



**NATIONAL VOCATIONAL  
TRAINING INSTITUTE  
TESTING DIVISION  
REGULATIONS AND SYLLABUS  
FOR  
RADIO, T.V. ELECTRONIC SERVICING  
CERTIFICATE ONE**

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**A. INTRODUCTION:**

- i. The review of this syllabus has been generally influenced by the demands of industries due to its continuous change as a result of technological advancement and the changing needs of society.

It was also influenced by the TVET reforms under the directions of the new educational reforms with the view to opening up further education and training opportunities to TVET graduates.

The certificate ONE syllabus is designed to respond to the following level descriptors:

<b>QUALIFICATION</b>	<b>KNOWLEDGE LEVEL</b>	<b>SKILLS AND ATTITUDE:</b>
Certificate 1	<ul style="list-style-type: none"><li>1. To demonstrate a broad knowledge base incorporating some technical concepts.</li><li>2. To demonstrate knowledge of the theoretical basis of practical skills.</li><li>3. To demonstrate knowledge in numeracy, literacy, IT and Entrepreneurial skills</li></ul>	<ul style="list-style-type: none"><li>1. Require a wide range of technical skills</li><li>2. Are applied in a variety of familiar and complex contexts with minimum supervision.</li><li>3. Require collaboration with others in a team</li></ul>

- ii The rationale for the course is to provide students with broad understanding of the technology of the manufacture, installation maintenance and repairs of domestic and industrial equipment for the enhancement of national development.

## **B. THE GENERAL OBJECTIVES**

The Radio Television and Electronics course is to establish the level of knowledge and skills required by persons undergoing training or employed in the servicing of Radio, Television and any other electronic equipment whether domestic professional or industrial.

The course deals progressively with:

Observation of safe working procedures and safety precautions.

Application practical skills, safe use of tools and equipment and judicious use of materials.

The purposes and functions of components in basic circuits and their effect on signals.

The circuit analysis required for the proper use of measuring instruments during fault tracing to component level.

## **C. THE COURSE COMPONENT**

The course comprises of:

- a. Trade Theory
- b. Trade Science and Calculation
- c. Trade Drawing
- d. General Paper
- e. Trade Practical
- f.

**EXAMINATION:** The candidates would be examined in the FIVE components listed in 'C' above.

Practical work must be carefully planned to illustrate the application of trade Technology, Science and Calculations, and Drawing; so as to provide maximum opportunity for craft practice. It is recommended that not less than 60% of the course time should be allowed for craft practice.

#### **D. KNOWLEDGE AND SKILLS REQUIREMENT**

The prime objective of the programme is to provide knowledge and skills of the trade in a manner that will best meet the needs of the trade as well as industries using professional equipments

#### **E. ENTRY TO THE COURSE**

Minimum education: Must have passed JHS or SHS examination/Foundation Certificate. However, the selection of the students for the course is within the discretion of the head of the institution.

#### **F. ELIGIBILITY FOR ENTRY TO EXAMINATION**

Candidates may enter for examination only as internal candidate; that is those who at the time of entry to the examination are undertaking (or) have already completed the course at an approved establishment.

#### **G. EXTERNAL EXAMINERS**

The practical work of candidates will be assessed by an external examiner appointed by the Trade Testing Commissioner.

#### **H. EXAMINATION RESULTS AND CERTIFICATES**

Each candidate will receive record of performance given the grade of performance for the components

Taken. These are:

- i) Distinction
- ii) Credit
- iii) Pass
- iv) Referred/Failure

Certificates would be issued to candidates who pass in all the components.

**I. NOTE:**

All Technical and Vocational trainees who aspire to take advantage of the opportunities opened to them in the educational reforms should NOTE that, for a trainee to progress to certificate Two (2) a pass in Certificate One (1) is compulsory.

