4. Prepare project report | • Importance of a research project report<br>• Format of project research report<br>• Contents of a project report | • Observation<br>• Oral questioning<br>• Project report |

**Suggested Methods of Instruction**
- Lectures
- Group discussions
- Demonstration by trainer
- Exercises by trainee

**Recommended Resources**
- Data
- Computer
- Stationery
- Internet

# SAFETY AND SURVIVAL TECHNIQUES

**UNIT CODE: ENV/CU/MGT/CC/02/6/A**

**Relationship to Occupational Standards**

This unit addresses the unit of competency: Perform safety and survival techniques

**Duration of Unit:** 60 hours

**Unit Description**

This unit describes the competencies required to perform safety and survival techniques. It involves administering first aid, observing safety in the wilderness, demonstrating team building skills and conducting solo expedition. It also entails demonstrating bush craft skills.

**Summary of Learning Outcomes**

1. Administer first aid
2. Observe safety in the wilderness
3. Demonstrate team building skills
4. Conduct solo expedition
5. Demonstrate bush craft skills

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

| Learning Outcome | Content | Suggested Assessment Methods |
|---|---|---|
| 1. Administer first aid | • Importance of first aid box<br>• Contents of first aid box<br>• Accidents and incidents in the wilderness<br>• Injuries and their treatment<br>• Poisoning and their treatment | • Observation<br>• Oral questioning<br>• Written tests<br>• Practical assignments |
| 2. Observe safety in the wilderness | • Survival in the wilderness<br>   o Wildlife psychology/behavior<br>   o Signs and markings for wildlife territories<br>   o Poisonous and non-poisonous plants in the wilderness | • Observation<br>• Oral questioning<br>• Written tests<br>• Practical assignments |

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|---|---|---|---|---|
| | • Survival in water<br>   o Swimming techniques<br>• Safety measures<br>   o Fire-fighting techniques<br>   o First aid skills<br>• Clothing | | | |
| 3. Demonstrate team building skills | • Importance of team building<br>• Key elements in team development<br>• Leadership skills<br>• Initiative tests<br>• Group dynamics<br>• Interpersonal skills | • Observation<br>• Oral questioning<br>• Written tests<br>• Practical assignments<br>• Projects | | |
| 4. Conduct solo expedition | • Map reading and interpretation<br>• Navigation techniques<br>• Navigation tools and equipment<br>• Communication in the wilderness<br>• Sources and types of distress<br>• Stress management<br>• Mountain climbing skills<br>• Prevention of hazards during outward bound activities | • Observation<br>• Oral questioning<br>• Written tests<br>• Practical assignments<br>• Projects | | |
| 5. Demonstrate bush craft skills | • Wilderness ethics<br>• Common camping diseases<br>• Camping hygiene and sanitation<br>• Bush craft tolls and equipment<br>• Care and maintenance of tools and equipment | • Observation<br>• Oral questioning<br>• Written tests<br>• Projects<br>• Practical assignments | | |

**Suggested Methods of Instruction**
- Trips
- Lectures
- Group discussions
- Demonstration by trainer
- Exercises by trainee

**Recommended Resources**
- Navigation tools and equipment

- o Compass
  - o Maps
- Protective gear
- Tents
- Life boats
- Life-saving jackets
- Torch
- Pen knife
- Tape
- Sleeping bags

## PARTICIPATORY COMMUNITY DEVELOPMENT AND CAPACITY BUILDING

**UNIT CODE: ENV/CU/MGT/CC/03/6/A**

**Relationship to Occupational Standards**

This unit addresses the unit of competency: Build capacity for community development

**Duration of Unit:** 80 hours

**Unit Description**

This unit describes the competencies required to build capacity for community development. It involves mobilizing stakeholders in resource management, applying participatory approaches in community development, performing participatory planning and applying participatory technologies (PTD). It also entails resolving natural resource use conflicts.

**Summary of Learning Outcomes**

1. Mobilize stakeholders in resource management
2. Apply participatory approaches in community development
3. Perform participatory planning
4. Apply participatory technologies  (PTD)
5. Resolve natural resource use conflicts

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

| Learning Outcome | Content | Suggested Assessment Methods |
|---|---|---|
| 1. Mobilize stakeholders in resource management | <ul><li>Meaning and importance of stakeholder analysis</li><li>Tools for stakeholder analysis</li><li>Role of community in resource management</li><li>Approaches for enhancing participatory resource management</li><li>Types of participation</li><li>Benefits of participatory resource management</li></ul> | <ul><li>Observation</li><li>Oral questioning</li><li>Written tests</li><li>Projects</li><li>Practical assignments</li></ul> |

| | | | |
|---|---|---|---|
| | <ul><li>Limitations of participatory resource management</li><li>Community mobilization techniques</li><li>Community empowerment approaches</li><li>Techniques for enhancement of community participation</li><li>Community based conservation programs</li></ul> | | |
| 2. Apply participatory approaches in community development | <ul><li>Theoretical perspectives to participatory development</li><li>Participatory approaches for community involvement in resource management</li><ul><li>Rapid Rural Appraisal (RRA)</li><li>Participatory Rural Appraisal (PRA)</li><li>Participatory Learning and Action (PLA)</li></ul><li>Participatory Appraisal techniques and methods</li><ul><li>Community mapping</li><li>social mapping</li><li>wealth/well-being ranking</li><li>Transect walks</li><li>Venn Diagrams</li><li>Livelihoods analysis</li></ul></ul> | <ul><li>Observation</li><li>Oral questioning</li><li>Written tests</li><li>Projects</li><li>Practical assignments</li></ul> | |
| 3. Perform participatory planning | <ul><li>Meaning of participatory planning</li><li>Co-evolving streams of participatory methodologies</li><li>Integrated pest management</li></ul> | <ul><li>Observation</li><li>Oral questioning</li><li>Written tests</li><li>Projects</li></ul> | |

| | | |
|---|---|---|
| | • Stepping stones<br>• Participatory GIS<br>• Participatory Action and Learning systems<br>• Community Led Total Sanitation(CLTS) | • Practical assignments |
| 4. Apply participatory technologies (PTD) | • Historical and institutional contexts for PTD<br>• The PTD process<br>• Typologies for participation<br>• Participatory evaluation<br>• Differences between participatory and conventional evaluation | • Observation<br>• Oral questioning<br>• Written tests<br>• Projects<br>• Practical assignments |
| 5. Resolve natural resource use conflicts | • Stages of conflict development<br>    • Pre-conflict<br>    • Confrontation<br>    • Crisis<br>    • Post conflict<br>• Conflict analysis process<br>    • Types of resource use conflicts<br>    • Causes of resource use conflicts<br>    • Actors involved<br>    • Interest<br>• Mechanisms for conflict resolution<br>    • Mediation<br>    • Arbitration<br>    • Negotiation<br>    • Adjudication<br>    • Alternative dispute resolution (ADR)<br>• Conflict transformation | • Observation<br>• Oral questioning<br>• Written tests<br>• Projects<br>• Practical assignments |

