جامعة المجمعة
Majmaah University
كلية العلوم

Chemistry Student Handbook

Academic Year: 2025–2026

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Introduction

Chemistry has been described as the central science, having strong interactions with biology, medicine, engineering, environmental sciences, physics, and mathematics.

Chemistry helps you to understand the world around you, because chemical matter includes the entire physical world, such as the things we use, the food we eat, and even ourselves.

The Department of Chemistry provides the opportunity for the students to obtain a thorough fundamental knowledge of various fields of chemistry such as (but not limited to) organic chemistry, inorganic chemistry, physical chemistry, analytical chemistry and biochemistry.

Close student-faculty interactions have been a hallmark of our Department. The caring and supportive attitude of faculty members creates confidence and enthusiasm in the students to reach where they aspire to be.

The faculty members in the department share the responsibility together to make the department 'The best in the University'. Our facilities are continuously expanding and we are modernizing our laboratories and improving upon education. We are marching forward to blend chemistry education with latest advances in chemical research and introducing relevant courses to keep pace with modern chemistry.

Program vision

Leadership and excellence in the fields of general chemistry and industrial chemistry and their applications, to prepare qualified cadres capable of creative thinking and contributing to scientific research and community development.

Program Mission

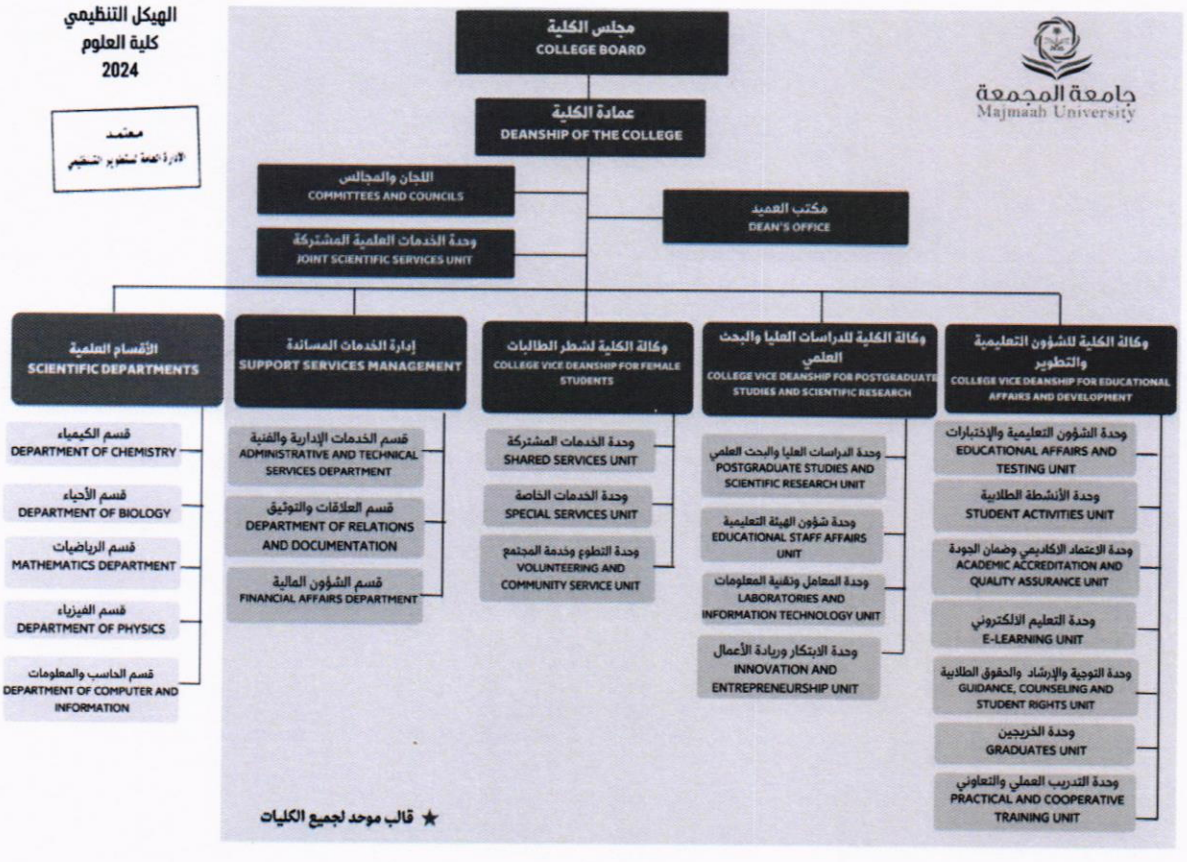
The Department of Chemistry is committed to prepare and qualify innovative and distinguished cadres in the field of Chemistry and its applications. They should be able to compete in Work Market to meet needs of development, improve the Scientific Research System and participate in Community Service.

