

T-104 2022

Course Specification

T3 202

Course Code: : CLS 233

Program: Bachelor of Clinical laboratory Science

Department: Clinical laboratory Science Department

Institution: : Shaqra University

Version: template 2022_1

Last Revision Date: 28-08-2023



Table of Contents:

Content	Page
A. General Information about the course	3
 Teaching mode (mark all that apply) Contact Hours (based on the academic semester) 	4
B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods	5
Course Content	7
D. Student Assessment Activities	9
E. Learning Resources and Facilities	10
1. References and Learning Resources	10
2. Required Facilities and Equipment	10
F. Assessment of Course Qualit	10
G. Specification Approval Data	11





A. General information about the course:

Course Identification

1. Credit hours: 3 (2 + 1)

- 2. Course type
- a. University College Department Track Others
- b. Required □ Elective □
- 3. Level/year at which this course is offered: Level 3/ 2rd Year
- 4. Course general Description

The course provides a review of fundamental concepts of volumetric analysis as

applied to biological fluids. The theoretical and practical aspects of different types of

titrimetric analysis including acid-base, complexometric and precipitation titrations

are studied.

5. Pre-requirements for this course (if any): Chem 105, Chem 106

6. Co- requirements for this course (if any):

7- Course Main Objective

This course is designed to help the students achieve a number of broad objectives. At the end of the course/module, students should be able to:

- 1. Provide with a solid background in those chemical principles that are particularly
- 2. important to analytical chemistry.
- 3. Students will be familiar with basic concepts, applications, equipment's and laboratory
- 4. glass wares of clinical analytical chemistry
- 5. Develop an appreciation for the task of judging the accuracy and precision of
- 6. experimental data and to show how these judgments may be sharpened by the application
- 7. of statistical methods.
- 8. Introduce wide range of techniques that are useful in modern analytical chemistry
- 9. Develop skills necessary to solve analytical problems in a quantitative manner
- 10. Acquire laboratory skills that will enable students to gain confidence in their ability to obtain high-quality analytical data.





1. Teac	1. Teaching mode (mark all that apply)				
No	Mode of Instruction	Contact Hours	Percentage		
1.	Traditional classroom	Theory = 30 practical =30	50% 50%		
2.	E-learning				
3.	Hybrid • Traditional classroom • E-learning				
4.	Distance learning				

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	30
2.	Laboratory/Studio	30
3.	Field	
4.	Tutorial	
5.	Others (specify)	
	Total	60





B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and unde	rstanding		
1.1	Describe the basic principles of Clinical analytical chemistry	К1	 a) Interactive lectures (b) Reading from the textbooks, related articles, medical journals and related websites. (c) Discussion to enhance them understanding and used to improve students' intellect and skills. d). video 	- Quizzes - Exams - Presentation - Assignment
1.2	Clarify basic principles of data treatment and data handling	К2	 a) Interactive lectures (b) Reading from the textbooks, related articles, medical journals and related websites. (c) Discussion to enhance them understanding and used to improve students' intellect and skills. d). video 	- Quizzes - Exams - Presentation - Assignment
2.0				
2.1	Apply what he understood in analyze Problems and Evaluate Options concerning Clinical analytical chemistry	S3	 a) Lectures (b) Discussion sessions (c) Lab experiments (d) MCQs (formative assessment) (e) Analyze a case 	- Quizzes - Exams - Presentation - Assignment
2.2	Develop practical hand skills in Laboratory Activities	S1	a) - Practical Activities	- Quizzes - Exams





Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
			- Problem based learning - Video viewing - Interactive Lecture - Group Discussion	- Presentation - Assignment
2.3	Operate proper use of the laboratory instruments.	S2	 Practical Activities Problem based learning Video viewing Interactive Lecture Group Discussion 	- Written and practical examinatio n -Lab reports
3.0				
3.1	To promote awareness amongst students for life-long learning in the field of course	V1	 a) Interactive lectures (b) Reading from the textbooks, related articles, medical journals and related websites. (c) Discussion to enhance them understanding and used to improve students' intellect and skills. d). video 	- Quizzes - Exams - Presentation - Assignment
3.2	To encourage the ability of build relationships and effective communication	V2	 a) Interactive lectures (b) Reading from the textbooks, related articles, medical journals and related websites. (c) Discussion to enhance them understanding and used to improve students' intellect and skills. 	- Quizzes - Exams - Presentation - Assignment



Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
			d). video	
3.3	To promote team work	V3	 a) Interactive lectures (b) Reading from the textbooks, related articles, medical journals and related websites. (c) Discussion to enhance them understanding and used to improve students' intellect and skills. d). video 	- Quizzes - Exams - Presentation - Assignment

