



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

QUALITY ASSURANCE AND CONTROL

ISCED UNIT CODE: 0531 551 17A

TVET CDACC UNIT CODE: ASC/OS/ACHEM/CR/07/6/MA

Relationship to Occupational Standards

This unit addresses the Unit of Competency: Perform Quality Assurance and Control.

Duration: 180 Hours

Unit Description

This unit covers the competencies required in performing quality assurance and control of analytical chemistry laboratory procedures. It involves conducting quality control, quality assurance, quality audits, and method validation.

Summary of Learning Outcomes

S/No	Learning Outcomes	Duration (Hours)
1.	To conduct quality control	45
2.	To conduct quality assurance	45
3.	To conduct quality audit	45
4.	To conduct method validation	45
Total		180

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. To conduct quality control	1.1 Sample collection 1.2 Run blank samples 1.3 Run quality control samples	<ul style="list-style-type: none">• Practical Assessment

	<p>1.4 Run blind samples</p> <p>1.5 Run chemical standards</p> <p> 1.5.1 Standard solution</p> <p> 1.5.2 Analytical reagents</p> <p> 1.5.3 Reference standard</p> <p>1.6 Run repeat samples</p> <p>1.7 Document results</p> <p> 3.2.4 Reports</p> <p> 3.2.5 Graphs</p> <p> 3.2.6 Filling</p>	<ul style="list-style-type: none"> • Project-Based Assessment • Portfolio of Evidence • Written Assessment
2. To conduct quality assurance	<p>2.1 Sample collection</p> <p>2.2 Run certified reference material</p> <p>2.3 Run chemical standards</p> <p>2.4 Run inter-laboratory samples</p> <p> 2.4.1 Independent certified laboratory</p> <p> 2.4.2 Compliance laboratories</p> <p>2.5 Evaluate uncertainty</p>	<ul style="list-style-type: none"> • Practical Assessment • Project-Based Assessment • Portfolio of Evidence • Written Assessment
3. To conduct quality audit	<p>3.1 Select quality audits</p> <p> 3.1.1 Safety</p> <p> 3.1.2 Quality management systems</p> <p> 3.1.3 Product quality</p> <p> 3.1.4 Quality operations</p> <p> 3.1.5 Pollution</p> <p>3.2 Develop audit plan</p> <p>3.3 Conduct pre-audit review</p> <p>3.4 Conduct on-site audit</p> <p>3.5 Generate audit findings</p> <p>3.6 Report audit findings</p>	<ul style="list-style-type: none"> • Practical Assessment • Project-Based Assessment • Portfolio of Evidence • Written Assessment

<p>4 To conduct method validation</p>	<p>4.1 Validate method selectivity (ICH 2003)</p> <p>4.2 Validate method precision (ICH 2003)</p> <p>4.3 Validate method accuracy (ICH 2003)</p> <p>4.4 Validate method bias (ICH 2003)</p> <p>4.5 Validate measurement range (ICH 2003)</p> <p>4.2.1 Accuracy</p> <p>4.2.2 Selectivity</p> <p>4.2.3 Detection limits</p>	<ul style="list-style-type: none"> • Practical Assessment • Project-Based Assessment • Portfolio of Evidence • Written Assessment
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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
12.	Calibration standards	For trainer and trainee use	enough	1:1
D	Tools and Equipment			
1.	International quality standards manuals	For trainer and trainee use	5	1:5
2.	Quality control charts	For trainer and trainee use	5	1:5
3.	Analytical balances	For trainee use	5	1:5
4.	First aid kit	For trainee use	5	1:25
5.	Muffle Furnace	For trainee use	1	1:25
6.	oven	For trainee use	2	1:12
7.	centrifuges	For trainee use	4	1:6
8.	refrigerator/freezer	For trainee use	1	1:25
9.	Water bath	For trainee use	3	1:8
10.	hot plate	For trainee use	6	1:4
11.	colorimetric	For trainer and trainee use	1	1:25
12.	Ultraviolet -Visible spectrophotometer	For trainer and trainee use	1	1:25
13.	Fourier Transform-Infrared spectrophotometer	For trainer and trainee use	1	1:25
14.	Atomic Emission spectrophotometer	For trainer and trainee use	1	1:25
15.	Atomic Absorption spectrophotometer	For trainer and trainee use	1	1:25

16.	Standard Operating Procedures (SOPs)	For trainer and trainee use	5	1:5
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