**Suggested Methods of Instruction**
- Lectures
- Group discussions
- Demonstration by trainer
- Exercises by trainee

**Recommended Resources**
- Public address system
- Pamphlets
- Questionnaires
- Recorders
- Cameras
- Data
- Computer
- Stationery
- Internet

# CLIMATE CHANGE AND GLOBAL WARMING

**UNIT CODE: ENV/CU/MGT/CC/04/6/A**

**Relationship to Occupational Standards**

This unit addresses the unit of competency: Manage climate change and global warming

**Duration of Unit:**  60 hours

**Unit Description**

This unit describes the competencies required to manage climate change and global warming. It involves managing effects of climate change and global warming, applying responses, mitigation and adaptation strategies and applying international policies and interventions to climate change.

**Summary of Learning Outcomes**

1. Manage effects of climate change and global warming
2. Apply responses, mitigation and adaptation strategies to climate change.
3. Apply international policies and interventions

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

| Learning Outcome | Content | Suggested Assessment Methods |
|---|---|---|
| 1. Manage effects of climate change and global warming | • Meaning of climate change and global warming <br>• Causes of global warming <br>• Effects of global warming and climate change <br>• Greenhouse effect <br>• Greenhouse gases <br>• Alternative sources of energy <br>• Indicators of global warming <br>• Climate change modelling | • Observation <br>• Oral questioning <br>• Written tests <br>• Projects <br>• Practical assignments |
| 2. Apply responses, mitigation and adaptation | • Meaning of adaptation and mitigation <br>• Adaptation and mitigation measures to climate change <br>• Resource efficiency mechanisms for | • Observation <br>• Oral questioning <br>• Written tests <br>• Projects |

| | | |
|---|---|---|
| strategies to climate change. | resolving climate change issues<br>• Sustainable development<br>• Climate change Act 2016<br>• Causes, impact and adaptation of climate change | • Practical assignments |
| 3. Apply international policies and interventions | • Carbon trading<br>• Conference of parties (COP)<br>• Local and International policies on climate change<br>• Functions of the national climate change council<br>• Policies of UNFCC (United nations Framework on climate change)<br>• Relationship between climate and development<br>• Community sensitization and coping strategies | • Observation<br>• Oral questioning<br>• Written tests<br>• Projects<br>• Practical assignments |

**Suggested Methods of Instruction**
- Lectures
- Group discussions
- Demonstration by trainer
- Exercises by trainee
- Trips

**Recommended Resources**
- Data
- Computer
- Stationery
- Projectors
- Internet

# LAND USE PLANNING AND MANAGEMENT

## UNIT CODE: ENV/CU/MGT/CC/05/6/A

### Relationship to Occupational Standards

This unit addresses the unit of competency: Plan and manage land use

**Duration of Unit:** 70 hours

### Unit Description

This unit specifies the competencies required to manage and plan projects. It involves planning for projects, conducting stakeholder analysis, implementing project, managing project risks and monitoring and evaluation of project.

### Summary of Learning Outcomes

1. Apply land use management tools
2. Apply land use threshold
3. Prepare an integrated land use plan
4. Resolve land use conflicts
5. Apply land tenure systems

### Learning Outcomes, Content and Suggested Assessment Methods

| Learning Outcome | Content | Suggested Assessment Methods |
|---|---|---|
| 1. Apply land use management tools | • Types of land use <br>• Meaning and importance of land use management tools <br>• Types of land use management tools <br>   o Zonation <br>   o Building line set back <br>   o Carrot approach <br>   o Liaison committee <br>   o Stick approach | • Observation <br>• Oral questioning <br>• Written tests <br>• Projects <br>• Practical assignments |
| 2. Apply land use threshold | • Meaning and importance of land use planning <br>• Principles of land valuation and its | • Observation <br>• Oral questioning <br>• Written tests |

| | | | Projects |
|---|---|---|---|
| | | • Relationship between land valuation and land use planning | • Practical assignments |
| | | • Factors for determining land productivity and degradation | |
| | | • Determination of land carrying capacity | |
| | | • Determination of land use threshold in relation to its carrying capacity | |
| 3. Prepare an integrated land use plan | | • Agro-ecological zonation of Kenya<br>• Land use practices in each agro-ecological zone<br>• Multiple land use practices<br>• Mapping and zonation of land uses<br>• Land use planning process<br>• Land reclamation/rehabilitation/restoration<br>• Measures for development control<br>• Preparation of a land use plan | • Observation<br>• Oral questioning<br>• Written tests<br>• Projects<br>• Practical assignments |
| 4. Resolve land use conflicts | | • Stages of conflict development<br>    • Pre-conflict<br>    • Confrontation<br>    • Crisis<br>    • Post conflict<br>• Conflict analysis process<br>    • Types of land use conflicts<br>    • Causes of land use conflicts<br>    • Actors involved<br>    • Interest<br>• Mechanisms for conflict resolution<br>    • Mediation<br>    • Arbitration<br>    • Negotiation<br>    • Adjudication<br>    • Alternative dispute resolution (ADR)<br>• Conflict transformation | • Observation<br>• Oral questioning<br>• Written tests<br>• Projects<br>• Practical assignments |

| | | |
|---|---|---|
| | • Destructive versus constructive conflicts<br>• Reconciliation and consensus building | |
| 5. Apply land tenure systems | • Land tenure systems<br>• Land property rights<br>• Land use policies and administration<br>• Land laws /ordinances and regulations<br>• Monitoring and assessment of land use<br> • Land information systems | • Observation<br>• Oral questioning<br>• Written tests<br>• Projects<br>• Practical assignments |

**Suggested Methods of Instruction**
- Lectures
- Group discussions
- Demonstration by trainer
- Exercises by trainee

**Recommended Resources**
- Public address system
- Pamphlets
- Questionnaires
- Recorders
- Cameras
- Data
- Computer
- Stationery
- Internet

# PROJECT PLANNING AND MANAGEMENT

**UNIT CODE: ENV/CU/MGT/CC/06/6/A**

**Relationship to Occupational Standards**

This unit addresses the unit of competency: Plan and manage project

**Duration of Unit:** 80 hours

**Unit Description**

This unit describes the competencies required to plan for project, conduct stakeholder analysis, allocate project resources, manage project risks and monitor and evaluate project, manage conflicts.