Program Objectives

- Prepare experts and scientifically qualified pioneers in Chemistry and its applications to satisfy the needs of development plans and work Market in KSA.

- Prepare students for intellectual creativity in the field of chemistry and related fields through the use of modern technology
- Support and encourage scientific research through the communication among public and private institutions especially those that support and fund scientific research.
- Participate in spreading scientific culture and offering consultations in Chemistry for both public and private institution

Organization chart of program



Admission requirements

New students admitted to the Chemistry Department must meet the following requirements:

1- He holds a high school diploma or its equivalent from inside the kingdom or outside.

2- He should have received his high school diploma or its equivalent for five years or less.

3-He must be of good conduct.

4-He must get a study approval in case he works for a governmental or private hand.

5- He must be medically fit.

6- He should meet any other conditions specified by the University Council.

7-He must succeed any test/ interview appointed by the university.

8- He should not be expelled from another university for disciplinary or educational reasons.

9- It is not permitted to accept students obtaining a bachelor's degree.

10- It is not permitted to accept students enrolled in another university degree to get another bachelor's degree from the same university or another

Graduation requirements

The studying cycle of the B.Sc. chemistry program is four years splitted into eight semesters. By the end of the 8th semester, a Bachelor Degree of Science in Chemistry is awarded upon fulfillment of the following graduation requirements:

All students working for their Bachelor's Degree in Chemistry must successfully complete 136 credit hours distributed as follows:

Program Structure	Required/ Elective	No. of courses	Credit Hours
Institution Requirements	Required	4	8
	Elective	2	4
College Requirements	Required	6	18
	Elective	1	2
Program Requirements	Required	28	87
	Elective	6	12
Capstone Course/Project		2	4
Field Training/ Internship		1	1
Residency year		4	8
Others			
Total		54	136

Academic reference standards of program

The Academic Reference Standards represent general expectations about the standards for the award of qualifications at the B.Sc. degree in chemistry, and articulate the attributes and capabilities that the graduates should be able to demonstrate.

The undergraduates of chemistry programs should provide students with an education in the main branches of chemistry, namely:

1. Analytical chemistry: study of the structure, composition and analysis of substances.
2. Inorganic chemistry: study of non-carbon-based compounds.
3. Organic chemistry: study of carbon-based compounds.

4. Physical chemistry: application of concepts and laws to study the characteristics of atoms and molecules as well as chemical reactions. Also, study of the principles and theories of quantum mechanics.

The graduates of the Chemistry should be able to:

1. Recognize the basic principles and theories of chemistry in the development of society.
2. Apply information technology in chemistry and develop his/her professional career.
3. Design and carry out the chemical experiments and estimate the chemical problems and develop solution strategies.
4. Employ scientific facts and theories to analyze, interpret and present practical data using appropriate formats and techniques.
5. Implement self and long life-learning and participate effectively in research activities.
6. Discuss what's up-to-date in chemistry field.
7. Initiate, develop and implement new ideas.
8. Communicate well with his/her colleagues from different social and cultural backgrounds under professional working conditions.

