Republic of Rwanda
Ministry of Education

RTB | RWANDA TVET BOARD

FPACD
501

COMPUTER AIDED DESIGN

APPLY COMPUTER AIDED DESIGN

RQF Level: 5

Learning hours
40

Credits:4

Sector: **ARTS AND CRAFTS**

Trade: **FINE AND PLASTIC ARTS**

Module Type: General

Curriculum: **ARCFPA5001- TVET Certificate 5 in FINE AND PLASTIC ARTS**

2024-25

Issue Date: JUNE 2024

Purpose statement	This module offers knowledge, skills and attitudes to apply Computer Aided Design. At the end of this module, the learners will be able to perform ARCHICAD drawing, perform AutoCAD drawing, perform CHIEF ARCHITECT drawing and perform SKETCHUP drawing					
Learning assumed to be in place	Sketch and computer skills.					
Delivery modality	Training delivery		100%	Assessment		Total 100%
	Theoretical content		30%	Formative assessment	30%	100%
	Practical work:		70%		70%	
	Group project and presentation	20%				
	Individual project /Work	50%				
	NA					

Elements of Competency and Performance Criteria

Elements of competency	Performance criteria
1. Perform ArchiCAD drawing	1.1. The theme is properly identified based on project.
	1.2. The floor plan is properly created according to the project theme.
	1.3. The structure is properly designed according to the building elements.
	1.4. The annotation elements and details are properly added according to the standards.
	1.5. The blueprint is properly exported according to the format
2. Perform AutoCAD drawing	2.1. The theme is properly identified based on project.
	2.2. The floor plan is properly created according to the project theme
	2.3. The structure is properly designed according to the building elements.
	2.4. The annotation elements and details are properly added according to the standards
	2.5. . The blueprint is properly exported according to the format
3. Perform Chief Architect drawing	3.1. The theme is properly identified based on project .
	3.2. The floor plan is properly created according to the project theme.
	3.3. The structure is properly designed according to the building elements.
	3.4. The annotation elements and details are properly added according to the standards.
	3.5. The blueprint is properly exported according to the format.
4. Perform Sketchup drawing	4.1. The theme is properly identified based on project.
	4.2. The floor plan is properly created according to the project theme

	4.3.	The structure is properly designed according to the building elements.
	4.4.	The annotation elements and details are properly added according to the standards
	4.5.	The rendering and estimation cost are properly applied in accordance to the standard.
	4.6.	The blueprint is properly exported according to the format

Knowledge	Skills	Attitudes
ESSENTIAL KNOWLEDGE • Identify the theme • Create a floor plan • Design building elements • Add annotation elements and detail • Export blueprint	**ESSENTIAL SKILLS** • Perform project theme • Use tools and scale • Create building elements • Work with annotation • Print on paper format	**WORKER BEHAVOUR/ATTITUDES** • Pay attention to identify the theme/client needs • Use creativity and innovation throughout creating a floor plan • Be punctuality during the creating building elements. • Demonstrate usefulness in annotation • Pay attention to use printer

Course content	
Learning outcomes	**At the end of the module the learner will be able to**: 1. Perform Archicad drawing 2. Perform Autocad drawing 3. Perform chief architect drawing 4. Perform Sketchup building
1. Learning outcome 1: Perform ARCHICAD drawing	Learning hours: 20
Indicative content	

- **Identification of theme**

✓ Project theme
- Residential building
- Industrial building
- Commercial building
- Educational building
- Institutional building

✓ Steps of project setting
- Options
- Project preferences
- Working units &dimension

- **Creation of floor plan**

✓ Toolbox
- Design tool
- Document tool
- More tool

✓ Info box
✓ Coordinate box
✓ Control box
✓ Navigator
✓ Scale types
- Reduced scale
- Enlarged scale
- Full scale

- **Design building elements**

- ✓ Element of building
  - Building slab
  - Walls and columns
  - Doors and windows
  - Stairs
  - Ceiling
  - Roof plan
  - Furnitures and equipment
- ✓ Types of section
  - Cross section
  - Longitudinal section
  - Horizontal section
  - Vertical section
  - Offset section
- ✓ Types of elevation
  - Front elevation
  - Behind elevation
  - Left side elevation
  - Right side elevation
- ✓ Types of perspective
  - Front perspective
  - Back perspective

