Republic of Rwanda
Ministry of Education

RTB | RWANDA TVET BOARD

AUTOMATIC ELECTRICAL SWITCHES AND DETECTORS INSTALLATION

ELTSD301

INSTALL AUTOMATIC ELECTRICAL SWITCHES AND DETECTORS

Competence

RQF Level: 3

Learning Hours 90

Credits: 9

Sector: Energy

Trade: Electrical Technology

Module Type: Specific

Curriculum: ENGELT3001- TVET Level 3 Electrical Technology

Issue Date: April 2022

<table>
<tr><td>Purpose statement</td><td colspan="6">This module describes the skills, knowledge and attitude required to install automatic electrical switches and detectors. At the end of this module, learners will be able to identify Automatic electric Switches and detectors, connect Automatic Electric switches and detectors and test Automatic electric Switches and detectors system functionality in various places such as home buildings, shops, warehouses, supermarket, hospitals, pharmacies, banks, schools, garage, market, home, churches, and hotels under minimum supervision.</td></tr>
<tr><td>Learning to be assumed in place</td><td colspan="6">SHE, Basics of electricity and electronic, Electrical drawing, Bench work applied to electricity.</td></tr>
<tr><td rowspan="6">Delivery modality</td><td colspan="2">Training delivery</td><td>100%</td><td colspan="2">Assessment</td><td>Total 100%</td></tr>
<tr><td colspan="2">Theoretical content</td><td>30%</td><td rowspan="4">Formative assessment</td><td>30%</td><td rowspan="4">50%</td></tr>
<tr><td colspan="2">Practical work:</td><td rowspan="3">70%</td><td rowspan="3">70%</td></tr>
<tr><td>• Group project and presentation</td><td>20%</td></tr>
<tr><td>• Individual project /Work</td><td>50%</td></tr>
<tr><td colspan="3"></td><td colspan="2">Summative Assessment</td><td>50%</td></tr>
</table>

Elements of Competency and Performance Criteria	
Elements of competency	**Performance criteria**
1. **Identify Automatic Electric Switches and detectors**	1.1. Automatic Electrical switches and detectors are correctly described in line with instruction manual
	1.2. Automatic Electrical switches are properly selected in line with their application.
	1.3. Automatic Electrical detectors are properly selected in line with their application
2. connect Automatic Electric switches and detectors	2.1. The automatic electrical switches and detectors position is determined based on their function.
	2.2. The Automatic electric switches are properly fixed in line with the manufacturer manual
	2.3. The automatic Electric detectors are properly fixed in line with the manufacturer manual.
	2.4. Automatic electrical switches and detectors are correctly connected in line with wiring diagram
3. Test system functionality	3.1. The automatic Electrical switches and detectors are properly supplied with respect to the manufacturer manual.

	3.2. The automatic Electrical switches and detectors are set based on their function and manufacturer manual.
	3.3. The automatic Electrical switches and detectors are properly tested and run based on the system functionality.

Course content

Learning outcomes	At the end of the module the learner will be able to: 1. Identify Automatic Electric Switches and detectors 2. Connect Automatic Electric switches and detectors 3. Test system functionality
Learning outcome 1: Identify Automatic Electric Switches and detectors	**Learning hours: 25**

Indicative content

- **Description of automatic electrical switches and detectors**
  - ✓ The types of automatic electrical switches and detectors
  - ✓ automatic electrical switches and detectors characteristics/specifications
  - ✓ automatic electrical switches and detectors working principles
- **Selection of automatic electrical switches**
  - ✓ Types of power supply
  - ✓ Automatic switches electrical parameters
  - ✓ Application of automatic electrical switches
- **Selection of electrical detectors**
  - ✓ Source of power supply
  - ✓ Parameters of electrical detectors
  - ✓ Application of electrical detectors

Resources required for the learning outcome

Equipment	Projector, Multimeter, drilling machine,

Materials	Automatic electrical switches
Tools	Set of screw drivers, Set of pliers, Electrician hummer, Spilt level, Hack saw, Tape measure
Facilitation techniques / learning activities	• Group discussion • Trainer guided
Formative assessment methods	• Written assessment • Performance assessment

Learning outcome 2: connect Automatic Electric switches and detectors	**Learning hours: 50**
Indicative content	
• **Determination of automatic electrical switches and electrical detectors position** ✓ automatic electrical switches and electrical detector's function • **Fixation of automatic electrical switches** ✓ Tools and equipment ✓ Fixing techniques • **Fixation of electrical detectors** ✓ Tools and equipment ✓ Fixing techniques • **Automatic electrical switches and detectors connection** ✓ Connection technics	
Resources required for the indicative content	
Equipment	Projector, Multimeter, drilling machine,
Materials	Wires, Cables, Wire clips, Drill bits, Lamps, bells, Lamp holders, Automatic electrical switches, Electrical detectors, Protective devices, Screws, Automatic switches and detectors
Tools	Set of screw drivers, Set of pliers, Electrician hummer, Spilt level, Hack saw, Tape measure
Facilitation techniques and learning activities	• Practical exercise • Group discussion • Trainer guided • Individual and group work

