



Republic of Rwanda
Ministry of Education



RTB | RWANDA
TVET BOARD

PLUMBING WORKS PLANNING

PLTPW301

PLAN PLUMBING WORKS

Competence

RQF Level: 3

Learning Hours



Credits: 7

Sector: Construction and Building Services

Trade: Plumbing Technology

Module Type: Specific

Curriculum: CBSPLT302- TVET Certificate 3 in Plumbing Technology

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Issue Date: May 2022

Purpose statement	This module describes the skills, knowledge and attitudes required by a trainee to plan plumbing works. It involves: Conduct site survey, Sketch & interpret plumbing drawings, Identify tools, equipment, and materials, Estimate the cost, Elaborate clauses of agreement, Plan work schedule in order to have full information for starting a given plumbing project.					
Leaning assumed to be in place	Safety, Health and environment at workplace.					
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 site survey.	1.1 Existing facilities are properly observed according to the work.
	1.2 Site condition is properly assessed according to the work.
	1.3 Measurements of the work place are correctly taken referring to the work.
	1.4 Labours are properly identified based on the type of work.
2. Interpret plumbing drawings	1.5 Plumbing symbols are properly interpreted based on plumbing standards.
	2.2 Types of drawings are clearly interpreted according to the work.
	2.3 Units are properly converted based on drawings.
	2.4 Drawing scale is correctly interpreted.
3. Identify tools, equipment, and materials	3.1 PPEs are correctly selected according to the work.
	3.2 Tools are properly selected according to the work.

	3.3 Materials are properly selected according to the work.
	3.4 Tools and materials logistic means are properly observed.
4. Estimate the cost	4.1 Bills of quantity is properly calculated according to the market survey.
	4.2 Quotation is properly calculated according to the current prices with taxes inclusive.
	4.3 Total cost of the work is properly determined.
5. 5 Elaborate clauses of agreement	5.1 The agreed-on value of the project is clearly mentioned.
	5.2 The agreed-on duration of the project is clearly mentioned.
	5.3 The agreed-on duties or scope of work to be performed is clearly mentioned.
	5.4 The agreed-on payment terms are clearly mentioned.
	5.5 The terms and conditions of the agreement is clearly mentioned.
	5.6 The agreed-on terms and conditions are certified.
6. Plan work schedule	6.1 Work phases are properly determined.
	6.2 Work schedule document is properly elaborated.
	6.3 Daily work management is clearly established.

Course content

Learning outcomes:	<p>At the end of the module the learner will be able to:</p> <ol style="list-style-type: none"> 1. Conduct site survey. 2. Sketch & interpret plumbing drawings, 3. Identify tools, equipment and materials 4. Estimate the cost 5. Elaborate clauses of agreement 6. Plan work schedule
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Indicative content

- **Observation of existing facilities according to the work.**
 - ✓ Existing plumbing facilities
 - ✓ Existing electrical facilities
 - ✓ Existing structure facilities

- **Assessment of site condition according to the work (Refer to: RS ISO 14001, ISO14015).**
 - ✓ The topography of the site
 - ✓ The weather conditions of the site
 - ✓ Environmental conditions

- **Taking Measurements of the workplace referring to the work. (Refer to: ISO 7078: 2020, ISO 80000-1:2009)**
 - ✓ Measuring length
 - ✓ Measuring width
 - ✓ Measuring height

- **Identification of Labour based on the type of work.**
 - ✓ Manpower
 - ✓ Skilled plumbing helpers
 - ✓ Skilled Plumber

Resources required for the learning outcome

Equipment	PPEs, calibrated (Dump Level machine, Theodolite machine ,total station) computer
Materials	Pegs, Nails, Marking pen, Recording hand book, papers.
Tools	Calibrated (Tape measure, Measuring wheel, Spirit level, Water level, Plumb Bob, Right Angle frame), pen, internet, hammers, building line.