Program intended learning outcomes (PLOs)

Knowledge and understanding

K1. Recognize the fundamental concepts, basic principles and theories related to chemistry

K2. Describe basic concepts and laws in chemistry and related sciences

Skills

S1. Apply the safety principles when dealing with laboratory tools, devices and chemicals

S2. Communicate effectively orally and written using appropriate presentation formats for different issues with different types of recipients.

S3. Demonstrate the ability to use modern technology and statistical applications used in the various fields of chemistry

S4. Perform safely the Laboratory experiments using the right scientific methods

Values

V1. Dealing honestly and professionally with peers and in writing the reports

V2. Show the ability to deal with difficult situations and work under pressure

V3. Demonstrate the ability to teamwork and lead the team and perform the tasks entrusted to him professionally

Study plan of program

Level	Course Code	Course Title	Required or Elective	Pre-Requisite Courses	Credit Hours	Type of requirements (Institution, College, or Program)
Level 1		متطلب جامعة اختياري مجموعة1 Uni. Elective/ group 1	Elective	-	2	-
		متطلب جامعة اختياري مجموع3 Uni. Elective/ group 3	Elective	-	2	-
	SENG101	لغة إنجليزية علمية Scientific English	Required	-	3	-
	BIOL101	أحياء عامة General Biology	Required	-	3	-
	CSI101	مقدمة في الحاسب الآلي Introduction to Computer Science	Required	-	3	-
	CHM101	كيمياء عامة-1 General Chemistry-1	Required	-	3	-
Level 2	**PHYS101**	فيزياء عامة-1 General Physics-1	Required	-	3	-
	MTH231	أسس الرياضيات Basis of Mathematics	Required	-	3	-
	CHM102	كيمياء عامة -2 General Chemistry-2	Required	CHM101	3	-
	CHM111	كيمياء تحليلية- 1 Analytical chemistry-1	Required	CHM101	3	-
	CHM121	كيمياء عضوية -1 Organic chemistry-1	Required	CHM101	4	-

Level	Course Code	Course Title	Required or Elective	Pre-Requisite Courses	Credit Hours	Type of requirements (Institution, College, or Program)
	CHM131	أطوار المادة والمحاليل Phases of Substances and Solutions	Required	CHM101	2	-
Level 3		متطلب جامعة اختياري مجموع2 Uni. Elective/ 2group	Elective	-	2	-
	CHM212	كيمياء تحليلية -2 Analytical chemistry2	Required	CHM 111	3	-
	CHM222	كيمياء عضوية -2 Organic chemistry-2	Required	CHM121	4	-
	CHM241	كيمياء مجموعات رئيسية Main Group Chemistry	Required	CHM102	2	-
	MTH101	حساب تفاضل وتكامل-1 Calculus-1	Required	-	3	-
	PHYS 213	فيزياء عامة-2 General Physics-2	Required	PHYS101	3	-
Level 4		متطلب جامعة اختياري مجموعة1 Uni. Elective/ group 1	Elective	-	2	-
		متطلب جامعة اختياري مجموعة2 Uni. Elective/ group 2	Elective	-	2	-
		متطلب كلية اختياري Elective college requirements	Required	-	2	-
	CHM223	كيمياء عضوية حلقية غير متجانسة	Required	CHM222	3	-

Level	Course Code	Course Title	Required or Elective	Pre-Requisite Courses	Credit Hours	Type of requirements (Institution, College, or Program)
		Heterocyclic organic chemistry				
	CHM242	كيمياء العناصر الانتقالية والتناسقية Transition metals and Coordination Chemistry	Required	CHM 241	3	-
	CHM232	كيمياء ديناميكا حرارية Thermodynamic Chemistry	Required	MTH101	3	-
	CHM251	متطلب قسم اختياري	Elective		2	-
	CHM244	Elective department requirement				
Level 5		متطلب جامعة اختياري مجموعة 1 Uni. Elective/ 1 group	Elective	-	2	-
	CHM324	كيمياء البوليمرات والبتروكيماويات Polymers & Petrochemicals Chemistry	Required	CHM222	2	-
	CHM333	كيمياء السطوح والغرويات والحفز Surface, Colloids and Catalysis Chemistry	Required	CHM232	3	-
	43CHM3	كيمياء الكم Quantum chemistry	Required	MATH101	3	-
	45CHM3	كيمياء العضو معدنية Organometallic chemistry	Required	CHM242	2	-
	CHM361	كيمياء حيوية-1 Biochemistry-1	Required	CHM222	3	-