- **Adding annotation elements and detail**

- ✓ Standard annotation types
  - Text
  - Label
  - Leader
  - Fills
  - Grid
  - Figures
  - Objects
- ✓ Types of dimension
  - Linear dimension
  - Elevation dimension
  - Level dimension
  - Radial dimension
  - Angle dimension

- **Exporting blueprint**

- ✓ Paper format
  - A_4
  - A_3
  - A_2
  - A_1
  - A_0
- ✓ Layout in ArchiCAD
  - Document

- Layout book
- New Master layout

✓ Printing in ArchiCAD
- Print command
- Plot command
- Publisher

Resources required for the learning outcome	
Equipment	Computers, projector, Printer.
Materials	Paper ,ink
Tools	Pens, pencil, Isograph, compactable ArchiCAD software
Facilitation techniques	Demonstration and simulation, video aids on ArchiCAD, Individual and group work, Practical exercise on using ArchiCAD Software, Group discussion on ArchiCAD
Formative assessment methods	Written assessment, Oral presentation, Performance assessment, project based assessment

Learning outcome 2: Perform AUTOCAD drawing	Learning hours: 10

Indicative content

- **Identification of theme**

✓ Theme of project setup
- Residential building
- Educational building
- Commercial building
- Industrial building

✓ Steps of project setup and setting
- Settings
- Project name

- **Creation of floor plan**

✓ Types of AutoCAD workspaces
- 2Ddrafting and annotation
- Initial setup workspace
- AutoCAD classic
- 3D modelling

✓ Use precision tools (Status bar)
- Snap
- Grid
- Object Snap Tracking
- Dynamic User Coordinate System
- Dynamic Input
- Line Weight
- Quick Properties

- Ortho
- Polar Tracking
- Object Snap

✓ Communication with AutoCAD
- Command line
- Specify command options
- Execute commands
- Repeat command
- Cancel command

✓ Menu bar
- File
- Edit
- View
- Insert

✓ Toolbars
- Draw
- Layers
- Modify
- Properties
- Standard
- Styles

✓ Modify commands (level I)
- Move
- Copy
- Scale
- Rotate
- Fillet
- Chamfer
- Offset
- Trim
- Extend
- Break
- Break at point

✓ Modify commands (level II)
- Array
- Mirror
- Sketch
- Pedit
- Explode
- Lengthen
- Join

✓ Scale types
- Reduced scale
- Enlarged scale
- Full scale

- **Designing of building elements**

- ✓ Element of building
  - Walls
  - Columns
  - Doors and windows
  - Roofs plan
- ✓ Types of Section
  - Cross section
  - Longitudinal section
- ✓ Types of Elevations
  - Front elevation
  - Back elevation
  - Left side elevation
  - Right side elevation
- ✓ Types of perspective
  - Front perspective
  - Back perspective

- **Adding annotation elements and detail**

- ✓ Standard annotation types
  - Notes
  - Labels
  - Hatches
  - Leader
  - Table
  - Blocks
- ✓ Basic dimension commands
  - Linear
  - Aligned
  - Arc Length
  - Ordinates
  - Radius
  - Diameter
  - Angular
  - Quick dimension
  - Continue
  - Baseline

- **Exporting blueprint**

- ✓ Paper format
  - A_4
  - A_3
  - A_2
  - A_1
  - A_0
- ✓ Layout in AutoCAD
  - Model space
  - Paper space
  - Page setup

- Viewport

✓ Printing in AutoCAD
- Print command
- Plot command
- Publisher

Resources required for the indicative content	
Equipment	Computers , projector, Printer
Materials	Paper , ink
Tools	Pens, pencil, Isograph, compactable AutoCAD software
Facilitation techniques	Demonstration and simulation, video aids on AutoCAD, Individual and group work, Practical exercise on using AutoCAD Software, Group discussion on AutoCAD
Formative assessment methods	Written assessment, Oral presentation, Performance assessment, project based assessment.