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 2: Interpret plumbing drawings	Learning hours: 10
Indicative content:	
<ul style="list-style-type: none"> • Interpretation of plumbing symbols based on standards. <ul style="list-style-type: none"> ✓ Plumbing fixture symbols. ✓ Plumbing pipe symbols. ✓ Plumbing fitting symbols. ✓ Other common plumbing symbols used. • Interpretation of different type of drawings according to the work. <ul style="list-style-type: none"> ✓ Definition of technical drawing ✓ Architectural Drawings ✓ Structural Drawings ✓ Mechanical Drawings ✓ Plumbing Drawings ✓ Electrical Drawings • Conversion of units based on drawings. (Refer to: ISO 7078: 2020, ISO 80000-1:2009,) <ul style="list-style-type: none"> ✓ Imperial system measurements ✓ Metric system measurements ✓ Imperial vs Metric measurements ✓ Other units of measurement • Identification of drawing scales. <ul style="list-style-type: none"> ✓ Definition of scale ✓ Types of scale ✓ How to use scale 	

Resources required for the indicative content	
Equipment	PPEs, Computers, Projectors, Ipad & Tablets, Drawing table,
Materials	Papers, pens, Pencils.
Tools	Mathematical Set, Drawing board, internet and books.
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: Select tools, equipment, and materials	Learning hours: 10
Indicative content:	
<ul style="list-style-type: none"> • Selection of PPEs according to the work. (Refer to: RS ISO 45001:2018, RS ISO 20347) <ul style="list-style-type: none"> ✓ Definition of PPE ✓ Plumbing PPEs ✓ How to use plumbing PPEs • Selection of Tools and equipment according to the work. <ul style="list-style-type: none"> ✓ Plumbing tools ✓ Plumbing equipment ✓ Selection criteria • Selection of Materials according to the work. <ul style="list-style-type: none"> ✓ Plumbing materials ✓ Materials selection criteria • Observation of Tools and materials logistic means <ul style="list-style-type: none"> ✓ Loading and offloading of plumbing materials ✓ Transport means of plumbing materials ✓ Storage of plumbing materials 	
Resources required for the indicative content	
Equipment	PPEs, hand Drilling machines, Hot guns, Grinding Machines, PPR welding

	machine, Power threading machine, Shearing machine, Power hacksaw, Hydraulic press bending machine, Rolling machine, Folding machine, Angle grinder, Sander machine, Power drilling machine, DC/AC Welding machine, Oxy-acetylene welding machine, Diestock, computer, white/blackboard, projector.
Materials	Pipes, sealants, Sanitary appliances, Pipe fittings, wall plugs, screws
Tools	Hacksaw, Pipe wrenches, Pipe vices, A set of dies, Screw drivers, spanners, PPR Scissors, Snips, Pipe cutter, calibrated (Tape measure, Vernier caliper, Try square, Combination square, spirit level), Pliers, Plumb bob, Tongs, Clamps. internet, books.
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 4: Estimate the cost	Learning hours: 15
Indicative content:	
<ul style="list-style-type: none"> • Calculation of Bills of quantity according to the market survey. <ul style="list-style-type: none"> ✓ Materials specification ✓ Quantities calculation • Calculation of Quotation according to the current prices with taxes inclusive. <ul style="list-style-type: none"> ✓ Proforma Invoices ✓ Cost evaluation • Determination of total cost of the work. <ul style="list-style-type: none"> ✓ Labour Cost ✓ Cost of materials ✓ Transport cost 	

- ✓ Tax and profit.

Resources required for the indicative content

Equipment	Computer, Printers, Scanners, Projector, white/black board , Telephone.
Materials	Papers, Pens, Proforma invoices, papers , flip charts.
Tools	Calculator , maker pen/ chalk, books and internet
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 5: Elaborate clauses of agreement

Learning hours: 15

Indicative content

- **Mention the agreed-on value of the project**
 - ✓ Labour cost
 - ✓ Material cost
 - ✓ Logistics cost
 - ✓ Project size
 - ✓ Project location
- **Mention the agreed-on duration of the project.**
 - ✓ Time frame of the project
 - ✓ Payment terms
 - ✓ Execution phases
- **Mention the agreed-on duties or scope of work to be performed**
 - ✓ Unit prices estimation
 - ✓ Work load/Break down of work
 - ✓ Project location
- **Mention the agreed-on payment terms**
 - ✓ Phases payment
 - ✓ Progress payment
 - ✓ Types of contracts