**Summary of Learning Outcomes**

1. Plan for projects
2. Conduct stakeholder analysis
3. Implement project
4. Manage project risks
5. Monitor and evaluate projects

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

| Learning Outcome | Content | Suggested Assessment Methods |
|---|---|---|
| 1. Plan for projects | <ul><li>Meaning of projects</li><li>Types of projects</li><li>Role of project manager</li><li>Project management cycle</li><li>Project proposal</li><li>Project schedule</li><li>Logical framework/ planning matrix</li><li>Project sustainability</li><li>Project report</li></ul> | <ul><li>Observation</li><li>Oral questioning</li><li>Written tests</li><li>Projects</li></ul> |

| 2. Conduct stakeholder analysis | • Meaning of stakeholder<br>• Types of stakeholders<br>• Role of stakeholders in project management<br>• Stakeholder participation | • Observation<br>• Oral questioning<br>• Written tests<br>• Projects |
|---|---|---|
| 3. Implement project | • Resource mobilization<br>• Financial plans/ budgets<br>• Human resource<br>• Terms of reference (TOR)<br>• Decommissioning<br>• Conflict resolution | • Observation<br>• Oral questioning<br>• Written tests<br>• Projects |
| 4. Manage project risks | • Risk identification<br>• Risk analysis<br>• Risk contingency planning<br>• Risk mitigation<br>• Risk tracking<br>• Risk identification reiteration process<br>• Risk assessment | • Observation<br>• Oral questioning<br>• Written tests<br>• Projects |
| 5. Monitor and evaluate projects (M&E) | • Meaning of M&E<br>• M&E tools<br>• Monitoring procedures<br>• Methods of monitoring<br>• PESTEL<br>• M&E report<br>• Project audit and review | • Observation<br>• Oral questioning<br>• Written tests<br>• Projects |

**Suggested Methods of Instruction**
- Lectures
- Group discussions
- Demonstration by trainer
- Exercises by trainee

**Recommended Resources**
- Farm tools
- Survey tools
- Irrigation kits
- Pipework

# BASIC PRINCIPLES OF ENVIRONMENT

**UNIT CODE**:  ENV/CU/MGT/CC/07/6/A

**Relationship to Occupational Standards**:
This unit addresses the unit standard: Apply basic principles of environment

**Duration of Unit:** 90 hours

## Unit Description
This unit specifies the competencies required to apply basic principles of environment. It involves applying principles of ecology, managing environmental resources, pollution and wastes and demonstrating sustainable resource use. It also entails applying environmental legislations and implementing and monitoring environmental programs.

## Summary of Learning Outcomes
1. Apply principles of ecology
2. Manage environmental resources
3. Manage pollution and wastes
4. Demonstrate sustainable resource use
5. Apply environmental legislations
6. Implement and monitor environmental programs

## Learning Outcomes, Content and Suggested Assessment Methods

| Learning Outcome | Content | Suggested Assessment Methods |
|---|---|---|
| 1. Apply principles of ecology | <ul><li>Meaning of environment</li><li>Components of environment</li><li>Ecological concepts</li><li>Bio-geochemical cycles</li><li>Interactions in ecosystems:<ul><li>Species interaction</li><li>Ecological niche</li><li>Plant distribution</li><li>Energy flow in the ecosystem</li></ul></li></ul> | <ul><li>Written questions</li><li>Oral questions</li><li>Observation of work procedures</li><li>Role play</li></ul> |

| | | | |
|---|---|---|---|
| | | • Carrying capacity<br>• Ecological succession<br>• Types of ecosystems<br>• Ecosystem degradation<br>• Biogeography and climate of East Africa<br>• Conservation strategies<br>• Contemporary environmental issues | |
| 2. Manage pollution and wastes | | • Types of pollution<br>• Sources of pollution<br>• Environmental pollution control measures<br>• Types of wastes<br>• Procedures of waste management<br>• Methods for waste management<br>• Different types of environmental pollution<br>• Pollution prevention, minimization and control<br>• Principles of waste management<br>• Effects of pollution on the environment | • Written questions<br>• Oral questions<br>• Observation of work procedures<br>• Role play |
| 3. Demonstrate sustainable resource use | | • Types of resources<br>• Uses of resources<br>• Management of resources<br>• Monitoring of resources<br>• Techniques in measuring current usage of resources<br>• Methods for minimizing wastage<br>• Collection of information on environmental and resource efficiency systems and procedures<br>• Resource conservation plans | • Written questions<br>• Oral questions<br>• Observation of work procedures<br>• Role play |
| 4. Apply environmental legislations | | • Environmental issues/concerns<br>• Environmental legislations<br>• Multilateral Environmental Agreements | • Written questions<br>• Oral questions<br>• Observation of work procedures |

| | | | |
|---|---|---|---|
| | • Environmental management practices<br>• Law enforcement mechanisms<br>• Environmental offences and penalties<br>• Policy formulation and review | | |
| 5. Implement and monitor environmental programs | • Community needs assessment<br>• Resource mobilization<br>• Stakeholder analysis<br>• Project implementation and monitoring plan<br>• Resolving problems /constraints encountered<br>• Report writing<br>• Monitoring and reporting of environmental incidents | • Written questions<br>• Oral questions<br>• Observation of work procedures<br>• Role play |
| 6. Develop resource Conservation plans | • Determination of efficiency of use/conversion of resources<br>• Causes of low efficiency of use of resources<br>• Plans for increasing the efficiency of resource use | • Written tests<br>• Oral questions<br>• Practical test<br>• Observation |

## Suggested Methods of Instruction

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

## Recommended Resources

- Standard operating and/or other workplace procedures manuals
- Specific job procedures manuals
- Environmental Management and Coordination Act 1999
- Machine/equipment manufacturer's specifications and instructions
- Personal Protective Equipment (PPE)
- ISO standards
- Company environmental management systems (EMS)
- Montreal Protocol
- Kyoto Protocol

# ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

## UNIT CODE: ENV/CU/MGT/CC/08/6/A

### Relationship to Occupational Standards

This unit addresses the unit of competency: Assess environmental and social impact

**Duration of Unit:** 90 hours

### Unit Description

This unit describes the competencies required to assess environmental and social impact. It involves conducting environmental impact assessment, preparing an environmental and social management plan, conducting strategic environmental assessment, conducting environmental audit and applying legal policy and administrative framework for EIA and EA.