**J. ACKNOWLEDGEMENT**

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## SYLLABUS FOR ELECTRONICS CERTIFICATE ONE

TASK	CRITICAL SKILLS	SUB SKILLS	INSTRUCTIONAL TECHNIQUES	ASSESSMENT METHOD
<b>1.0</b> Recognize health and safety hazard in workshop.	<b>1.1</b> Observed General Safety.	<b>1.1.1</b> State safe working procedures and safety regulations.	Discuss safe working procedures.	Apply relevant regulations to work situations correctly.
	<b>1.2</b> Observed Electrical Safety	<b>1.2.1</b> State various types of protective devices. <b>1.2.2</b> Select suitable size of protective device. <b>1.2.3</b> Describe the symptoms of electric shock and the correct action to be taken. <b>1.2.4</b> List the type of fire extinguishers and their appropriate use. <b>1.2.5</b> Demonstrate the use of fire extinguishers	Assist student to discuss various types of protective devices and their usage.  Discuss and list the various types of fire extinguishers, their properties and appropriate use	Identify and describe types of protective devices and their application.  Identify and list types of fire extinguishers as applicably to fire safety.
<b>2.0</b> Demonstrate an understanding of the concept of Basic Electrical Principles.	<b>2.1.</b> Investigate the Nature of Electricity.	<b>2.1.1</b> Explain the structure atom through discussion	Explain the meaning of electric field and its characteristics.	Describe electric field and its properties.
	<b>2.2</b> Understand the concept of Electric field.  <b>2.3</b> Know and understand the concept of Basic Magnetism	<b>2.2.1</b> State Ohms Law <b>2.2.2</b> Demonstrate a basic DC Circuit to illustrate the relationship between voltage (v) current (I) and Resistance (R) <b>2.2.2</b> Define conducting material and insulating material. <b>2.2.3</b> State the types of conductors and insulators. <b>2.2.4</b> State their applications. <b>2.3.1</b> State the type of magnets and their applications.	Through discussion describe the types of magnet and their application.  -Assist students to state the laws of magnetism.	Solve simple problems involving electric field.  Describe the types of magnet and their application correctly.  -Student to state the laws of magnetism .

TASK	CRITICAL SKILLS	SUB SKILLS	INSTRUCTIONAL TECHNIQUES	ASSESSMENT METHOD
		<p>2.3.2 Define the following magnetic flux, flux Density and Reluctance.</p> <p>2.3.3 State the laws of magnetism.</p>	Demonstrate to explain the laws of magnetism.	-Student to demonstrate to proof the law.
	2.4 Understand the concept of Semi conductor theory	<p>2.4.1 Define semiconductor.</p> <p>2.4.2 State the electrical properties (valence band ,conduction band, and forbidden band).</p> <p>2.4.3 State the types of semiconductor material (Germanium and Silicon.)</p> <p>2.4.4 Explain the process of doping (Extrinsic and Intrinsic Semiconductor)</p>	<p>Discuss the electrical properties of semiconductor material.</p> <p>Discuss the formation of P-type and N-type material</p>	<p>Explain the properties of semiconductor materials.</p> <p>Explain the difference between N-type and P-type material.</p>
<b>3.0</b> Differentiate between types of Passive Electronic Components	<b>3.1</b> Know and understands the application of Resistors.	<p>3.1.1 Define Resistance</p> <p>3.1.2 State types of Resistors (Carbon ,metal, film, wirewond integrated, resistor ,Variable. Resistor )</p> <p>3.1.3 Select value of resistor using colour coding.</p> <p>3.1.4 Test the value of resistor using measuring instruments.</p> <p>3.1.5 Estimate Power Rating of Resistor s</p> <p>3.1.6 Connect Resistor in series and parallel.</p>	<p>Guide students to discuss various types of fixed resistors characteristics and uses.</p> <p>- Guide students to discuss various types of resistors characteristics and their application.</p> <p>- Discuss how to use the colour code table to determine the nominal value of resistance.</p> <p>- Through discussion show how to estimate power handling capacity of various size.</p> <p>- Discus and show how resistors are connected in series and parallel</p>	





TASK	CRITICAL SKILLS	SUB SKILLS	INSTUCTIONAL TECHNIQUES	ASSESSMENT METHOD
		3.3.7 Explain the behavior of an inductor under A.C condition. 3.3.8 Observe the effect of passing alternating current through the coil. 3.3.9 Observe the effect of connecting two inductors in series to A.C source.	- Discuss how to show to solve problems involving inductors connected in series and parallel.	
<b>4.0</b> Understand the concept of alternating current generation(AC)	4.1 Principle of operation of a generator	4.1.1 Explain the principle of operation. 4.1.2 List parts of an A.C generator. 4.1.3 Define various AC quantities.	- Through discussion explain the principle of operation of a generator. - Assist students to list parts of a generator. - Assist students to define various A.C quantities (RMS, Peak, Average values, Form factor, Cycle, Period, Frequency) -	- Explain the operation of a generator. - List parts of a generator. - Define A.C quantities.
<b>5.0</b> Understanding the concept of a transformer.	5.1 Explain the Construction of a transformer.	5.1.1 State the types of transformer (shell and core). 5.1.2 Explain the principle of operation. 5.1.3 Solve problems in transformation ratio $\left[ \frac{V_1}{V_2} = \frac{N_1}{N_2} = \frac{I_2}{I_1} \right]$	- Lead students to state the types of transformer - Through discussion explain the principle of operation. - Assist students to solve problems on transformation ratio.	- Student to list the types of transformer. - Student to explain the principle of operation - Students to solve problems on transformation ratio.





