



Course Specification

(Bachelor)

Course Title: **Analytical Chemistry 1**

Course Code: **CEM 120**

Program: **Chemistry – Industrial chemistry**

Department: **Chemistry**

College: **college of science**

Institution: **Majmaah University**

Version: **TP-153**

Last Revision Date: **9 December 2024**



Table of Contents

A. General information about the course:	3
B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods	4
C. Course Content	4
D. Students Assessment Activities	5
E. Learning Resources and Facilities	5
F. Assessment of Course Quality	5
G. Specification Approval	6



A. General information about the course:

1. Course Identification

1. Credit hours: 3 Hours)

2. Course type

A. University College Department Track Others
 B. Required Elective

3. Level/year at which this course is offered: (2nd level)

4. Course General Description:

At the end of this course students will recognize the basic concepts and fundamental analytical chemistry; concentration units, chemical equilibrium and factors which effect equilibrium constant, solubility equilibria, pH and pH calculations. Students will be able to identify the cations and anions in different salts.

5. Pre-requirements for this course (if any):

CEM 101

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

Nil

7. Course Main Objective(s):

- Recognizing the basic principles of analytical chemistry
- Studying the different types of concentration units
- studying the principals of chemical equilibrium
- identify the cations and anions in a sample

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	30 (lectures) 30 (practical)	100% 100%
2	E-learning	-	-



No	Mode of Instruction	Contact Hours	Percentage
3	Hybrid <ul style="list-style-type: none"> Traditional classroom E-learning 	-	-
4	Distance learning	-	-

3. 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		

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Know the concepts and principles of analytical chemistry and the ability to evaluate and interpret their principals	K1	Lectures	Exams , quizzes Electronic exam, home works
1.3	Explain different types of concentration(molarity, normality, percent, molality, mole fraction,...) and concepts of calculations.	K3	Lectures Discussions Brainstorming	Exams , quizzes Electronic exam, home works





Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
...				
2.0	Skills			
2.1	Demonstrate laboratory skills, proper safety procedures, and regulatory compliance in laboratory settings.	S1	Lab experiments	Practical exam Lab reports
2.3	Demonstrate the ability to use modern technology and statistical applications that are used in the analytical chemistry.	S3	Lectures Laboratories	Final exam -Midterm exam -Quizzes. - Homework -Class exercises -Practical exams
...				
3.0	Values, autonomy, and responsibility			
3.2	Demonstrate the ability of working independently and with groups.	V2	Cooperative work Lab experiments	Presentations Lab reports
3.3				
...				

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction to Analytical Chemistry - Applications - Classifying Analytical Techniques Basic Equipment and Instrumentation Analytical Perspective	4
2.	Numbers in Analytical Chemistry Units for Expressing Concentration (Molarity and Formality - Normality -Molality-Weight, Volume, and Weight-to-Volume Ratios - Converting Between Concentration Units)	10





---	diprotic and polyprotic acids molecular structure and strength of acids acid - base properties of salts acid-base properties of oxides and hydroxides lewis acids and bases questions and problems	2
	Homogeneous versus Heterogeneous Solution Equilibria the common ion effects buffer solution solubility equilibria	6
	the common ion effect and solubility pH. and solubility complex ion equilibria and solubility application of the solubility product principle to qualitative analysis questions and problems	8
	total	30
	Practical part	
	Qualitative Analysis of acid radicals (group A, B and C)	12
	Qualitative Analysis of basic radicals (group 1,2,3,4,5 and 6)	16
	Revision	2
	Total	30

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Midterm1	6th	10%
2.	Midterm2	10th	10%
3.	E-exam	15th	10%
...	Group discussion and activities	Every week	10%
	Practical examination	16th	20%

*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	Fundamentals of Analytical Chemistry 9th Edition by Douglas A. Skoog 2013
Supportive References	Chemistry 12 Edition by Raymond Chang and Golds Kenneth 2010
Electronic Materials	http://www.chemistry.ohio-state.edu
Other Learning Materials	Bb, power point

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Class rooms are available with smart boards and internet
Technology equipment (projector, smart board, software)	Computers and internet are available for online study and video tutorials.
Other equipment (depending on the nature of the specialty)	Labs are available with required glassware and chemicals

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Effectiveness of teaching	students
Effectiveness of Students assessment	Effectiveness of Students assessment	students
Quality of learning resources	Quality of learning resources	students
The extent to which CLOs have been achieved	The extent to which CLOs have been achieved	Staff members
Other	-	-

Assessors (Students, Faculty, Program Leaders, Peer Reviewers, Others (specify))

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	CHEMISTRY
REFERENCE NO.	17
DATE	15/12/2024