### Summary of Learning Outcomes

1. Conduct Environmental Impact Assessment (EIA)
2. Prepare an Environmental and Social Management plan (EMP)
3. Conduct Strategic Environmental Assessment (SEA)
4. Conduct Environmental Audit (EA)
5. Apply legal policy and administrative framework for EIA and EA

### Learning Outcomes, Content and Suggested Assessment Methods

| Learning Outcome | Content | Suggested Assessment Methods |
|---|---|---|
| 1. Conduct Environmental Impact Assessment (EIA) | • Role and mandate of NEMA in managing EIA<br>• Meaning and importance of EIA<br>• EIA procedure<br>• EIA methodology<br>• Stakeholder identification and mapping<br>• Consultation and public participation<br>• Principles of EIA<br>• Objectives of EIA | • Observation<br>• Oral questioning<br>• Written tests<br>• Projects |

| | | • EIA report<br>• Decision making<br>• NEMA requirements for EIA<br>• EIA regulations and policies<br>• Selected case studies | |
|---|---|---|---|
| 2. | Prepare an Environmental and Social Management plan (EMP) | • Meaning and importance of EMP<br>• Principles of EMP<br>• Components of EMP<br>• Preparation of environmental action plan<br>• Role and mandate of EMP<br>• Monitoring and evaluation of EMP<br>• Social impact assessment | • Observation<br>• Oral questioning<br>• Written tests<br>• Projects |
| 3. | Conduct Strategic Environmental Assessment (SEA) | • Meaning and importance of SEA<br>• Principles of SEA<br>• Objectives of SEA<br>• SEA process<br>• SEA report<br>• Submission of SEA report | • Observation<br>• Oral questioning<br>• Written tests<br>• Projects |
| 4. | Conduct Environmental Audit (EA) | • Meaning and importance of EA<br>• Types of Environmental Audits<br>• Environmental Audit procedure<br>• Format of EA report<br>• Contents of EA report<br>• EA Monitoring<br>• Audit report<br>• Decision making<br>• Selected audit case studies | • Observation<br>• Oral questioning<br>• Written tests<br>• Projects |
| 5. | Apply legal policy and administrative framework for EIA and EA | • Legal policy provisions relating to EIA and EA in Kenya<br>• Administrative framework for EIA and EA | • Observation<br>• Oral questioning<br>• Written tests<br>• Projects |

**Suggested Methods of Instruction**
- Lectures
- Group discussions

- Demonstration by trainer
- Exercises by trainee
- Visits/trips

**Recommended Resources**
- Recorders
- Cameras
- Stationery
- Internet

# CORE UNITS OF LEARNING

## DISASTER AND RISK MANAGEMENT

**UNIT CODE: ENV/CU/MGT/CR/01/6/A**

**Relationship to Occupational Standards**

This unit addresses the unit of competency: Manage disaster and risk

**Duration of Unit:** 90 hours

**Unit Description**

This unit describes the competencies required to manage disaster and risk. It involves classifying disasters, conducting risk vulnerability assessment and preparing for disaster. It also entails preparing for and managing hazards and conducting disaster recovery and response.

**Summary of Learning Outcomes**

1. Classify disasters
2. Conduct risk vulnerability assessment
3. Prepare for disaster
4. Prepare for and manage hazards
5. Conduct disaster recovery and response

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

| Learning Outcome | Content | Suggested Assessment Methods |
|---|---|---|
| 1. Classify disasters | • Meaning of disasters<br>• Difference between disasters, risks and hazards<br>• Meaning and importance of disaster preparedness and management<br>• Types and classes of disasters<br>• Causes of disasters<br>• Effects of disasters<br>• Disaster occurrence and distribution<br>• Disaster prevention and mitigation measures | • Observation<br>• Oral questioning<br>• Written tests<br>• Practical assignments |

| No. | Competency | Content | Assessment Method |
|---|---|---|---|
| 2. | Conduct risk vulnerability assessment | • Meaning of risks<br>• Types of risks<br>• Meaning and importance of risk vulnerability assessment<br>• Risk characterization<br>• Measures of risk reduction<br>• Risk vulnerability analysis<br>• Measures for risk management | • Observation<br>• Oral questioning<br>• Written tests<br>• Practicals |
| 3. | Prepare for disaster | • Phases of disaster preparedness and management<br>   • Pre-disaster<br>   • During disaster<br>   • Post disaster<br>   • Disaster mitigation<br>• Disaster early warning systems<br>• Preparation of disaster preparedness and management plan | • Observation<br>• Oral questioning<br>• Written tests<br>• Practicals |
| 4. | Prepare for and manage hazards | • Meaning of hazard<br>• Types of hazards<br>• Hazard identification<br>• Hazard assessment<br>• Hazard preparedness and management | • Observation<br>• Oral questioning<br>• Written tests<br>• Practical |
| 5. | Conduct disaster recovery and response | • Resource mobilization<br>• Environmental refugee management<br>• Evacuation plans<br>• Search and rescue skills<br>• Disaster response authorities<br>• Recovery and reconstruction and rehabilitation of damaged resources | • Observation<br>• Oral questioning<br>• Written tests<br>• Projects<br>• Practical assignments |

**Suggested Methods of Instruction**
- Lectures
- Group discussions
- Demonstration by trainer
- Exercises by trainee

**Recommended Resources**

- Fire-fighting equipment
- Life boats
- Life-saving jackets
- Cameras
- Data
- Computer
- Stationery
- Internet

# WATER RESOURCES MANAGEMENT

**UNIT CODE: ENV/CU/MGT/CR/02/6/A**

**Relationship to Occupational Standards**

This unit addresses the unit of competency: Manage water resources

**Duration of Unit:** 60 hours

**Unit Description**

This unit describes the competencies required to manage water resources. It involves analysing water supply and demand, conserving water, monitoring water quality and controlling water pollution. It also includes managing aquatic weeds.

