Republic of Rwanda
Ministry of Education

RTB | RWANDA TVET BOARD

BASICS CONSTRUCTION SKILLS

RENCS301

Apply basics construction skills

Competence

RQF Level: 3

Learning Hours 50

Credits: 5

Sector: Energy

Trade: Renewable Energy

Module Type: General

Curriculum: ENGREN3001- TVET Certificate 3 in Renewable energy

Copyright: © Rwanda TVET Board, 2022

Issue Date: April 2022

Purpose statement	This is module describes the skills, knowledge and attitude to be acquired by the learner to perform work by conducting pre work activities, Preparing motor and erect brick wall in order to construct good quality brick wall . According to the standards, the learner will be able to choose appropriate material and has enough knowledge and skills of using tools and equipment.					
Delivery modality	**Training delivery**		**100%**	**Assessment**		**Total 100%**
	Theoretical content		30%	Formative assessment	30%	50%
	Practical work:		70%		70%	
	• Group project and presentation	20%				
	• Individual project /Work	50%				
				Summative Assessment		50%

Elements of Competency and Performance Criteria

Elements of competency	Performance criteria
1. Conduct construction pre-work activities	1.1. Tools, materials and Equipment are appropriately selected according to the wok
	1.2. Mixing place is adequately prepared as per standard.
	1.3. Safety equipment, signs and posts are appropriately positioned according to the standards.
2. Prepare mortar	2.1. Mix ratio is relevantly identified according to the type of work.
	2.2. Mixing batch is prepared correctly with the reference to the mixing ratio.
	2.3. Ingredients are precisely quantified according to the mix ratio.
	2.4. Mortar mixing is relevantly done according to the standard.
	3.1. Interpretation of drawing is relevantly done according to the standards.

3. Elevate brick walls and	3.2. Setting out of walls is adequately done according to the drawing.
	3.3. Brick lying is systematically done according to the type of bond.
	3.4. Systematic construction of lintels, Arches, piers and pillars according to the standards
	3.5. Tools, materials and equipment are properly cleaned according to the standards.
4. Apply tiles and basic plastering skills	4.1. Surface area is accurately prepared
	4.2 Plastering procedure is applied adequately according to the standards.
	4.3 Tiles are applied appropriately
	4.4 Joints are jointed appropriately
	4.5 Tools, equipment and work place are correctly cleaned

Learning outcomes	**At the end of the module the learner will be able to:** 1. Conduct construction pre-work activities 2. Prepare mortar 3. Elevate brick walls 4. Apply tiles and basic plastering skills
Learning outcome 1: Conduct pre-work activities	**Learning hours: 5**
Indicative content	
• **Selection of tools, materials and Equipment:** ✓ Identification of tools, materials and Equipment used to erect brick masonry ✓ Use of tools, materials and Equipment ✓ Maintenance of tools, materials and Equipment • **Preparation of mixing place:** **Requirement of mixing** ✓ Hard core ✓ Paved	

- ✓ Accessible
- ✓ Rounded shape

- **Position safety Equipment, signs and posts**
  - PPE
  - Types of sign post

Resources required for the learning outcome	
Equipment	▪ Computers, Projector, Projection screen, Printers
Materials	▪ Chalks,Pens, Books, Papers, Flip-chart, Books Helmet, Gloves ,Safety shoes, Overall ,Ear plug ,Face mask ,Prohibition sign posts ,Warning sign posts ,Mandatory sign posts ,Emergency sign posts
Tools	▪ Wokshop,Site, Internet
Facilitation techniques	▪ Demonstration and simulation ▪ Individual and group work ▪ Practical exercise ▪ Individualized ▪ Trainer guided ▪ Group discussion
Formative assessment methods	▪ Written assessment ▪ Oral presentation ▪ Performance assessment ▪ Product based assessment ▪ Project based assessment

Learning outcome 2: Prepare mortar	Learning hours: 10

Indicative content

- **Identification of mixing ratio**
  - ✓ Meaning of mixing ratio
  - ✓ Proportion of mixing ratio
  - ✓ Application of mixing ratio
- **Preparation of mixing batch**
  - ✓ Meaning of batching
  - ✓ Methods of batching
    - Volumetric batching
    - Weigh batching
- **Quantification of Ingredients**
  - ✓ Ingredients
    - Cement
    - Sand
    - Lime
    - Water
    - Murrum
  - ✓ Quantification method
    - Volumetric method
    - Area method
- **Mix Mortar**
  - ✓ Types of Mortar
  - ✓ Cement mortar
  - ✓ Lime mortar
  - ✓ Cement lime mortar
  - ✓ Mud mortar
- **Mortar mixing tips**
- **function of various ingredients**
- **Properties of good mortar**
  - ✓ Plasticity
  - ✓ Workability
  - ✓ Setting time for mortar
  - ✓ Adhesion
  - ✓ Durability
  - ✓ Strength

• **Method of mixing mortar** ✓ Manual ✓ Mechanical

Resources required for the indicative content	
Equipment	▪ Computers, Projector, Projection screen, Printers , Concrete mixer,PPE Shovel ,Wheelbarrow ,Batch
Materials	▪ Chalks, Pens, Books, Papers, Flip-chart, Picture and videos, PPT slides, Cement ,Lime,Water ,Soil ,Book
Tools	▪ Internet access, Workshop
Facilitation techniques	▪ Lectures ▪ Demonstration and simulation ▪ Individual and group work ▪ Practical exercise ▪ Individualized ▪ Trainer guided ▪ Group discussion
Formative assessment methods	▪ Written assessment ▪ Oral presentation ▪ Performance assessment ▪ Product based assessment ▪ Project based assessment