TASK	CRITICAL SKILLS	SUB SKILLS	INSTRUCTIONAL TECHNIQUES	ASSESSMENT METHOD
	7.4 Describe the operation of wave shaping circuit.	7.3.2 State types of class of Bias (class A, Class B, Class AB, Class C) 7.3.3 Draw and explain Single Stage CE Voltage Amplifier (Biasing, loading emitter stabilizing circuits, coupling and decoupling) 7.3.4 Connect and Test a typical CE Voltage Amplifier. 7.4.1 State the types (Differentiator, Integrator Circuit). 7.4.2 Draw the types of circuit.	-- Demonstrate an operation of a typical CE Voltage Amplifier. - Assists the students to measure the voltage gain. -Through discussion explain differentiator and integrator circuits. - Lead student to draw and explain the difference between the input and output signal of the two wave shaping circuits (differentiator and integrator). Limiting it to C-R wave shaping circuit.	the single stage CE voltage Amplifier. - Construct a single stage CE Voltage Amplifier. Perform an experiment in a wave shaping circuit for a given input signal.
8.0 Understand the basic operation of Logic Circuit.	8.1 Understand the concept of number systems.  8.2 Understand the concept of Logic Gates.	8.1.1 Convert denary to binary and vice versa 8.1.2 Perform basic binary calculation (Addition and Subtraction).  8.2.1 Define logic gate. 8.2.2 Draw symbols of basic logic gate (AND, NAND, NOT ,NOR, EXOR, EXNOR). 8.2.3 Draw Truth table and Timing Diagram 8.2.4 Draw logic circuits using switches. 8.2.5 Wire logic gates using switches (AND, NOT, NAND, OR NOR)	- Through discussion explain the various number system. - Assist student to convert denary to binary. - Assist student to draw the logic gate symbols. - Assist student to draw the truth table and the timing diagram. - Guide student to wire logic gate using switches	- Convert denary to binary and vice versa. - Draw the logic gate symbols. - Draw the various truth table and timing diagram.

TASK	CRITICAL SKILLS	SUB SKILLS	INSTRUCTIONAL TECHNIQUES	ASSESSMENT METHOD
9.0 Understand the principle operation of measuring instruments	9.1 Understand use and care of an Analogue Multimeter.	9.1.1 Describe the construction of moving coil instrument. 9.1.2 Explain the operation. 9.1.3 Convert a moving coil galvanometer using shunt and multipliers. 9.1.4 Solve problems involving shunt and multiplier.	- Through the discussion, describe the construction of moving coil instrument. - Through the discussion explain the principle of operation.	- Explain the operation of moving coil instrument  - Solve problems involving shunt and multiplier
	9.2 Understand the use and care of digital multimeter.  9.3 Understand the operation of oscilloscope.	9.1.5 Use bridge network in measuring (Temperature, Pressure, etc). 9.1.6 Explain sensitivity of multimeter  9.2.1 Explain the operation. 9.2.2 State advantages of Digital over Analogue multimeter.  9.3.1 Explain the functions of the controls on the (CRO). Cathode Ray Oscilloscope. 9.3.2 CRO to observe waveforms.	- Assist students to solve problems involving shunt and multiplier. -Through discussion describe the operation of digital multimeter. - Through discussion explain the function of controls in C R O. - Through discussion explain the use of CRO to observe waveforms.	- Student to explain the operation.  -Student to explain the function of CRO controls.  - Student to observe waveform on oscilloscope.
10.0 Understand the concept of communication.	10.1 State the relationship between velocity wavelength and frequency.  10.2 Explain the process of modulation.	10.1.1 Define velocity, frequency wavelength. 10.1.2 Explain the relationship between velocity, frequency and wavelength. 10.1.3 Calculate for any of them (frequency wave length, velocity).  10.2.1 Describe modulation (AM,FM) 10.2.2 Draw the wave forms (AM, FM) 10.2.3 Explain how these waveform come about. 10.2.4 State the advantages of FM over AM .	- Assist student to explain the relationship between velocity wave length and frequency.  - Assist student to sketch and explain the waveform of AM, FM. - Assist student to state the advantages of FM over AM.	- Student to define wave length, frequency and velocity. -Student to calculate the frequency wavelength, velocity. - Student should sketch and label modulation waveform (AM,FM). - Student to state the advantages of FM over AM.