**Summary of Learning Outcomes**

1. Analyze water supply and demand
2. Conserve water
3. Monitor water quality
4. Control water pollution
5. Manage aquatic weeds

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

| Learning Outcome | Content | Suggested Assessment Methods |
|---|---|---|
| 1. Analyze water supply and demand | • Properties of water<br>• Uses of water<br>• Water and health<br>• Types of water sources<br>• Global water supply and distribution<br>• Water allocation<br>• Water quality supply problems<br>• Economics of water resources | • Observation<br>• Oral questioning<br>• Written tests<br>• Projects<br>• Practicals |
| 2. Conserve water | • Rain water harvesting<br>• Water conservation methods<br>• Water conservation structures<br>• Protection of water catchment areas<br>• Policies and regulations on the | • Observation<br>• Oral questioning<br>• Written tests<br>• Projects<br>• Practical |

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|---|---|---|
| | integrated water resource management (IWRM)<br>• Mathematical models for IWRM<br>• Water resource management regulations and guidelines<br>• International water laws | |
| 3. Monitor water quality | • Water quality parameters<br>• Analytical tools and standards for water quality<br>• International and local standards criteria for water quality<br>• Water quality objectives<br>• Water sampling and analysis<br>• Water treatment process<br>• Transboundary conflicts of water resources<br>• Water quality monitoring and assessment | • Observation<br>• Oral questioning<br>• Written tests<br>• Projects<br>• Practical |
| 4. Control water pollution | • Sources of water pollution<br>• Water pollution indicators<br>• Water pollution prevention measures<br>• Water policies and related regulations. (Water Act, 2016)<br>• Water pollution control measures<br>• Community sensitization | • Observation<br>• Oral questioning<br>• Written tests<br>• Projects |
| 5. Manage aquatic weeds | • Types of aquatic weeds<br>• Effects of aquatic weeds on water ecosystems<br>• Control mechanisms<br>   • Physical<br>   • Biological<br>   • Chemical<br>• Significance of aquatic weeds | • Observation<br>• Oral questioning<br>• Written tests<br>• Projects<br>• Practical |

**Suggested Methods of Instruction**
- Lectures
- Group discussions

- Demonstration by trainer
- Exercises by trainee

**Recommended Resources**
- Monitoring Equipment
- Laboratory
- Data
- Computer
- Stationery
- Internet

# ENVIRONMENTAL POLLUTION AND WASTE MANAGEMENT

**UNIT CODE: ENV/CU/MGT/CR/03/6/A**

**Relationship to Occupational Standards**

This unit addresses the unit of competency: Manage environmental pollution and waste

**Duration of Unit:** 100 hours

**Unit Description**

This unit describes the competencies required to manage environmental pollution and waste. It involves controlling air, water, soil and noise pollution. It also entails managing wastewater, solid waste, hazardous waste and e-waste and sensitizing the community.

**Summary of Learning Outcomes**

1. Control air pollution
2. Control water pollution
3. Control soil pollution
4. Control noise pollution
5. Manage wastewater
6. Manage solid waste
7. Manage hazardous waste
8. Manage e-waste
9. Sensitize community

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

| Learning Outcome | Content | Suggested Assessment Methods |
|---|---|---|
| 1. Control air pollution | • Meaning of pollution<br>• Effects of pollution to the environment<br>• Types of pollution<br>• Types of air pollutants<br>• Sources of air pollution<br>• Dispersion of pollutants<br>• Gaseous air pollutants | • Observation<br>• Oral questioning<br>• Written tests<br>• Projects<br>• Practical |

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|---|---|---|---|
| | • Inorganic air pollutants<br>• Analysis of air samples<br>• Smog forming emissions<br>• Effects of air pollution to the environment<br>• Air pollution trends<br>   • Ozone depletion<br>   • Acid rain | | |
| 2. Control water pollution | • Nature and type of water pollution<br>• Types of water pollutants<br>• BOD, COD, acidity, alkalinity, salinity<br>• Harmful effects of pollutants to water<br>• Water pollution control methods<br>• Water pollution trends<br>   • Water hyacinth<br>   • Eutrophication<br>   • Siltation | • Observation<br>• Oral questioning<br>• Written tests<br>• practical | |
| 3. Control soil pollution | • Characteristics of soil<br>• Sources of soil pollution<br>• Soil tests for determination of pollutants<br>• Treatment of polluted soil<br>• Effects of pollutants to the soil<br>• Soil pollution control measures<br>• Environmental regulations (EMCA 1999) | • Observation<br>• Oral questioning<br>• Written tests<br>• Practical | |
| 4. Control noise pollution | • Sources of noise pollution<br>• Noise meters<br>• Determination of noise pollution level<br>• Noise pollution control measures<br>• Environmental regulations (EMCA 1999) | • Observation<br>• Oral questioning<br>• Written tests<br>• Projects<br>• Practical | |

| 5. Manage wastewater | • Meaning and importance of waste management<br>• Types of waste<br>• Sources of wastewater<br>• Types of wastewater<br>• Wastewater treatment process<br>• Recovery of wastes | • Observation<br>• Oral questioning<br>• Written tests<br>• Projects<br>• Practical |
|---|---|---|
| 6. Manage solid waste | • Types of solid waste<br>• Quantities and characteristics of solid waste<br>• Solid waste collection<br>• Solid waste disposal<br>• Methods of solid waste volume reduction<br>• The 7Rs principle<br>   • Reuse<br>   • Recycle<br>   • Reduce<br>   • Repair<br>   • Rethink<br>   • Refill<br>   • Refuse | • Observation<br>• Oral questioning<br>• Written tests<br>• Projects<br>• Practical |
| 7. Manage hazardous waste | • Meaning of hazardous wastes<br>• Type of hazardous wastes<br>• Impacts of hazardous waste to the environment<br>• Hazardous waste processing and handling<br>• Transportation of hazardous waste<br>• Resource recovery alternatives<br>• Hazardous waste management facilities | • Observation<br>• Oral questioning<br>• Written tests<br>• Projects<br>• Practical |
| 8. Manage e-waste | • Types of electronic wastes<br>• E-waste management process<br>• The 7Rs principles<br>• Waste management regulations, WEEE (waste, electrical and | • Observation<br>• Oral questioning<br>• Written tests<br>• Projects<br>• Practical |

| 9. Sensitize community | • Importance of community sensitization<br>• Community mobilization and sensitization procedures<br>• Waste management policies. (EMCA, 1999 and amended EMCA 2015) | • Observation<br>• Oral questioning<br>• Written tests<br>• Projects |
|---|---|---|
| | electronic equipment) directives and guidelines | |

**Suggested Methods of Instruction**

- Lectures
- Group discussions
- Demonstration by trainer
- Exercises by trainee

**Recommended Resources**

- Monitoring Equipment
- Laboratory
- Data
- Computer
- Stationery
- Internet

## MARINE AND WETLAND RESOURCES MANAGEMENT

**UNIT CODE: ENV/CU/MGT/CR/04/6/A**

**Relationship to Occupational Standards**

This unit addresses the unit of competency: Manage marine and wetland resources

**Duration of Unit:** 90 hours

**Unit Description**

This unit describes the competencies required to manage marine and wetland resources. It involves utilizing marine resources, managing marine protected area (MPAs), classifying wetland ecosystems, conserving and restoring wetlands.