Resources required for the indicative content	
Equipment	PPEs, Computer, Phones, Extension cable, printer, scanner.
Materials	Papers , flip charts.
Tools	Rulers, pens, Calculators, book and internet.
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 6: Plan work schedule	Learning hours: 10
Indicative content	
<ul style="list-style-type: none"> • Determine Work phases properly. <ul style="list-style-type: none"> ✓ Work load/breakdown of the work ✓ Flow of tasks ✓ Recruitment of skilled and non-skilled Labour ✓ Funds • Elaborate work schedule document <ul style="list-style-type: none"> ✓ Work load /breakdown of the work ✓ Flow of tasks ✓ Recruitment criteria of skilled and non-skilled labour • Establish daily work management <ul style="list-style-type: none"> ✓ Supervision of daily works ✓ Team management ✓ Materials, tools and equipment management 	

✓ Daily works reporting

Resources required for the indicative content

Equipment	PPEs, Computer, Phones, Extension cable, printer.
Materials	Papers, note books, Sketching pencils.
Tools	Rulers, pens, Calculators, book and internet.
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.

Integrated/Summative assessment

Integrated situation

Mr. MUGABO needs a plumber to plan his domestic plumbing system installation works. The plumbing system will be as follow: One tank for water storage, outside water access point with one tap, one WC, one shower supplied with both cold and hot water, one hand wash basin supplied with both cold and hot water.

As a qualified and skilled plumber, make a clear plan of the above plumbing works in 5hours.

Resources

Tools	Tape measure, Measuring wheel, Spirit level, Water level, Plumb Bob, Right Angle frame, Decca-meter
Equipment	Computer , Printers, Scanners, Projector, digital Cameras

Materials/ Consumables	Pegs, Nails, marking pen, recording handbook, building line, papers.				
Assessable outcomes	Assessment criteria (Based on performance criteria)	Indicator	Observation		Marks allocation
			Yes	No	
Learning outcome 1: Conduct site survey. (14%)	1.1 Existing facilities are properly observed	Ind.1 Existing facilities are listed			2
	1.2 Site condition is properly assessed according to the work.	Ind.2 Site status report			5
	1.3 Measurements of the work place are correctly taken referring to the work.	Ind.3 Site recorded data			5
	1.4 Labor is properly identified based on the type of work.	Ind.4 site status report			2
Learning outcome 2: Sketch & interpret plumbing drawings (15%)	2.1 Plumbing symbols are properly identified based on plumbing standards.	Ind.1 sketches done			5
	2.2 Types of drawings are clearly identified according to the work	Ind.2 sketches done			3
	2.3 Units are properly converted based on drawings.	Ind.3 worksheet and sketches done			4
	2.4 Drawing scale is correctly identified	Ind.5 sketches done			3
Learning outcome 3: Identify tools, equipment, and materials (14%)	3.1 PPEs are correctly selected according to the job.	Ind.1 Listed PPEs			3
	3.2 Tools are properly selected according to the job.	Ind.2 Listed tools			3
	3.3 Materials are properly selected according to the job.	Ind.3 Listed materials			4
	3.4 Tools and materials	Ind.4 shipping and			4

	logistic means are properly observed.	storage plan			
Learning outcome 4: Estimate the cost(31%)	4.1 Bills of quantity is properly calculated according the market survey	Ind.1 BOQ calculated			13
	4.2 Quotation is properly calculated according to the current prices with taxes inclusive.	Ind.2 Worksheet			9
	4.3 Total cost of the work is properly determined.	Ind.3 Worksheet			9
Learning outcome 5: Elaborate clause of agreement (14%)	5.1 The agreed-on value of the project is clearly mentioned.	Ind.1Elaborated clause of agreement			3
	5.2 The agreed-on duration of the project is clearly mentioned.	Ind.2Elaborated clause of agreement			2
	5.3 The agreed-on duties or scope of work to be performed is clearly mentioned.	Ind.3Elaborated clause of agreement			2
	5.4 The agreed-on payment terms are clearly mentioned.	Ind.4Elaborated clause of agreement			2
	5.5The terms and conditions of the agreement is clearly mentioned.	Ind.5Elaborated clause of agreement			2
	5.6The agreed-on terms and conditions are certified.	Ind.6Elaborated clause of agreement			3
Learning outcome 6: Plan work schedule(12%)	6.1 Work phases are properly determined.	Ind.1Work schedule document			4
	6.2 Work schedule document is properly elaborated.	Ind.2Work schedule document			4

	6.3 Daily work management is clearly established	Ind.3Work schedule document			4
Total marks		100			
Percentage Weightage		100%			
Minimum Passing line % (Aggregate): 70%					

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