**LEVEL – CERTIFICATE ONE – TEST SPECIFICATION TABLE  
TRADE THEORY**

<b>NO</b>	<b>TOPIC</b>	<b>COGNITIVE KNOWLEDGE</b>	<b>AFFECTIVE UNDERSTANDING</b>	<b>PSYCHOMOTOR APPLICATION</b>	<b>TOTAL</b>
1.	Ref. to task 1.0	1.1		1.1	3
2.	Ref. to task 2.0	2.3	2.1, 2.3, 2.4	2.2, 2.3	2
3.	Ref. to task 3.0	3.2, 3.3	3.2	3.1, 3.2, 3.3	2
4.	Ref. to task 4.0	4.1	4.1		2
5.	Ref. to task 5.0	5.1		5.1	2
6.	Ref. to task 6.0	6.1, 6.3	6.3	6.1, 6.2	2
7.	Ref to task 7.0	7.2	7.2, 7.3	7.2	2
8.	Ref to task 8.0			8.1	4
9.	Ref to task 9.0	9.1	9.1, 9.2	9.1, 9.3	2
10.	Ref. To task 10.0	10.1, 10.2		10.1	4

**LEVEL – CERTIFICATE ONE – TEST SPECIFICATION TABLE  
TRADE SCIENCE AND CALCULATIONS**

<b>NO</b>	<b>TOPIC</b>	<b>COGNITIVE KNOWLEDGE</b>	<b>AFFECTIVE UNDERSTANDING</b>	<b>PSYCHOMOTOR APPLICATION</b>	<b>TOTAL</b>
1.	Ref. to task 1.0			2.2.	
2.	Ref. to task 2.0			3.1, 3.2, 3.3	3
3.	Ref. to task 3.0			4.1	1
4.	Ref. to task 4.0			5.1	1
5.	Ref. to task 5.0				
6.	Ref. to task 6.0				
7.	Ref to task 7.0			7.4	1
8.	Ref to task 8.0			8.1	1
9.	Ref to task 9.0			9.1	1
10.	Ref. To task 10.0			10.1	1

**LEVEL – CERTIFICATE ONE – TEST SPECIFICATION TABLE  
TRADE PRACTICALS**

<b>NO</b>	<b>TOPIC</b>	<b>COGNITIVE KNOWLEDGE</b>	<b>AFFECTIVE UNDERSTANDING</b>	<b>PSYCHOMOTOR APPLICATION</b>	<b>TOTAL</b>
1.	Ref. to task 1.0				
2.	Ref. to task 2.0				
3.	Ref. to task 3.0				
4.	Ref. to task 4.0				
5.	Ref. to task 5.0				
6.	Ref. to task 6.0				
7.	Ref to task 7.0			7.2, 7.3	2
8.	Ref to task 8.0				
9.	Ref to task 9.0				



**LEVEL – CERTIFICATE ONE – TEST SPECIFICATION TABLE  
TRADE DRAWING**

<b>NO</b>	<b>TOPIC</b>	<b>COGNITIVE KNOWLEDGE</b>	<b>AFFECTIVE UNDERSTANDING</b>	<b>PSYCHOMOTOR APPLICATION</b>	<b>TOTAL</b>
1.	Ref. to task 1.0				
2.	Ref. to task 2.0				
3.	Ref. to task 3.0				
4.	Ref. to task 4.0				
5.	Ref. to task 5.0				
6.	Ref. to task 6.0			6.1, 6.2	4
7.	Ref to task 7.0			7.2	2
8.	Ref to task 8.0			8.1, 8.2	4
9.	Ref to task 9.0				
10.	Ref. To task 10.0				
					10