Level	Course Code	Course Title	Required or Elective	Pre-Requisite Courses	Credit Hours	Type of requirements (Institution, College, or Program)
Level 6	5CHM32	كيمياء فراغية Stereochemistry	Required	CHM222	2	-
	CHM334	كيمياء كهربية Electrochemistry	Required	PHYS213	3	-
	5CHM33	كيمياء حركية Kinetic chemistry	Required	CHM232	3	-
	CHM362	كيمياء حيوية-2 Biochemistry-2	Required	CHM361	3	-
		مقرر حر اختياري Free elective course	Elective	-	3	-
	CHM363	متطلب قسم اختياري Elective department requirement	Elective	CHM361	2	-
	CHM336			-		-
Level 7	CHM413	التحليل الطيفي والكهربي Spectroscopic & electric analysis	Required	CHM334	3	-
	CHM426	كيمياء النواتج الطبيعية Natural products chemistry	Required	CHM223	3	-
	CHM437	كيمياء نووية واشعاعية Nuclear and radiochemistry	Required	CHM242	3	-
	CHM453	كيمياء النانو Nano Chemistry	Required	CHM333	2	-
		مقرر حر اختياري Free elective course	Elective	-	3	-
	CHM472	مشروع تخرج 1(خطة اعداد البحث) Graduation project (theoretical part)	Required	Complete 80 credit hours	2	-
	CHM452		Elective	-	2	-

Level	Course Code	Course Title	Required or Elective	Pre-Requisite Courses	Credit Hours	Type of requirements (Institution, College, or Program)
	CHM463	متطلب قسم اختياري Elective department requirement			2	-
Level 8	**CHM414**	طرق الفصل الكروماتوجرافي Methods of chromatographic analysis	Required	CHM333	3	-
	CHM427	ميكانيكية التفاعلات العضوية Mechanisms of organic reactions	Required	CHM325	2	-
	CHM428	أطياف المركبات العضوية Spectroscopy of organic compounds	Required	CHM413	3	-
	CHM438	كيمياء كهربية متقدمة Advanced electrochemistry	Required	CHM334	3	-
	CHM454	الكيمياء الخضراء Green chemistry	Required	-	2	-
	CHM455	كيمياء عضوية تطبيقية Applied organic chemistry	Required	CHM222	3	-
	CHM473	مشروع تخرج 2 (الجزء العملي) Graduation project-2 (practical part)	Required	CHM472	2	-

Program key performance indicators (KPIs)

Key Performance Indicators (KPIs)

List the results of the program's key performance indicators (including the key performance indicators required by the National Center for Academic Accreditation and evaluation)

Performance indicators are important tools for assessing the quality of Academic Programs and monitoring their performance. They contribute to continuous development processes and decision-making support. The National Center for Academic Accreditation and Evaluation has identified 11 key performance indicators at the program level. All of these are in line with the program accreditation standards version 2023. These indicators are the minimum to be periodically measured, and the academic program can use additional performance indicators if it believes they are necessary to ensure the quality of the program. It is expected that the academic program measures the key performance indicators with benchmarking using the appropriate tools, such as (Surveys, Statistical data, etc.) according to the nature and objective of each indicator, as well as determining the following levels for each indicator:

- Actual performance
- Targeted performance level
- Internal reference (Internal benchmark)
- External reference (External benchmark)
- New target performance level

A report describing and analyzing the results of each indicator (including performance changes and comparisons according to sites and gender) is expected with precise and objective identification of strengths and aspects that need improvement.

Program Key Performance Indicators (KPIs)

Including the key performance indicators required by the NCAAA.

