Course Specification
(Bachelor)

Course Title:	Laboratory safety & management
Course Code:	CEM 102
Program:	Chemistry - Industrial chemistry
Department:	**Chemistry**
College:	**Science**
Institution:	**Majmaah university**
Version:	**TP-153**
Last Revision Date:	9/12/2024

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: 2 hours					
2. Course type					
A.	☐University	☐College	☒ Department	☐Track	☐Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: (3rd level)					
4. At the end of this course students should understand all the lab safety methods and technology used in laboratories including laboratory emergencies, chemical hazards, lab signs, Personal Protective Equipment ,managing and working with chemicals, waste handling, case studies of university accidents, laboratory equipment, biosafety, radiation, and animals, and microfabrication and nanomaterials.					
5. Pre-requirements for this course (if any):					
CHM101					
6. Pre-requirements for this course (if any)**: Nil**					
CHM101					
7. Course Main Objective(s): • **Identification the rules and hazards of using laboratories** • **Knowing the different types of lab signs & chemical hazards** • **How to deal with lab accidents including Spills and Fires accidents** • **How to work with different Equipment in the laboratories** • **Working with organic solvents and highly toxic and radiated compounds** • **How to handle different types of waste in the labs** • **Waste management**					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	15 (lectures) 30 (practical)	100% 100%
2	E-learning	0	0
3	Hybrid • Traditional classroom • E-learning	-	-
4	Distance learning	-	-

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	15
2.	**Laboratory/Studio**	30
3.	**Field**	-
4.	**Tutorial**	-
5.	**Others (specify)**	-
Total		45

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 understanding**			

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.2	Recognize laboratory safety skills, quality control standards, and the concepts of safety in different experiments in chemistry.	K2	Lectures labs	• Practical exam • Homework • Mid-term and final exam
2.0	**Skills**			
2.1	Demonstrate laboratory skills, proper safety procedur compliance in laboratory settings.	S1	Lectures Labs - Cooperative Education	• Practical exam • Homework • Mid-term and final exam • Lab reports
2.2	Communicate effectively orally and written using appropriate presentation formats for different issues with recipients of different types	S2	Group work lectures	• Presentation • Small researches
3.0	**Values, autonomy, and responsibility**			
3.2	Work independently and as part of a team	**V2**	GROUP WORK	assessment of group presentations Direct observation

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
3.2				
...				

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction to lab safety , lab signs, hazards signs , and how to work with different types of chemicals	2
3	Risk Assessment, Types of Toxins, Flammable Hazards, Flammability Characteristics, Flammability Classes, Causes of Ignition, Reactive Hazards, Explosives	1
4	Managing and Working with Chemicals Chemical Segregation, Transfer and Transport, Chemical Fume Hoods (Safety, Types, Operation), Other Types of Ventilation)	1
5	Working with Highly Toxic Compounds (General Considerations, Planning, Precautions for Minimizing Exposure – Handling, In the Event of a Spill),. Working with radioactive substances	1
6	Working with flammable substances (standard operating procedures) ii. working with highly reactive or explosive substances and compressed gases	1
	Waste Handling (Characterization of Waste, Collection and Storage).	1

	Solid Wastes (Chemicals, Broken Glass, Sharps, Cylinders, Pick-up)	
	laboratory equipment working with electricity, working with high pressure/vacuum, working with stirring and mixing devices, working with heating devices	1
	Biosafety, Radiation, and Animals, Biological waste handling	1
	Microfabrication and Nanomaterials Hazards of nanoparticles, Preventative Measures Disposal. Microfabrication Chemical hazards associated with microfabrication Instrument hazards associated with microfabrication	1
	total	10
	Practical part	
	Different experiments and instructions on the laboratories safety and hazards and how to use different equipment in the lab.	
Total		**20**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1	Midterm1	6th	10%
	Midterm2	10th	10%
2	E-exam	15th	10%
3	Group discussion and activities	Every week	10%
4	Practical examination	16th	20%
5	Final written Examination	18th	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	Handbook for Laboratory Safety, Benjamin Sveinbjornsson, Sveinbjorn Gizurarson,2022
Supportive References	Laboratory Safety for Chemistry Students, Robert. H. Hill & David C fenister, 2006
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	students	questionnaire
Effectiveness of Students assessment	students	Electronic questionnaire
Quality of learning resources	students	questionnaire
The extent to which CLOs have been achieved	Staff members	Internal revision reports
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**CHEMISTRY**
REFERENCE NO.	**17COMMITTEE**

DATE	16/12/2024