**Summary of Learning Outcomes**

1. Utilize marine resources
2. Manage marine protected area (MPAs)
3. Classify wetland ecosystems
4. Conserve wetlands
5. Restore wetlands

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

| Learning Outcome | Content | Suggested Assessment Methods |
|---|---|---|
| 1. Utilize marine resources | <ul><li>Marine ecological systems</li><li>Impact of development on marine environment</li><li>Policy legislations and international conventions</li></ul> | <ul><li>Observation</li><li>Oral questioning</li><li>Written tests</li><li>Projects</li><li>Practical assignments</li></ul> |
| 2. Manage marine protected area (MPAs) | <ul><li>Meaning and importance of MPAs</li><li>Roles and benefits of MPAs</li><li>Processes in the marine environment</li><li>Types of MPAs in East Africa</li><li>Advantages and disadvantages of transboundary MPAs</li><li>MPA management plan</li></ul> | <ul><li>Observation</li><li>Oral questioning</li><li>Written tests</li><li>Projects</li><li>Practical assignments</li></ul> |

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| | • Principles of MPA management<br>• Closure systems<br>• Regulation of activities in MPAs<br>  • Size limits and harvest limits<br>  • Gear limits<br>  • Licensing and permit<br>  • Limiting access<br>• Threats to MPAs<br>• Human impacts on marine<br>• Conflict resolution | | |
| 3. Classify wetland ecosystems | • Types and classes of wetlands<br>• Functions of wetlands<br>• Wetland ecosystems in Kenya<br>• Ramsar sites in Kenya<br>• Wetland biodiversity | • Observation<br>• Oral questioning<br>• Written tests<br>• Projects<br>• Practical assignments |
| 4. Conserve wetlands | • Guiding principles for wetland management<br>• Sustainable utilization of wetlands<br>• Process of preparing wetland management plan<br>  • Factors to consider<br>  • Stages of preparation<br>  • RAMSAR guidelines<br>  • Zonation<br>• Threats to wetlands<br>• Conventions for wetland resource management | • Observation<br>• Oral questioning<br>• Written tests<br>• Projects<br>• Practical assignments |
| 5. Restore wetlands | • Establishment of buffer zones placement<br>• Wetland mitigation<br>• Wetland conditions monitoring<br>• Wetland restoration measures<br>• Process of creation of constructed wetlands<br>• Community sensitization<br>• Wetlands monitoring | • Observation<br>• Oral questioning<br>• Written tests<br>• Projects<br>• Practical assignments |

**Suggested Methods of Instruction**

- Lectures
- Group discussions
- Demonstration by trainer
- Exercises by trainee

**Recommended Resources**

- Monitoring Equipment
- Laboratory
- Data
- Computer
- Stationery
- Internet

## RANGELAND AND WILDLIFE RESOURCES MANAGEMENT

**UNIT CODE: ENV/CU/MGT/CR/05/6/A**

**Relationship to Occupational Standards**

This unit addresses the unit of competency: Manage rangeland and wildlife resources

**Duration of Unit:** 110 hours

**Unit Description**

This unit describes the competencies required to manage rangeland and wildlife resources. It involves managing rangelands resources, wildlife, human-wildlife conflicts and developing an integrated wildlife and rangeland management plan.

**Summary of Learning Outcomes**

1. Manage rangeland resources
2. Manage wildlife
3. Manage human-wildlife conflicts
4. Develop an integrated wildlife and rangeland management plan

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

| Learning Outcome | Content | Suggested Assessment Methods |
|---|---|---|
| 1. Manage rangeland resources | • Meaning of Rangelands<br>• Characteristics of rangelands<br>• Values and threats of rangelands<br>• Rangeland resources<br>• Land use patterns<br>• Principles of sustainable rangeland management<br>• Threats and challenges of rangeland management<br>• Rangeland conditions and trends<br>• Strategies of rangeland conservation<br>• Measures for rangeland restoration | • Observation<br>• Oral questioning<br>• Written tests<br>• Projects<br>• Practical assignments |

| 2. Manage wildlife | • Wildlife diversity<br>• Wildlife ecology and management<br>• Importance and values of wildlife<br>• Methods of studying wildlife<br>• Types of wildlife management<br>• Rationale for wildlife resource management<br>• Sustainable wildlife utilization and management<br>• Captive wildlife management techniques<br>• Community wildlife management<br>• Conservation status of wildlife in Kenya<br>• Strategies of wildlife conservation in Kenya<br>• Threats and challenges facing wildlife conservation in rangelands | • Observation<br>• Oral questioning<br>• Written tests<br>• Projects<br>• Practical assignments |
| --- | --- | --- |
| 3. Manage human-wildlife conflicts | • Human interactions with wildlife<br>• Types of human-wildlife conflicts<br>• Causes of human-wildlife conflicts<br>• Ways of managing human-wildlife conflicts<br>• Wildlife policies and regulations (Wildlife Act, 2016) | • Observation<br>• Oral questioning<br>• Written tests<br>• Projects<br>• Practical assignments |
| 4. Develop an integrated wildlife and rangeland management plan | • Integrated wildlife management plan<br>  • Meaning<br>  • Importance<br>  • Content<br>• Grazing factors (carrying capacity)<br>• Strategies for Integrated Wildlife-livestock Management in rangelands<br>• Advantages and disadvantages of integrated wildlife livestock management | • Observation<br>• Oral questioning<br>• Written tests<br>• Projects<br>• Practical assignments |

**Suggested Methods of Instruction**
- Lectures
- Group discussions
- Demonstration by trainer
- Exercises by trainee

**Recommended Resources**
- Monitoring Equipment
- Tents
- Farm tools
- Maps
- Survey tools
- Data
- Computer
- Stationery
- Internet

# ENERGY RESOURCES MANAGEMENT

**UNIT CODE: ENV/CU/MGT/CR/06/6/A**

**Relationship to Occupational Standards**

This unit addresses the unit of competency: Manage energy resources

**Duration of Unit:** 80 hours

**Unit Description**

This unit describes the competencies required to manage energy resources. It involves classifying sources of energy, assessing environmental implication of energy sources, preparing energy mix plan, applying energy conservation strategies and performing energy audit.