No	KPI	KPI
1	**KPI-P01**	Percentage of achieved indicators of the program operational plan objectives
2	**MU-P1**	Stockholders' satisfaction with community services
3	**KPI-P02**	Students' Evaluation of quality of learning experience in the program
4	**KPI-P03**	Students' evaluation of the quality of the courses
5	**KPI-P04**	Completion Rate

6	KPI-P05	First-year student retention rate
7	KPI-P06	Students' performance in the professional and/or national examinations
8	KPI-P07	Graduates' employability and enrolment in postgraduate programs
9	KPI-P08	Average number of students in the class
10	KPI-P9	Employers' evaluation of the program graduate's proficiency
11	KPI-P10	Students' satisfaction with the offered services
12	MU-P2	Percentage of students who received a warning or more
13	MU-P3	The percentage of deprived students
14	MU-P4	The number of student research papers that were published or presented at scientific conferences during the past year
15	KPI-P11	The ratio of students to teaching staff
16	KPI-P12	Percentage of teaching staff distribution
17	31KPI-P	The proportion of teaching staff leaving the program
18	41KPI-P	Percentage of publications of faculty members
19	51KPI-P	Rate of published research per faculty member
20	61KPI-P	Citations rate in refereed journals per faculty member
21	MU-P5	The percentage of full-time faculty members who provided professional development activities inside .or outside the university during the year
22	71KPI-P	Satisfaction of beneficiaries with the learning resources

Assessment Methods for program learning outcomes

The program devises a plan for assessing Program Learning Outcomes (all learning outcomes should be assessed at least twice in the bachelor program's cycle and once in other degrees):

1. Direct assessment method

All the courses link with program outcomes and the questions match with KPI so, we can directly measure outcomes.

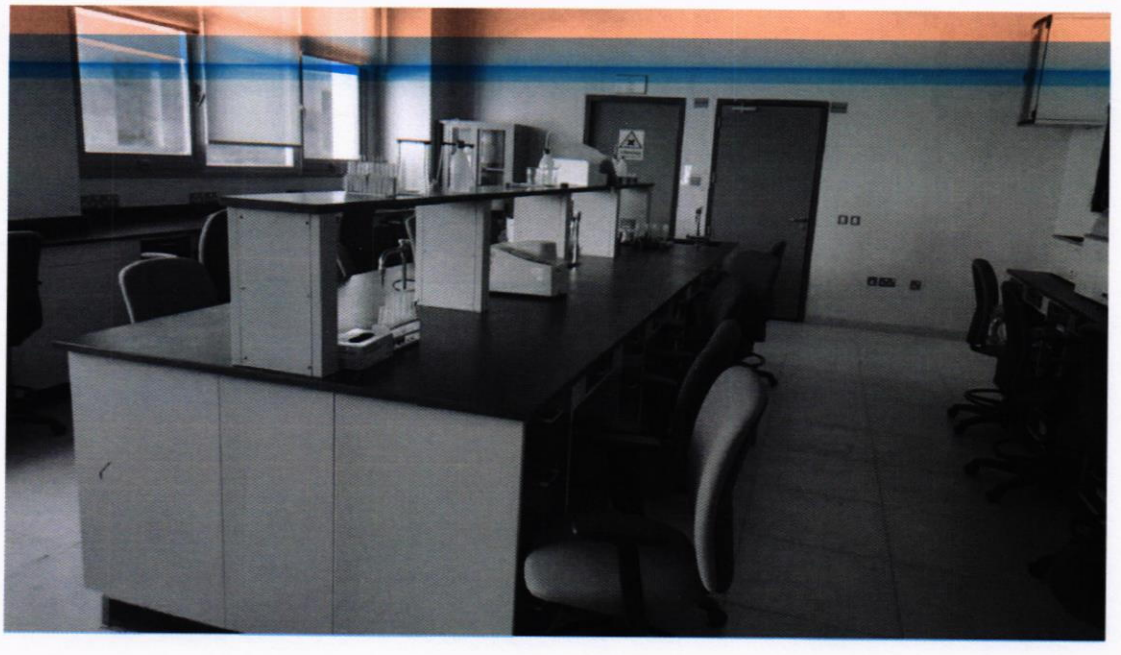
2. In Direct assessment method

Application of program evaluation questionnaires for graduates, students, Employer and stockholders

Facilities (Classrooms – Laboratories - Specialized equipment, etc.)

