21.2.0 ENGINEERING DRAWING AND DESIGN

21.2.01 Introduction

Engineering drawing is a type of technical drawing that is created in accordance with standardised conventions whose purpose is to accurately and unambiguously capture all the geometric features of a product or a component. The module unit is intended to assist the trainee in developing the abilities to design, draw and interpret electrical circuit drawings, understand common electrical/ electronic symbols, communicate ideas in electrical engineering and recognize related Kenya Bureau of standards specifications as well as International Standards Organization (ISO).

21.2.02 General Objectives

At the end of the course unit, the trainee should be able to:

a) Produce drawings in Isometric, Oblique, perspective and orthographic using computer
b) Demonstrate understanding by correctly drafting electronic drawing /electrical installation circuits using the computer.

21.2.03 Module Unit Summary and Time Allocation

Engineering Drawing and Design

Code	Sub Module Unit	Content	Time Hrs
22.2.1	Geometry	• Plane • Solid	6
22.2.2	Symbols & Circuits	• Electrical and electronics symbols • Motor connection and motor control circuits • Lighting switching arrangements • Schematic circuits	8
22.2.3	Design	• Principles of PCB design • Electronic circuits	6
22.2.4	Electronic circuits	• Manual sketch Processing • PCB layout drawing.	8
22.2.5	Computer Aided Electronic Drafting	• Introduction to computer aided drawing • Drafting software • PCB Drawing • Making printed circuit boards • Simulation of electronic circuits	16
Total Time			**44**

21.2.1 GEOMETRY

Practice

21.2.1P0 *Specific Objectives*
By the end of the sub module unit the trainee should be able to:
a) draw in plane geometry various diagram using the computer
b) draw in solid geometry various diagram using the computer

Content
21.2.1P1 Drawing diagram in plane geometry using computer
i) Line
ii) Regular polygons
iii) Circles
iv) hyperbola
21.2.1P2 Drawing diagram in plane geometry using computer
i) Isometric
ii) Oblique

21.2.1C Competence
The trainee should have the ability to: draw geometric figures using a computer

Suggested teaching/Learning Activities
- Illustration
- Practical exercise

Suggested teaching/Learning Resources
Drawing instruments and materials

Suggested Evaluation Methods
- Oral tests
- Assignments
- Timed practical tests

21.2.2 SYMBOLS & CIRCUITS

Practice

21.2.2P0 *Specific Objectives*
By the end of the sub module unit the trainee should be able to:
a) identify various symbols used in electrical and electronic circuits.
b) draw motor and control circuits
c) draw light switching circuits

Content
21.2.2P1 Identification of electronic symbols
21.2.2P2 Drawing Motor and motor control circuits
21.2.2P3 Drawing Light Switching Circuits
- Drawing schematic circuits

21.2.2C Competence
The trainee should have the ability to: draw Motor and motor control circuits, Light Switching Circuits and electronic circuits

Suggested teaching/Learning Activities
- Illustration
- Demonstration
- Practical exercise

Suggested teaching/Learning Resources

- Electronic devices
- Electronic components
- Computer and computer drawing software
- Drawing instruments and materials

Suggested Evaluation Methods
- Oral tests
- Timed written tests
- Assignments
- Timed practical tests

21.2.3 DESIGN

Practice

21.2.3P0 *Specific Objectives*
By the end of the sub module unit the trainee should be able to:
a) explain the principles of PCB design
b) correctly sketch and draw connection drawing for electronic circuits

Content
21.2.3P1 Principles of PCB design
21.2.3P2 Electronic circuits

21.2.3C Competence
The trainee should have the ability to: draw Electronic circuit design circuits, motor and control circuits and light switching circuits

21.2.4 ELECTRONIC CIRCUITS

Practice

21.2.4P0 *Specific Objectives*
By the end of the sub module unit the trainee should be able to:
a) draw manual sketch of tracks (single side)
b) construct PCB layout drawing

Content
21.2.4P1 Manual Processing
21.2.4P2 Drawing PCB layout

21.2.4C Competence
The trainee should have the ability to: prepare a printed circuit board

Suggested teaching/Learning Activities
- Discussion
- Demonstration

Suggested Teaching and Learning Resources
- Copper boards

Suggested Evaluation Methods
- Assignments
- Timed practical tests

21.2.5 ELECTRONIC DRAFTING

Practice

21.2.5P0 *Specific Objectives*
By the end of the sub module unit the trainee should be able to:

a) explain the basics of computer aided drawing
b) apply computer software in electronic drafting
c) draw of PCB circuits
d) develop printed circuit boards
e) simulate electronic circuits

- Project

Content

21.2.5P1 Computer aided drawing
21.2.5P2 Using Software in electronic drafting
21.2.5P3 Drawing PCB Circuits
21.2.5P4 Developing Printed Circuit Boards
21.2.5P5 simulation of electronic circuits

21.2.5C Competence

The trainee should have the ability to: develop printed circuit boards

Suggested teaching/Learning Activities

- Discussion
- Question and answer
- Demonstration
- Observation
- Practical exercise

Suggested teaching/Learning Resources

- Electronic devices
- Electronic components
- Computer and drawing software

Suggested Evaluation Methods

- Oral tests
- Assignments
- Timed practical tests