▪

Learning outcome 3: Elevate brick walls and apply basic plastering skills	**Learning hours: 25**
Indicative content	
• **Interpretation construction drawings** ✓ Types of Drawing : Section plane	

- Elevation plan
- Floor plans
- Foundation plan

- **Setting out of brick walls .**
  - ✓ Identification types of damp proof course
  - ✓ Requirements of damp proof course
  - ✓ Steps of setting out and leveling first course brick
    - Selection and soaking of bricks
    - Use mason line to guide the setting out of the first brick layer
    - layer dry brick and make connection where required
    - Make measurement
    - Check squareness using 3,4,5 and diagonal method
- **Laying brick wall**
  - ✓ Technical terms for bonding
  - ✓ Identify, draw and interpret
  - ✓ types of brick bond
    - English bond
    - Dutch bond
    - Row lock bond
    - Rat trap bond
    - Flemish bond
    - Stretcher bond
    - Header bond
    - Stack bond
    - American bond
    - Facing bond
    - Diagonal bond
    - Zigzag bond
- **Classification of walls**
  - ✓ According to construction materials
  - ✓ According to loading system
  - ✓ According to location
  - ✓ According to function
  - ✓ According to the method of construction (cavity and solid walls)
- **Construction of lintels, arches, piers and pillars**
  - ✓ Identification of lintel and arches
    - Definition
    - Function
    - Location
    - Types of lintels

- **Classification of arches**
  - ✓ Based on construction of materials
  - ✓ Based on shape
  - ✓ Based on number of centers.
- **Terminologies of Arches**
- **Calculation of arches**
- **Steps of lintel and arch construction:**
  - ✓ Prepare form work
  - ✓ Lay arches or lintel
  - ✓ Remove form work
- **Piers and pillars construction**
  - ✓ Attached
  - ✓ Dettached
- **Clean tools , equipment and working area**
  - ✓ Method of Cleaning
    - Manual
    - Mechanical

Resources required for the indicative content	
Equipment	▪ Concrete mixer, PPE Shovel ,Wheelbarrow
Materials	▪ Cement, Lime, Water, Blocks, Bricks, Book, Sand , Stones ,Timber , Nails ▪ Hammer, Spades, Tape measure Pincers,Jointer ,Pan,Compressor,Brush,Silicon gun,Sand paper,Straight edge, Squares
Tools	▪ Workshop
Facilitation techniques	▪ Demonstration and simulation ▪ Individual and group work ▪ Practical exercise ▪ Individualized ▪ Trainer guided ▪ Group discussion
Formative assessment methods	▪ Written assessment ▪ Oral presentation ▪ Performance assessment ▪ Product based assessment

	▪ Project based assessment

Learning outcome 4: Apply tiles and basic plastering skills	Learning hours: 10
Indicative content	

- **Preparing of the surface area**
  - ✓ Assessment of the surface area
  - ✓ Cleaning of the surface area \
  - ✓ Procedures of setting out the surface are
- **Application of plastering procedures**
  - ✓ Preparation of the area
  - scratch in case of repair
  - Spray water on the surface
  - Use of levelling mark
- **Steps of applying plaster mortar**
  - ✓ **Fill in** the space between the levelled marks
  - ✓ Screeding the cement mortar
  - ✓ Smooth the surface
- Putting in place tiles
- **Batching and mixing of mortar ingredients for tiles works**
- Steps used for applying tiles:
  - ✓ Mix the mortar
  - ✓ Spread the mortar
  - ✓ Press the first tile in place
  - ✓ Install more tiles
  - ✓ Cut tiles to fit
  - ✓ Grout the floor
  - Performing of jointing
- **Steps of jointing:**
  - ✓ Pointing
  - ✓ Spraying of water
  - ✓ Grouting
- **Cleaning of tools, quipment and workplace**

✓ **Methods of cleaning tools and equipment:**
  - By water
  - By oil
  - By brush

- By air compressor

✓ Methods of cleaning work place:
- By water
- By brush
- By air compressor

✓ Removal of waste material

Resources required for the indicative content	
Equipment	▪ Concrete mixer, PPE Shovel ,Wheelbarrow
Materials	▪ Cement, Lime, Water, Blocks, Bricks, Book, Sand, Stones ,Timber , Nails ▪ Hammer, Spades, Tape measure Pincers, Air compressor, Jointer ,Pan, Compressor, Brush, Silicon gun, Sand paper, Straight edge, Squares, Water, Oil, Thinner, Brush
Tools	▪ Workshop
Facilitation techniques	▪ Demonstration and simulation ▪ Individual and group work ▪ Practical exercise ▪ Individualized ▪ Trainer guided ▪ Group discussion
Formative assessment methods	▪ Written assessment ▪ Oral presentation ▪ Performance assessment ▪ Product based assessment ▪ Project based assessment

References:

1. ROY CHUDLEY, ROGER GREENO, 2016, Building construction hand books eigthth edication (8), Routledge.
2. ROY CHUDLEY, ROGER GREENO,2010, Building construction hand books, Routedge
3. Frederick S Merritt, jonathanT.Ricketts,2000, Building Design and Construction Handbook, 6th Edition, MCRaw-hill professional
4. Roy chudley, roger greeno,2006, Advanced construction technology 4thedition, prentice hall (UK)