Republic of Rwanda
Ministry of Education

RTB | RWANDA TVET BOARD

BASICS OF TECHNICAL DRAWING

GENTD401

Apply Basics of Technical Drawing

Competence

RQF Level: 4

Learning Hours 50

Credits: 5

Sector: ICT and Multimedia

Trade: Networking and Internet Technologies

Module Type: General

Curriculum: ICTNIT4001-TVET Certificate IV in Networking and Internet Technologies

1200

Issue Date: September 2023

<table>
<tr><td>Purpose statement</td><td colspan="6">This module describes the skills, knowledge and attitude required to apply basics of technical drawing. This module is intended to prepare Leaner pursuing TVET Level 4 in Networking and Internet Technologies.
At the end of this module learner will be able to Identify drawing materials, instruments, and equipment; Draw symbols, geometric figures and solids used in technical drawing and Apply 2 and 3 dimensions.</td></tr>
<tr><td>Learning assumed to be in place</td><td colspan="6">N/A</td></tr>
<tr><td rowspan="6">Delivery modality</td><td>Training delivery</td><td colspan="2">100%</td><td>Assessment</td><td colspan="2">Total 100%</td></tr>
<tr><td>Theoretical content</td><td colspan="2">30%</td><td rowspan="4">• Formative assessment</td><td>30%</td><td rowspan="4">100%</td></tr>
<tr><td>Practical work:</td><td colspan="2" rowspan="3">70%</td><td rowspan="3">70%</td></tr>
<tr><td>• Group work and presentation</td><td>20%</td></tr>
<tr><td>• Individual Work</td><td>50%</td></tr>
</table>

Elements of Competency and Performance Criteria

Elements of competency	Performance criteria
1. Identify materials, instruments and equipment	1.1. Drawing materials are properly identified according to their uses.
	1.2. Drawing instruments are properly identified according to their uses.
	1.3. Drawing equipment are properly identified according to the task assigned.
2. Draw symbols, geometric figures and solids used in technical drawing	2.1. Drawing sheet layout is properly presented according to the ISO standards.
	2.2. The symbols and geometric figures are accurately drawn according to their style.
	2.3. Lettering is effectively applied according to the user need.
	2.4. Scales are accurately applied in technical drawing according to the ISO standards.
	2.5. Dimensions are properly described according to technical drawings standards.
3. Apply 2 and 3 dimensions	3.1. 2D and 3D are properly described based on the object provided.

	3.2. Projections are properly differentiated based on their standards.
	3.3. Views and sections are correctly drawn according to the object provided.

Intended Knowledge, Skills, and Attitude		
Knowledge	**Skills**	**Attitude**
✓ Define Drawing Technical Terminologies ✓ Describe Geometric Principles ✓ Describe Dimensioning concepts ✓ Define CAD (Computer-Aided Design) ✓ Define Projection Methods ✓ Describe Symbols and Abbreviations ✓ Identify Drawing Instruments ✓ Describe lettering classifications	✓ Represent object graphically ✓ Draw geometric figures ✓ Apply drawing dimensions ✓ Scale graphical object ✓ Interpret design ✓ Create geometrical shapes ✓ Apply lettering styles	✓ Innovation ✓ Attention to Accuracy ✓ Attention to Detail ✓ Adaptability ✓ Ethical Mindset ✓ Persistence ✓ Self-motivation ✓ Creativity ✓ Patience ✓ Critical thinking

Course content

Learning outcomes	At the end of this module the learner will be able to:
	1. Identify drawing materials, instruments and equipment. 2. Draw symbols, geometric figures and solids used in technical drawing. 3. Apply 2 and 3 dimensions.

Learning outcome 1: Identify drawing materials, instruments and equipment	Learning hours: 10

Indicative content

- **Identification of drawing materials**
  - ✓ Definition of drawing materials
  - ✓ Common drawing materials and their uses
- **Identification of drawing instruments**
  - ✓ Definition of drawing instruments
  - ✓ Common drawing instruments and their uses
- **Identification of drawing equipment**
  - ✓ Definition of drawing equipment
  - ✓ Common drawing equipment and their uses

Resources required for the learning outcome

Equipment	▪ Drawing board ▪ Mini-Drafter
Materials	▪ Paper ▪ Rubber ▪ Pen ink ▪ Propelling pencil

