



REPUBLIC OF KENYA

COMPETENCY BASED MODULAR CURRICULUM

FOR

ANALYTICAL CHEMISTRY TECHNOLOGY

KNQF LEVEL 6

(CYCLE 3) PROGRAMME ISCED CODE: 0531 554A



TVET CDACC
P.O. BOX 15745-00100 NAIROBI

CLASSICAL ANALYSIS TECHNIQUES

ISCED UNIT CODE: 0531 551 08A

TVET CDACC UNIT CODE:ASC/CU/ACHEM/CR/02/6/MA

Relationship to Occupational Standards

This unit addresses the Unit of Competency: **Perform Classical Analysis Techniques**

Unit Duration: 210 Hours

Unit Description

This unit covers the competencies required in performing classical analysis techniques. It involves standardizing reagents, carrying-out volumetric analysis, gravimetric analysis and proximate analysis.

Summary of Learning Outcomes

S/No	Learning Outcomes	Duration (Hours)
1.	Standardize reagents	70
2.	Carry out volumetric analysis	60
3.	Carry out proximate analysis	30
4.	Carry out gravimetric analysis	50
Total		210

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Standardize reagents	1.1 Assemble laboratory apparatus 1.2 Select laboratory reagents 1.3 Calculate reagents concentration 1.4 Measure reagents accurately	<ul style="list-style-type: none">• Practical Assessment

	<p>1.5 Prepare reagent solutions</p> <p>1.6 Label reagent solution</p>	<ul style="list-style-type: none"> • Project-Based Assessment • Portfolio of Evidence • Written Assessment
<p>2. Carry out volumetric analysis</p>	<p>2.1 Assemble volumetric analysis apparatus</p> <p>2.2 Standard solutions</p> <p style="padding-left: 40px;">2.2.1 Buffer solutions</p> <p style="padding-left: 40px;">2.2.2 Working standards.</p> <p style="padding-left: 40px;">2.2.3 Stock solutions</p> <p>2.3 Perform different types of titrations</p> <p>2.4 Acid base</p> <p>2.5 Redox</p> <p>2.6 Complexometric</p> <p>2.7 Precipitation</p> <p>2.8 Determine unknown concentration</p>	<ul style="list-style-type: none"> • Practical Assessment • Project-Based Assessment • Portfolio of Evidence • Written Assessment
<p>3. Carry out gravimetric analysis</p>	<p>3.1 Assemble gravimetric analysis apparatus</p> <p>3.2 Gravimetric process</p> <p style="padding-left: 40px;">3.2.1 Sample weighing</p> <p style="padding-left: 40px;">3.2.2 Precipitation</p> <p style="padding-left: 40px;">3.2.3 Filtration</p> <p style="padding-left: 40px;">3.2.4 Washing</p> <p style="padding-left: 40px;">3.2.5 Drying and ignition</p> <p>3.3 Types of precipitates</p> <p style="padding-left: 40px;">3.3.1 Crystalline</p> <p style="padding-left: 40px;">3.3.2 colloidal</p>	<ul style="list-style-type: none"> • Practical Assessment • Project-Based Assessment • Portfolio of Evidence • Written Assessment

	3.4 Solubility constant and product 3.5 Gravimetric calculations	
4. Carry out proximate analysis	4.1 Set up apparatus and equipment 4.2 Collect biological samples 4.2.1 Carbohydrates 4.2.2 Lipids 4.2.3 Proteins 4.3 Prepare samples 4.4 Select required reagents 4.5 Test samples 4.6 Write test reports	<ul style="list-style-type: none"> • Practical Assessment • Project-Based Assessment • Portfolio of Evidence • Written Assessment

Suggested Methods of Instruction

- 1 Practical
- 2 Projects
- 3 Demonstrations
- 4 Group discussion
- 5 Direct instructions

Recommended Resources for 25 Trainees

S/No.	Category/Item	Description/Specifications	Quantity	Recommended Ratio (Item: Trainee)
A	Learning Materials			
1.	Power point presentations	For trainer's use	1	1:25
2.	Desktop computer/laptop	For trainer's use	1	1:25
3.	Projector	For trainer's use	1	1:25
4.	Standard manuals/SOPs	For trainer's use	1	1:25
5.	Flip charts	For trainer's use	1	1:25
6.	Whiteboard	For trainer's use	1	1:25
7.	Assorted reference materials	For trainer's and trainee use	5	5:25
B	Learning Facilities & infrastructure			

1.	Lecture/theory room	For trainer's and trainee use	1	1:25
2.	standard Science laboratory	For trainee use	1	1:25
3.	Internet connection	For trainee use	Enough	
4.	Assorted analytical instruments	For trainer's and trainee use	1	1:25
C	Consumable materials			
1.	Stationeries	For trainee use	25	1:1
2.	Gloves	For trainee use	25	1:1
3.	Laboratory coats	For trainee use	25	1:1
4.	Masks	For trainee use	25	1:1
5.	Covers slips	For trainee use	5	1:5
6.	Assorted whiteboard markers	For trainer's	enough	
7.	Assorted Glassware	For trainee use	enough	1:1
8.	Assorted equipment	For trainee use	enough	1:5
9.	Pestle and mortars	For trainee use	12	1:2
10.	Droppers/teat pipettes	For trainee use	25	1:1
11.	Assorted chemicals [acids, bases, solvents, salts]	For trainee use	enough	1:1
D	Tools and Equipment			
1.	Analytical balances	For trainee use	5	1:5
2.	First aid kit	For trainee use	5	1:25
3.	Muffle Furnace	For trainee use	1	1:25
4.	oven	For trainee use	2	1:12
5.	centrifuges	For trainee use	4	1:6
6.	refrigerator/freezer	For trainee use	1	1:25
7.	Water bath	For trainee use	3	1:8
8.	hot plate	For trainee use	6	1:4
9.	Proximate analysis apparatus [Soxhlet extractor, Khjedal apparatus, crucible, desiccators.]	For trainee use	5	1:5
10.	Titration apparatus [burette, pipette, lamp and stand, conical flasks, white tile]	For trainee use	25	1:1
11.	Sample storage apparatus	For trainee use	25	1:1
12.	Magnetic stirrers	For trainee use	5	1:5
13.	Atomic absorption spectroscopy	For trainers and trainee use	1	1:25