Formative assessment methods	• Written assessment • Performance assessment • Product based assessment

Learning outcome 3: Test system functionality	**Learning hours: 15**
Indicative content	
• **Supply of the automatic Electrical switches and detectors** ✓ Type of power supplies ✓ Characteristics of power supplies • **Setting of automatic Electrical switches and detectors** ✓ Types of Electrical switches and detectors settings • **Testing automatic Electrical switches and detectors** ✓ Types electrical test ✓ Testing instruments ✓ Instruments Setting	
Resources required for the indicative content	
Equipment	Projector, Multimeter, drilling machine,
Materials	Wires, Cables, Wire clips, Drill bits, Lamps, bells, Lamp holders, Automatic electrical switches, Electrical detectors, Protective devices, Screws, Automatic switches and detectors
Tools	Set of screw drivers, Set of pliers, Electrician hummer, Spilt level, Hack saw, Tape measure
Facilitation techniques and learning activities	• 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

ABILITY SUPPLY and SERVICE Ltd; an Engineering Consultant company located in KICUKIRO district, their office installation contains 4 economic outside lamps, 1 economic lamp in the storekeeper's house, 2 economic lamps in the waiting room,1 economic lamp in the secretary office and 1 economic lamp in the M. D's office.

They have encountered a high rate of lighting power consumption yet the installation contains a reasonable number of manually controlled economic lamps. Therefore, they need someone to solve that higher power consumption rate.

As an electrical domestic installer; you are requested to:

1. Change that manual control into automatic one to avoid the unnecessary use of power

Tasks:

2. Install 4 outside lamps in a way that they would be going ON in the night or whenever the day light is not adequate
3. Install the store keeper's lamp that go ON at 6PM and OFF at 6AM
4. Install the rest of lamps that go ON whenever the person is inside the office
5. All needed tools, materials and equipment are available
6. the task above must be done within 9 hours

Tools	Set of screw drivers, Set of pliers, Electrician hummer, Spilt level, Hack saw, Tape measure
Equipment	Multimeter,
Materials/ Consumables	Wires, Cables, Wire clips, Drill bits, Lamps, Lamp holders, Automatic electrical switches, Electrical detectors, Protective devices, Screws, and detectors

Assessable outcomes	Assessment criteria (Based on performance criteria)	Indicator	Observation		Marks allocation
			Yes	No	
Learning outcome 1: **Identify Automatic Electric Switches and detectors** **(20%)**	1.1. Automatic Electrical switches and detectors are correctly described in line with instruction manual	Electrical switches and detectors are correctly described			10
	1.2. Automatic Electrical switches are properly selected in line with their application.	Automatic Electrical switches are properly selected			5
	1.3. Automatic Electrical detectors are properly selected in line with their application	Automatic Electrical detectors are properly selected			5
Learning outcome 2:	2.1. The automatic electrical switches and detectors	automatic electrical switches and detectors position is determined			10

connect Automatic Electric switches and detectors **(50%)**	position is determined based on their function.				
	2.2. The Automatic electric switches are properly fixed in line with the manufacturer manual	Automatic electric switches are properly fixed			5
	2.3. The automatic Electric detectors are properly fixed in line with the manufacturer manual.	automatic Electric detectors are properly fixed			5
	2.4. Automatic electrical switches and detectors are correctly connected in line with wiring diagram	automatic electrical switches and electrical detectors position are determined			10
		Automatic electrical switches are properly fixed			5
		Automatic electrical switches are properly fixed			5
		Automatic electrical switches and detectors are appropriately connected			10
Learning outcome 3: **Test system functionality (30%)**	3.1. The automatic Electrical switches and detectors are properly supplied with respect to the manufacturer manual.	automatic Electrical switches and detectors are properly supplied			5
	3.2. The automatic Electrical switches and detectors are set based on their function and manufacturer manual.	automatic Electrical switches and detectors are set			15
	3.3. The automatic Electrical switches and detectors are properly tested and run based on the system functionality.	automatic Electrical switches and detectors are properly tested and run			10
Total marks					**100**
Percentage Weightage					**100%**
Minimum Passing line % (Aggregate): 70%					

References:

1. Trevor.Linsley, Introduction to Electrical Installation work, 1sted.Oxford, UK
2. Brian Scaddam, Electrical Wiring for Domestic Installers, Routledge; 15 editions (August 8, 2015)
3. Toner, A. "Automatic switches: Multi-use series." Elettrificazione;(Italy) 7 (1991).
4. Troubleshooting&Raiparing Major Appliances, Third Edition by ERIC KLEINERT
5. Electrical technology(Sri C. Suryanarayana Reddy M.Tech)
6. Linsley, T. (2013). Basic electrical installation work. Routledge.
7. Donnelly, E. L. (2014). Electrical installation: Theory and practice. Nelson Thornes.
8. Neidle, M. (2016). Electrical installation technology. Elsevier.
9. Linsley, T. (2007). Introduction to electrical installation work. Routledge.
10. Scaddan, B. (2011). The Dictionary of Electrical Installation Work. Routledge.