	▪ Drawing pencil.
Tools /instruments	▪ Ink-pen ▪ Paper cuter ▪ One-meter straight drawing ruler with handle ▪ Right angle ruler ▪ Protractor ▪ Drawing Compass ▪ Engineering Pencils ▪ Drawing Template ▪ French curves ▪ Set squares ▪ T square ▪ Paper holder ▪ Mathematical set Instruments
Facilitation techniques	▪ Brainstorming ▪ Individualized ▪ Trainer guided ▪ Group discussion
Formative assessment methods	▪ Written assessment ▪ Oral presentation

Learning outcome 2: Draw symbols, geometric figures and solids used in technical drawing	Learning hours: 20

Indicative content

- **Description of drawing sheet**
  - ✓ Definition
  - ✓ Drawing sheet types and their dimensions
  - ✓ Parts of drawing sheet layout
    - Margin
    - Title block
    - Borders and Frames

- **Identification of symbols and geometric figures in engineering drawing**
  - ✓ Description of geometric figures
    - Point
    - Types of lines and their uses
    - Angles and their types
    - Triangles and their types
    - Quadrilaterals and their proprieties
  - ✓ Drawing geometric figures
    - Point
    - Lines (Horizontal, Vertical, Oblique, curved, parallel, perpendicular)
    - Angles (Acute, Right, Obtuse, Straight, Reflex, Adjacent, complementary and supplementary)
    - Triangles (Equilateral, Isosceles, scalene, acute-angled, obtuse-angled, right-angled)
    - Quadrilaterals (Square, Rectangle, Rhombus/ parallelogram, Trapezoid, Trapezium/Kite, circles and arcs)
  - ✓ Description of Engineering Drawing Symbols
  - ✓ Drawing engineering drawing symbols
  - ✓ Description of solid object
    - Definition of solid object
    - Types of solids
  - ✓ Drawing solid objects
    - Polyhedrons (cube, Prism, pyramid)

- Solids of revolution (sphere, cylinder, cone)

- **Drawing Lettering**
  - ✓ Features of lettering
  - ✓ Classification of lettering
  - ✓ Style of freehand lettering
- **Application of drawing scale**
  - ✓ Description of drawing Scales
  - ✓ Types of Scaling
    - Full scale
    - Enlarging scale
    - Reducing scale
  - ✓ Scale Representation
- **Application of drawing dimensions**
  - ✓ Types of dimensions
  - ✓ Method of dimensioning
  - ✓ Elements of dimensioning
  - ✓ Function of dimensions
  - ✓ Rules of dimensioning

Resources required for the learning outcome	
Equipment	▪ Drawing board ▪ Drawing table
Materials	▪ Paper ▪ Ink-pen ▪ Rubber ▪ Drawing Pencil
Tools/Instruments	▪ Template ▪ Ink-pen ▪ One-meter straight drawing ruler with handle

	▪ Right angle ruler ▪ Protractor ▪ Drawing Compass ▪ Drafting Pencil ▪ Drawing Template ▪ French curves ▪ Letter tracing ▪ Set squares ▪ Calculator ▪ T square ▪ Paper holder ▪ Mathematical set Instruments
Facilitation techniques	▪ Demonstration ▪ Individualized ▪ Brainstorming ▪ Group discussion
Formative assessment methods	▪ Oral presentation ▪ Written assessment ▪ Performance based assessment

Learning outcome 3: Apply 2 and 3 dimensions	Learning hours: 20

Indicative content

- **Description of 2D and 3D**
  - ✓ Definition
  - ✓ Difference between 2D and 3D Shapes
  - ✓ Applications of 2D and 3D shapes
  - ✓ Formulas of 2D and 3D shapes
- **Types of projections**
  - ✓ Pictorial Projection
    - Perspective
    - Axonometric
    - Oblique
  - ✓ Orthographic projection
    - Plane of Projections
    - Angles of Projections
    - Dimensions of Object Views
- **Views and Sections of objects**
  - ✓ Front and Rear view
  - ✓ Sides view
  - ✓ Isometric view
  - ✓ Top and Bottom
  - ✓ Longitudinal section
  - ✓ Transversal section

Resources required for the Learning outcome

Equipment	▪ Drawing board ▪ Drawing table
Materials	▪ Paper ▪ Rubber

	▪ Pencil
Tools/Instruments	▪ White boards ▪ Marker pens ▪ Calculator ▪ Scale rulers ▪ Pencils ▪ Rubber ▪ Drawing Compass ▪ T square ▪ Protractor ▪ Pencil sharpener ▪ Mathematical set instruments
Facilitation techniques	▪ Demonstration ▪ Brainstorming ▪ Individual ▪ Trainer guided ▪ Group discussion
Formative assessment methods	▪ Oral presentation ▪ Written assessment ▪ Performance based assessment

References

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