**Summary of Learning Outcomes**

1. Classify sources of energy
2. Assess environmental implication of energy sources
3. Prepare energy mix plan
4. Apply energy conservation strategies
5. Perform energy audit

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

| Learning Outcome | Content | Suggested Assessment Methods |
|---|---|---|
| 1. Classify sources of energy | <ul><li>Importance of energy resources</li><li>Classification of energy resources<ul><li>Renewable</li><li>Non-renewable</li></ul></li><li>Types/forms of energy sources</li><li>Principles of energy development</li><li>Overview of Kenya and world energy scenarios</li></ul> | <ul><li>Observation</li><li>Oral questioning</li><li>Written tests</li><li>Projects</li><li>Practical assignments</li></ul> |
| 2. Assess environmental implication of | <ul><li>Energy and climate change</li><li>Energy production process</li><li>Environmental implications of various</li></ul> | <ul><li>Observation</li><li>Oral questioning</li><li>Written tests</li></ul> |

| | | |
|---|---|---|
| energy sources | stages of energy production | • Case studies |
| | • Mitigation measures for environmental energy issues | • Projects |
| | • Analysis of case study on energy development and utilization | • Practical assignments |
| | • Sustainable energy policies and regulations | |
| 3. Prepare energy mix plan | • Factors to consider for the choice of various energy sources | • Observation |
| | • Determination of composition of energy mix | • Oral questioning |
| | • Preparation of an energy mix plan | • Written tests |
| | | • Projects |
| | | • Practical assignments |
| 4. Apply energy conservation strategies | • Energy resource policies | • Observation |
| | • Energy saving techniques | • Oral questioning |
| | • Green energy technologies | • Written tests |
| | • Energy Act | • Projects |
| | • Institutional structures for energy development | • Practical assignments |
| | • Community sensitization | |
| 5. Perform energy audit | • Energy economics | • Observation |
| | • Determination of energy consumption and efficiency | • Oral questioning |
| | • Monitoring and regulation of energy use | • Written tests |
| | • Alternative energy sources | • Projects |
| | • Energy audit report | • Practical assignments |
| |     • Format | |
| |     • Contents | |
| |     • preparation | |

**Suggested Methods of Instruction**
- Lectures
- Group discussions
- Demonstration by trainer
- Exercises by trainee

**Recommended Resources**

- Monitoring Equipment
- Data
- Computer
- Stationery
- Internet

# FOREST RESOURCES MANAGEMENT

**UNIT CODE: ENV/CU/MGT/CR/07/6/A**

**Relationship to Occupational Standards**

This unit addresses the unit of competency: Manage forest resources

**Duration of Unit:** 70 hours

**Unit Description**

This unit describes the competencies required to manage forest resources. It involves classifying forests, establishing forests, conserving and certifying forests.

**Summary of Learning Outcomes**

1. Classify forests
2. Establish forests
3. Conserve forests
4. Certify forests

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

| Learning Outcome | Content | Suggested Assessment Methods |
|---|---|---|
| 1. Classify forests | <ul><li>Meaning and importance of forests</li><li>Types of forests and classification</li><li>Values and functions of forests</li><li>Status of different types of forests in Kenya</li><li>Watersheds in Kenya</li></ul> | <ul><li>Observation</li><li>Oral questioning</li><li>Written tests</li><li>Projects</li><li>Practical assignments</li></ul> |
| 2. Establish forests | <ul><li>Agroforestry</li><li>Tree species</li><li>Establishment and management of tree nurseries</li><li>Transplanting of seedlings</li><li>Forest mensuration</li><li>Forest sampling and estimation techniques</li></ul> | <ul><li>Observation</li><li>Oral questioning</li><li>Written tests</li><li>Projects</li><li>Practical assignments</li></ul> |

| | | |
|---|---|---|
| | • Forest practices<br>    • Afforestation<br>    • Reforestation<br>    • Regeneration<br>    • Rehabilitation<br>    • Restoration<br>• Forest biodiversity<br>• Forest biodiversity conservation | |
| 3. Conserve forests | • Principles of forest management<br>• Forest conservation, management policies and legal framework (Forest Act 2005)<br>• Forest conservation strategies<br>• Values of forests<br>    • Socio-economic<br>    • Cultural<br>    • Ecological<br>• Forest regeneration, recruitment and recovery<br>• Challenges and threats to forests in Kenya<br>• Participatory forest management<br>• Forest management plan<br>• Urban forestry<br>• Role of Community Forest Association (CFA) | • Observation<br>• Oral questioning<br>• Written tests<br>• Projects<br>• Practical assignments |
| 4. Certify forests | • Forest products<br>• Forest product utilization is licensed<br>• Forest certification principles<br>• Carbon trading<br>• Forest harvesting and marketing<br>• Markets for certifying forests<br>• Forest audits<br>• Preparation of forest audit report | • Observation<br>• Oral questioning<br>• Written tests<br>• Projects<br>• Practical assignments |

**Suggested Methods of Instruction**
- Lectures
- Group discussions
- Demonstration by trainer
- Exercises by trainee

**Recommended Resources**
- Maps
- Compass
- Survey tools
- Farm tools
- Stationery
- Internet

# ENVIRONMENTAL LAW

**UNIT CODE: ENV/CU/MGT/CR/08/6/A**

**Relationship to Occupational Standards**

This unit addresses the unit of competency: Apply environmental law

**Duration of Unit: 80** hours

**Unit Description**

This unit describes the competencies required to apply environmental laws. It involves applying environmental laws, formulating environmental laws and applying Multilateral Environmental Agreements (MEAs).

