COMPETENCY BASED CURRICULUM

FOR

ELECTRICAL ENGINEERING (POWER OPTION)

KNQF LEVEL: 6

ISCED PROGRAMME CODE: 0713 554B

TVET CDACC
P.O BOX 15745-00100
NAIROBI

ELECTRONICS

UNIT CODE: ENG/CU/PO/CR/04/6/B

Relationship to Occupational Standards
This unit addresses the unit of competency: Demonstrate understanding of Electronics

Duration of Unit: 120 hours

Unit Description
This unit covers the competencies required to demonstrate understanding of electronics. Competencies includes; apply semiconductor theory, applying semiconductor diodes, demonstrating understanding of transistors, applying special semiconductor devices, performing rectification, applying amplifiers, demonstrating understanding of oscillators, applying wave shaping and pulse generation circuit and applying Opto-electronics

Summary of Learning Outcomes

1. Apply semiconductor theory
2. Apply semiconductor diodes
3. Demonstrate understanding of transistors
4. Apply Special semiconductor devices
5. Perform rectification
6. Apply amplifiers
7. Demonstrate understanding of oscillators
8. Apply wave shaping and pulse generation circuits
9. Apply opto-electronics

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods

1. Demonstrate understanding of semiconductor theory	• Meaning of terms
	• Types of materials
	  • Insulators
	  • Conductors
	  • Semiconductors
	• Semiconductor materials
	• Types of semiconductors materials
	  • Intrinsic and Extrinsic
		• Observation
		• Oral questioning
		• Written tests

Learning Outcome	Content	Suggested Assessment Methods
2. Demonstrate understanding of semiconductor diodes	• Meaning of terms • P-N juction • Semiconductor diodes • Foreward and reverse Characteristics • Types of semicondctor diodes • Application of semiconductors diodes	• Written tests • Oral questioning
3. Demonstrate understanding of transistors	• Bipolar junction transistors • Operation of NPN and PNP • Field effect transistors • Operation N and P channels • Types of FETs • BJTs and FETs biasing • BJTs and FETs configuration • Characteristics of transistors • Gain of transistors • DC/AC load lines	• Observation • Oral questioning • Written tests

4. Apply Special semiconductor devices	• Meaning of terms
	• Types of special semiconductor devices
	  • UJT
	  • SCR
	  • LASCR
	  • TRIAC
	  • DIAC
	  • SCS
	• Application of special semiconductor devices
		• Observation
		• Oral questioning
		• Written tests

5. Perform rectification	• Meaning of Terms • Classification of rectifiers • Types of rectifiers • Application of rectifiers • Types of converters • Application of converters	• Written tests • Oral questioning

6. Apply amplifiers	• Meaning of terms
	• Types of amplifiers
	  • RC coupled amplifiers
	  • Small signal amplifier
		• Written tests
		• Oral questioning

Learning Outcome	Content	Suggested Assessment Methods
	• Power amplifiers • Wideband amplifiers • Operational Amplifiers • DC Amplifiers • Differential amplifier • Op-amp Characteristics • Op-amp Circuits • Application of Amplifiers	
7. Demonstrate understanding of oscillators	• Meaning of terms • Classification of oscillators • Sinusoidal • Non-Sinusoidal • Oscillator requirements • Oscillator circuits • Damped and Undamped Oscillations	• Observation • Oral questioning • Written tests
8. Apply wave shaping and pulse generation circuits	• Meaning of terms • Wave shaping • Pulse generation circuits • Application	• Observation • Oral questioning • Written tests
9. Apply opto-electronics	• Theory of opto-electronics • Lasers and masers • Properties and drive requirement • LED • LCD • Plasma • Photo devices • Applications	• Observation • Oral questioning • Written tests

Suggested Methods of Instruction

- Discussions
- Site visits
- On-job-training
- Charts and Audio-visual presentations

Recommended Resources

Equipment

- Computers
- Printers
- Cameras
- Phones

Reference materials

- Manufacturers' catalogues
- Working drawings
- EMCA Act
- OSHA
- County by-laws

Materials and supplies

- Stationery