Learning outcome 3: Perform CHIEF ARCHITECT drawing	Learning hours: 5

Indicative content

- **Identification of theme**

✓ Theme of project setup
- Residential building
- Educational building
- Commercial building
- Industrial building

✓ Project setting steps
- Edit
- Default setting

- **Creation of floor plan**

✓ Toolbar
- Wall tool
- Door tool
- Window tool

✓ Modification tools
- Push/Pull
- Offset
- Rotate

✓ Scale types
- Reduced scale
- Enlarged scale
- Full scale

- **Designing of building elements**

✓ Element of building
  - Wall and column
  - Doors and windows
  - roof

✓ Types of Section
  - Vertical section
  - Horizontal section
  - Cross section
  - Longitudinal section

✓ Types of elevation
  - Front elevation
  - Back elevation
  - Right /left side elevation

- **Adding annotation elements and detail**

✓ Standard annotation types
  - Text
  - Label
  - Hatches

✓ Dimension types
  - Elevation dimension
  - Angular dimension
  - Interior dimension
  - Exterior dimension

- **Exporting blueprint**

✓ Paper format
  - A_4
  - A_3
  - A_2
  - A_1
  - A_0

✓ Printing in CHIEF ARCHITECT drawing
  - Print command
  - Plot command
  - Publisher

Resources required for the indicative content	
Equipment	Computers , projector, Printer
Materials	Paper , ink
Tools	Pens, pencil, Isograph, compactable CHIEF ARCHITECT software
Facilitation techniques	Demonstration and simulation, video aids on CHIEF ARCHITECT, Individual and group work, Practical exercise on using CHIEF ARCHITECT Software, Group discussion on CHIEF ARCHITECT
Formative assessment	Written assessment, Oral presentation, Performance assessment, project based

methods	assessment.

Learning outcome 4: **Perform SKETCHUP BUILDING**	Learning hours: 5

Indicative content

- **Identification of theme**

✓ Theme of project setup
  - Residential building
  - Educational building
  - Commercial building
  - Industrial building

✓ Project setting steps
  - Sketchup
  - Preferences (MacOS) from the menu bar

- **Creation of floor plan**

✓ Toolbar
  - Sandbox
  - Section
  - Shadows
  - Measurement
  - Standard
  - View
  - Drawing
  - construction

✓ Menu bar
  - File
  - Edit
  - View
  - Camera

✓ Scale types
  - Reduced scale
  - Enlarged scale
  - Full scale

- **Designing of building elements**

✓ Element of building
  - Wall
  - Doors and windows
  - Roof

✓ Types of Section
  - Vertical section
  - Horizontal section
  - Cross section
  - Longitudinal section

✓ Types of elevation

- Front elevation
- Back elevation
- Right /left side elevation

✓ Types of perspective
- Front perspective
- Back perspective

- **Adding annotation elements and detail**

✓ Standard annotation types
- Text
- Label
- Hatches
- Leader line

✓ Dimension types
- Linear dimension
- Angular dimension
- Ordinate dimension

- **Applying rendering**

✓ Types of rendering
- Realistic rendering
- 3D rendering
- Shaded rendering

✓ Function of rendering

- **Applying estimation cost**

✓ Identification of measurement units
✓ Breakdown of building components
✓ Quantification of building materials

- **Exporting blueprint**

✓ Paper format
- A_4
- A_3
- A_2
- A_1
- A_0

✓ Printing in SKETCHUP drawing
- Print command
- Plot command
- Publisher

Resources required for the indicative content	
Equipment	Computer , projector, Printer.
Materials	Paper , ink
Tools	Pens, pencil, Isograph, compactable SKETCHUP software
Facilitation techniques	Demonstration and simulation, video aids on SKETCHUP, Individual and group work, Practical exercise on using SKETCHUP Software, Group discussion on SKETCHUP

Formative assessment methods	Written assessment, Oral presentation, Performance assessment, project based assessment.

Reference:

1. AutoCAD 2016 and AutoCAD LT 2016, Scott On Stott, Published simultaneously in Canada (ISBN: 978-1-119-05918-9).
2. https://www.youtube.com/results?search_query=tools+for+dimensioning+in+chief+architect+x14
3. https://www.youtube.com/results?search_query=dimensioning+in+sketchup.
4. https://www.youtube.com/results?search_query=SETUP+IN+CHIEF+ARCHITECT
5. https://blogs.autodesk.com/autocad/hitchhikers-guide-basics-of-autocad-notesandlabels/on 27th July 2020
6. https://knowledge.autodesk.com/support/autocad/getting/started/caas/CloudHelp/ cloud help/2019. on 27th July 2020