The Department of Chemistry is located in the College of Science building (Al Zulfi). The building houses the classrooms and instructional laboratories as well as the offices.

College of Science at Al-Zulfi -Majmaah University



Chemistry labs

Classroom facilities

The classrooms in the college of science are equipped with Smart Board functionalities or projectors which allow teachers to connect and collaborate with students in the best way. However, classrooms are, also, equipped with a white board. Each classroom can accommodate 20 - 35 students

Facilities and equipment

Specialized committees are formed in the program to determine the names of the books and references prescribed for all courses and the quantity required of each according to the student's number.

-A list of the required books and references recorded by the committee.

-The list of books and references is a certified by the Chemistry Program Council

-The a certified list of books and references is submitted to concerned authorities.

-These references are available in time before the beginning of the semester.

-Some internationally approved books are translated by faculty members.

- The public library of the university is available for all.

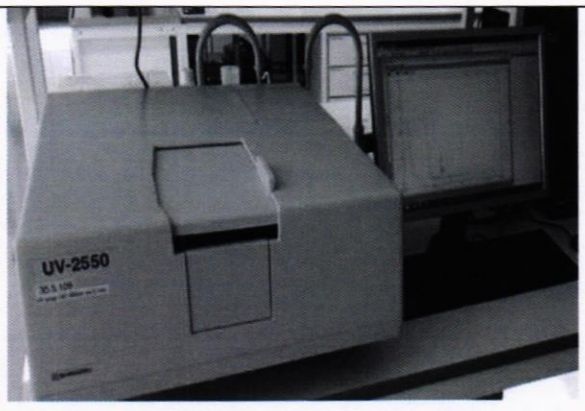
- Participate in the university database, which provides access to most international publishers.

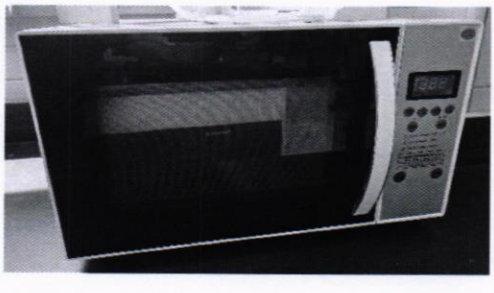
- The participation in the Saudi Digital Library is to allow for all program members.

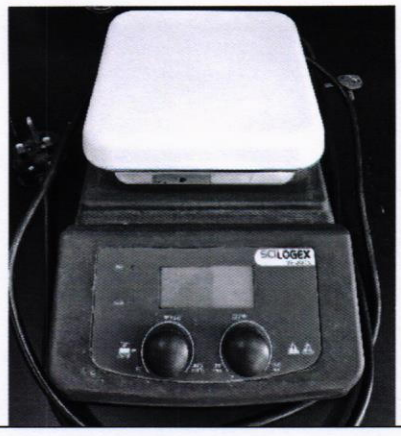
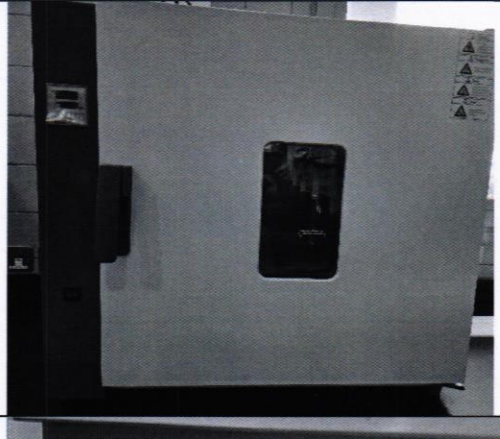
- Evaluate program laboratories, and monitor materials, equipment and tools that need to provide before the beginning of each semester.