B. Course Content

Week No	List of Topics	Contact Hours	Commented [KA1]: Total of hours here should be 30.
1	Introductory week	2 Hours	Here only 22 hours??
	Review of fundamental aspects- qualitative, quantitative analysis, Types of quantitative analysis,	2 Hours	
2-3	Normality, Molarity, Molality, Mole fraction, Molecular weight, Equivalent weight, Expression of concentration and strength of solution, Primary and secondary standards.	2 Hours	Commented [KA2]: Split that as week 1 and week 6
4-5	Acid Base Titration: Acid base concept, law of mass action, Neutralization curves, end point detection. Theory of indicators, choice of indicators, mixed indicators.	2 Hours	
6	Henderson-Hessel bach equation, Buffer solutions. Polyprotic system. Acid base titration curves for strong acid-strong base titration, weak acidstrong base titration, and weak base-strong acid titration	2 Hours	
7 – 8	Midterm Exam		
9-10	Non-aqueous Acid Base Titration Dissociating and non-dissociating solvents, leveling and differentiating effects, Types of solvents &	2 Hours	Commented [KA3]: Same as above comment
	indicators used in determination of acids & bases. end point detection,		



	Karlfischer method		
	Oxidation Reduction Titrations Concepts of oxidation and reduction,	2 Hours	
11-1:	Redox reactions. Theory of redox titrations, Oxidation –reduction 2 curves, Redox indicators, Nernst equation, titration with potassium		Commented [KA4]: Same as above comment
	permanganate, potassium dichromate.		
	Complexometric Titrations: Concept of complexation and chelation,	2 Hours	
13	formation of complex, its stability & factors affecting stability, Warner's co-ordination number. Titration curves, types of complexometric		
	titration, method of end point detection, metallochrome indicators.		
14	Assessment - Quiz	2 Hours	
	Precipitation Titrations: Precipitation reactions, Solubility products,	2 Hours	
	Effect of acids, temperature and solvent upon the solubility of a		
15	precipitate. Argentometric titrations and titrations involving ammonium or potassium thiocyanate, mercuric nitrate, and barium sulphate, Indicators, Gaylussac method; Mohrs method, Volhard's method and Fajan's method		
16	Fundamentals of Electrochemistry, Electrodes and Potentiometry	2 Hours	
17	Revision	2 Hours	
18	Final Exam		
19	Final Exam		
	Total	30 Hours	
No	List of Topics for Practical Section	Contact Hours	
Pr Int an	actical (1) troduction to analytical chemistry Lab – Types of quantitative alysis and laboratory safety	2	
Pr co	actical (2) ncentration Analyses	2	
Pr Ac	actical (3) cid Base Titration	2	
Pr	actical (4) Buffer solutions	2	
; Pr	actical (5) Types of solvents & dicators used in determination of acids & bases. end point detection	2	





6	Practical (6) Oxidation Reduction Titrations	2
7-8	Midterm examination	
9	Practical (7) Complexometric Titrations	2
10	Practical (8) Precipitation Titrations	2
11	Practical (9) Sample Dilution	2
12	Practical (10) Fundamentals of Electrochemistry	2
13	Practical (11), Electrodes	2
14	Practical (12) Potentiometry	2
15	Practical (12) Argentometric titrations	2
16	Practical (13) Laboratory Determination of Electrolytes	2
17	Revesion	2
18	Final examination	
19	Final examination	
	Total	30

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Participation and attendance	During semester	10%
2.	Quizzes/Assignments	Throughout the Course	10%
3.	Practical Activities	Throughout the Course	10%
4.	Midterm Examination	Week 7 - 8	20%
5.	Practical Mid Exam	Week 7 - 8	10%
6.	Final practical Exam	Week 18-19	15%
7.	Final Examination	Week 18-19	25%
8.	Total		100%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)





E. Learning Resources and Facilities 1. References and Learning Resources

Essential References	Vogel's Text Book of Quantitative Chemical Analysis, 6/Ed., Pearson Education.
Supportive References	Quantitative analysis by V. Alexyev, Student Edition, CBS Publisher & Distributors.
Electronic Materials	https://lms.su.edu.sa/login/index.php
Other Learning Materials	www.sciencedirect.com

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classroom and laboratory to accommodate at least 30 students with computer and internet access Blackboard Labs equipped with material for teaching
Technology equipment (projector, smart board, software)	Projector, Computer (CPU), Speaker, Blackboard (zoom meeting)
Other equipment (depending on the nature of the specialty)	 Calorimeter UV-VIS spectrophotometer Water bath Incubator Chemical and other apparatus required for biochemical tests

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	 Head of the department Quality Committee students 	Surveys Interviews Academic visitor Course report
Effectiveness of students assessment	 Academic affairs Head of the department Course coordinator Exam committee 	Exam building tool Reports
Quality of learning resources	Course instructor Course coordinator Students	Surveys
The extent to which CLOs have been achieved	Course instructor Course coordinator Quality Committee	CLOs measurement templet (1-4) Course Report Annual program report Surveys





Assessment Areas/Issues	Assessor	Assessment Methods
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify) Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Clinical Laboratory dept, College of Applied Medical Sciences – Dawadmi Campus
REFERENCE NO.	2
DATE	27-8-2023 (updated version for accreditation)