**Summary of Learning Outcomes**

1. Apply environmental laws
2. Formulate environmental laws
3. Apply Multilateral Environmental Agreements (MEAs)

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

| Learning Outcome | Content | Suggested Assessment Methods |
|---|---|---|
| 1. Apply environmental laws | • Foundations of environmental law<br>• Environmental law, policy and regulations in Kenya<br>• County environmental action plan<br>• Principles of environmental law and policy<br>• Importance of environmental law and policy<br>• Sources of environmental law in Kenya<br>• Environmental rights<br>• Environmental offences and penalties<br>• National environmental policies and regulations | • Observation<br>• Oral questioning<br>• Written tests |

| | | | | |
|---|---|---|---|---|
| | • Compliance and enforcement mechanisms for environmental laws<br>• Relationship between EMCA and sectoral laws. (Wildlife Act 2016, Water Act 2002, Forest Act 2005, Fisheries Act 2016, Public Health Act, Land Act, Agriculture Act 2012, Physical planning Act 2012)<br>• Environmental legal framework<br>• Mandate and roles of different institutions established under the EMCA amended 2015<br>• Environmental management at county levels<br>• Restoration orders and easements | | |
| 2. Formulate environmental law | • Stages in formulation of environmental laws and policies<br>• Role of the government in law formulation<br>• Implementation of environmental laws<br>• Challenges of law enforcement<br>• Environmental litigation | | • Observation<br>• Oral questioning<br>• Written tests<br>• |
| 3. Apply Multilateral Environmental Agreements (MEAs) | • Sources of international laws<br>• Role of Multilateral Environmental Agreements (MEAs)<br>• Challenges of domestication and Implementation of MEAs<br>• Implementation of international environmental laws | | • Observation<br>• Oral questioning<br>• Written tests |

**Suggested Methods of Instruction**
- Lectures
- Group discussions
- Demonstration by trainer
- Exercises by trainee

**Recommended Resources**
- Research material

- Case studies
- Environmental Records
- Stationery
- Internet

# GREENHOUSES MANAGEMENT

**UNIT CODE: ENV/CU/MGT/CR/09/6/A**

**Relationship to Occupational Standards**

This unit addresses the unit of competency: Manage greenhouses

**Duration of Unit:** 70 hours

**Unit Description**

This unit describes the competencies required to manage greenhouses. It involves designing greenhouses, establishing greenhouses, managing greenhouse crops and maintaining greenhouses.

**Summary of Learning Outcomes**

1. Design greenhouses
2. Establish greenhouses
3. Manage greenhouse crops
4. Maintain greenhouses

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

| Learning Outcome | Content | Suggested Assessment Methods |
|---|---|---|
| 1. Design greenhouses | • Meaning of greenhouse <br> • Significance of greenhouse technology <br> • Greenhouse types and designs. <br> • Site location <br> • Greenhouse Techniques | • Observation <br> • Oral questioning <br> • Written tests <br> • Projects <br> • Practical assignments |
| 2. Establish greenhouses | • Factors that determine Greenhouse establishment. <br> • Materials of greenhouse construction. <br> • Greenhouse construction procedures <br> • Installation of greenhouse apparatus <br> • Establishment of nursery beds | • Observation <br> • Oral questioning <br> • Written tests <br> • Projects <br> • Practical assignments |

| 3. Manage greenhouse crops | • Collection, preparation and treatment of plant propagules like seeds.<br>• Flower survey<br>• Seed collection.<br>• Seed testing.<br>• Seed Extraction, preparation and viability testing and storage.<br>• Seed pre-treatment methods.<br>• Methods of vegetative propagation.<br>• Tissue culture techniques<br>• Preparation of Germinating Media<br>• Methods of Media sterilization.<br>• Irrigation techniques<br>• Pest and diseases and weed control<br>• Product value chain | • Observation<br>• Oral questioning<br>• Written tests<br>• Projects<br>• Practical assignments |
| 4. Maintain greenhouses | • Maintenance of Greenhouse<br>• Greenhouse management practices<br>• Greenhouse repairs and fixtures<br>• Cooling and heating methods.<br>• Record keeping | • Observation<br>• Oral questioning<br>• Written tests<br>• Projects<br>• Practical assignments |

**Suggested Methods of Instruction**
- Lectures
- Group discussions
- Demonstration by trainer
- Exercises by trainee

**Recommended Resources**
- Farm tools
- Survey tools
- Irrigation kits
- Pipework
- Filters

# FISHERIES RESOURCE MANAGEMENT

**UNIT CODE: ENV/CU/MGT/CR/10/6/A**

**Relationship to Occupational Standards**

This unit addresses the unit of competency: Manage fisheries resources

**Duration of Unit:** 80 hours

**Unit Description**

This unit specifies the competencies required to manage fisheries resources. It involves classifying fish, developing fisheries management plan, managing fish farm, harvesting, processing and marketing fish.

**Summary of Learning Outcomes**

1. Classify fish
2. Develop fisheries management plan
3. Manage fish farm
4. Harvest fish
5. Process and market fish

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

| Learning Outcome | Content | Suggested Assessment Methods |
|---|---|---|
| 1. Classify fish | <ul><li>Types of fish</li><li>Fishery sectors in Kenya<ul><li>Characteristics of fishery sectors</li><li>Strengths and weaknesses</li></ul></li><li>Historical development of fishery development in Kenya</li><li>Types of fish ponds</li><li>Importance of culture fisheries</li><li>Threats and challenges facing fishery sectors</li><li>Fisheries sectoral laws</li></ul> | <ul><li>Observation</li><li>Oral questioning</li><li>Written tests</li><li>Projects</li><li>Practical assignments</li></ul> |

| | | |
|---|---|---|
| 2. Develop fish management plan | • Meaning of management plan<br>• Importance of management plan<br>• Steps of management planning<br>• Role of management plan in resource use<br>• Conflict management | • Observation<br>• Oral questioning<br>• Written tests<br>• Projects<br>• Practical assignments |
| 3. Manage fish farm | • Types of fish feeds<br>• Fish feeding procedures<br>• Fish stock management<br>• Fish sex change/reversal<br>• Water and wastewater management<br>• Pond maintenance<br>• Aquatic weed control<br>• Predation control<br>• Pest and disease control<br>• Record keeping | • Observation<br>• Oral questioning<br>• Written tests<br>• Projects<br>• Practical assignments |
| 4. Harvest fish | • Fishing gears<br>• Fishing methods<br>• Post-harvest handling of fish<br>• Fish preservation methods<br>• Fish storage facilities | • Observation<br>• Oral questioning<br>• Written tests<br>• Projects<br>• Practical assignments |
| 5. Process and market fish | • Market survey<br>• Fish value chain<br>• Scale removal procedures<br>• Packaging of fish<br>• Good housekeeping<br>• Fish waste management | • Observation<br>• Oral questioning<br>• Written tests<br>• Projects<br>• Practical assignments |

**Suggested Methods of Instruction**
- Lectures
- Group discussions
- Demonstration by trainer
- Exercises by trainee

**Recommended Resources**
- Fish farm
- Fish ponds

- Fishing gears
- Preservation equipment
- Fish packaging
- Pipework