- The faculty members of the program toured all the designated classrooms of the program and identified the needs before the beginning of the semester

The labs are well equipped with the necessary lab technology and equipment providing a good interdisciplinary collaborative environment through a discreetly designed plan of adjacent lab-spaces. Some equipment in chemistry laboratories are:

	Apparatus	Description
1		**Spectrophotometer UV 2550:** UV-2550 measures the absorbance, transmittance and reflectance for solid, thin film and liquid samples in wavelength from 200 to 800 nm.
2		**Model 225 Atomic Absorption Spectrophotometer:** Atomic absorption is suitable for measurement of a limited range of elements present at concentrations greater than approximately 1 $\mu g\ ml^{-1}$ in fluids, and for the analysis of solutions obtained from different sources. It measures the concentrations of several metals ions.
3	 InfraLUM FT-08 Fourier Transform Infrared Spectrometer	**Genesys 10S UV-Vis spectrophotometer:** It offers easy, flexible analysis for laboratories and classrooms, equally capable of routine and specialized analysis. It offers a full spectrum and determines the functional groups in either a liquid or solid sample
4		**pH meter:**

		It measures the pH of the aqueous solution
5		**Rota Vap:** It is used for evaporation processes through phases separation
6		**Spectrophotometer UV Thermofischer:** It measures the absorbance of the colored solutions and allows the determination of samples determination
7		**Furnace:** It allows the drying of solid samples at moderate temperatures
8		**Microwave:** It allows some reactions to be proceeded through microwave radiations

9		**Hotplate:** It allows some reactions to be proceeded through stirring at different temperatures
10		**Balance:** It measures the weight of samples at high accuracy (10^{-4})
10		**Furnace:** It allows the drying of solid samples at moderate temperatures
11		**Furnace:** It allows the carbonization of solid samples at high temperatures (even more than 1000°C)

Computer Facilities

The university offers personal Windows laptop computers for all staff. All the department members have the access to internet, printers, and copier. The deanship of

information technology and e-learning maintains a continuous supply of both software and data, and maintaining these systems in function.

Library facilities

There are University central library and college library. These libraries are providing students, faculty members, staff, and the community with collections of different book titles in different fields of Chemistry and others.

Procedures to ensure a healthy and safe learning environment

The Department of Chemistry is committed to the provision of a safe and healthy working, training and learning environment for all its faculty members, nonacademic staff members, students and visitors. The Department aims to prevent any accidents from occurring and will take all possible steps to make the Department a safe workplace. Where reasonably and practically possible, the Department is committed to:

1. Safety and Health

Making every effort to ensure health and safety in all phases of teaching, research, and in the development and commissioning of equipment/experiments and facilities. In this respect, we will identify all safety and health hazards and review constantly safety and health policies, rules and guidelines to reduce, if not eliminate, any hazards present. We will ensure that all faculty members, nonacademic staff members, students, take it as a personal responsibility to prevent injury to themselves and/or their colleagues.

2. No Accidents and Injuries

Making every effort to achieve a safe and healthy working environment.

3. Environmental Protection

Making every effort to minimize and defuse wastes and emissions so as to preserve the local environment

4. Conformance with Laws and Regulations

Complying with all relevant University and legal requirements in relation to safety, health and environmental policies.

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5. Education and Training

Establishing and promoting safety and health awareness by offering both in-house or external training courses, and communicating the importance of such awareness to prevent accidents and injuries.

6. Continual Improvement

Establishing and implementing a management system to ensure health and safety in our activities as well as to protect the environment, and continually improving this system at all levels of our organization.

Graduates employment opportunities

1. Research and Scientific Institutions
2. Chemistry teachers.
3. Industry (in Research and Development).
4. Environmental observatory.
5. Hospitals and Health centers.
6. Water and power stations.
7. Forensic and control of food products.
8. Organization for Standardization and Metrology and quality laboratories.
9. Pharmaceutical factories.
10. The field of mining and petroleum.