Course Specification
(Bachelor)

Course Title:	Quality measurements in chemical laboratories
Course Code:	CEM325
Program:	Chemistry
Department:	Chemistry
College:	College of Science
Institution:	Majmaah University
Version:	*Course Specification Version Number*
Last Revision Date:	*Pick Revision Date.*

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: (03 hours)					
2. Course type					
A.	☐University	☐College	☒ Department	☐Track	☐Others
B.	☐Required		☒ Elective		
3. Level/year at which this course is offered: (Level 6)					
4. Course General Description:					
This course describes the standard solutions, preparing dilutions, dealing with Errors, standard additions, calculating standard additions, quality control standards, calibration standards, and Creating a Calibration Curve.					
5. Pre-requirements for this course (if any):					
CEM 221					
6. Co-requisites for this course (if any):					
None					
7. Course Main Objective(s):					
The main objectives of this course are: Introduction to Standards Standard Solutions Using Standards to Help with Testing Using Standards Preparing Dilutions Testing Standards Frequency of Standard Testing Dealing with Errors Standard Additions Calculating Standard Additions Quality Control Standards Calibration Standards Creating a Calibration Curve for a Colorimetric Test Creating a Calibration Curve					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	03 hours/week	100%
2	E-learning		

No	Mode of Instruction	Contact Hours	Percentage
3	Hybrid • Traditional classroom • E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	45 hours
2.	**Laboratory/Studio**	
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	Define the concepts and principles of qualiy measurement in chemistry and related sciences, along with the ability to evaluate and interpret environment chemistry principals	**K1**	-Lectures. -Conduct scientific research. - Seminars. -Discussions -Brainstorming	-Final exam - Midterm exam - Short tests -Quizzes. - Homework - Class exercises - Evaluation of research
1.2	Recognize laboratory skills, quality control standards, and the concepts of experimental chemistry.	**K2**		
...				

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
2.0	**Skills**			
2.3	Perform the Laboratory experiments using the right scientific methods and proper safety procedures	**S1**	Lectures Laboratories Active learning - E-learning -Self-learning -Cooperative Education -Examinations	Final exam - Midterm exam - Short tests -Quizzes. - Homework - Class exercises - Evaluation of research -Practical tests
2.3	Demonstrate the ability to use modern technology and statistical applications that are used in the environmental chemistry	**S3**		
...				
3.0	**Values, autonomy, and responsibility**			
3.3	Self-development, assess own learning and performance and autonomously make decisions regarding self-development and/or tasks based on convincing evidence.	**V3**	Simulation programs Cooperative work	Practical tests
3.4				
...				

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction to Standards Standard Solutions Using Standards to Help with Testing Using Standards Preparing Dilutions Testing Standards Frequency of Standard Testing Dealing with Errors	**10**
2.	Advanced Standard Techniques Standard Additions Calculating Standard Additions	10

	Quality Control Standards Calibration Standards Creating a Calibration Curve for a Colorimetric Test Creating a Calibration Curve Wavelength	
3.	Lab Management and Quality Control Record Keeping Cleanliness Labware Maintenance Use of Standards Stability of Reagents Procedures	10
4.	Method Performance Causes of Error	
5.	Introduction to Statistical Concepts Sample and Population Mean, Standard Deviation, and Coefficient of Variation Method Precision Method Detection Limit	9
6.	Control Charts Creating A Control Chart	3
7.	Troubleshooting Standards	3
8.		

Total		

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quiz	Every week	10
2.	Mid term 1	Week 7	15
3.	Mid term 2	Week 12	15
4.	Homeworks	Every week	10
5.	E-exam	Week 14	10
6.	Final Exam	Week 17	40
...			

*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	An Introduction to Standards and Quality Control for the Laboratory. Barbara Martin. Hach Company, 2002.
Supportive References	
Electronic Materials	
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms, simulation rooms
Technology equipment (projector, smart board, software)	Projector, smart board, software
Other equipment (depending on the nature of the specialty)	NA

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Faculty	Direct
Effectiveness of Students assessment	Faculty	Direct
Quality of learning resources	Peer reviewers	
The extent to which CLOs have been achieved	Program leaders	direct
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**NUMBER 16**
REFERENCE NO.	
DATE	**15/06/1446**