جامعة الأمير سطام بن عبد العزيز
Prince Sattam Bin Abdulaziz University

Academic Guide of the Chemistry Department

Prince Sattam bin Abdul-Aziz University

College of Science &Humanities

Department of Chemistry

CONTENTS

Chairman's message

A word from the Head of Department

All praise to ALLAH, The Most Gracious, and The Most Merciful.

It is evident that academics have a major contribution in enhancing the life of man and developing societies. The Kingdom believes in this role as a key factor that leads to the fulfillment of its ambitions.

The College of Science and Humanities is one of the pillars on which Salman bin Abduaziz University stands loftily. In 1433 AH, the Department of Chemistry is an outcome of the University's endeavors that aim at providing the local market well qualified, trained and educated personnel in the field of chemistry. The girls section was inaugurated in the academic year 1433-34, while the boys section was established the following year.

Keeping up with the latest technological discoveries is of great importance for the Department of Chemistry. Nonetheless, the faculty is aware of the huge responsibility attributed to them. This results in graduates who are ready and equipped with the latest in their field.

This guide has been prepared to provide as much valuable information as possible, which is a mere application of the College's mission that aims at providing the society with the required workforce.

Finally, we hope that our Department is a valuable addition to the College of Science and Humanities. The Department will boost future development processes in the Kingdom by adding its professional workforce.

Dr. Thamer , HOD

Department of Chemistry

About the Department

Chemistry, literally and practically, is introduced by Arab Muslims. Chemistry is the science that deals with the study of the nature of the material, structure and its chemical changes. This study makes it an essential component of any institutional organization. So, no science college exits in absence of Department of Chemistry or Department of Applied Chemistry or Department of Organic Chemistry or Department of Biochemistry etc. because these departments are as important as Department of Physics, Department of Biology or Department of Geology.

As per the directions of the Higher Education Counsel in its 66th meeting dated 20/10/1432 AH, the College of Science and Humanities extended a huge effort in reforming a number of the departments at Salman bin Abduaziz University. Hence a modern Chemistry Department was established. It provides students with opportunities to sharpen their capabilities in chemical, technical, and manufacturing knowledge and skills. In addition, the Department of Chemistry serves many other colleges within the governorate including College of Engineering, College of Information Technology, and the Medical Colleges. Finally, we are expecting to announce a number of laboratories which will be beneficial in the learning process and in research.

Vision

Distinction in the studies of chemical sciences and scientific research at national level to serve the community.

.

Mission

Contribute effectively to national development through qualified and competitive graduates and stimulate research-based knowledge to enrich the community.

Objectives

1. Provide students with theoretical and practical Chemistry-related skills along with talents that fit the current scientific developments.
2. Prepare qualified individuals to meet the needs of the national, educational and industrial development plans.
3. Conduct scientific research work that best serve the interests of the Saudi society.
4. Encourage further scientific researches through collaboration with local and foreign research institutes.
5. Hold conferences and symposiums to share and broaden scientific knowledge to the community.
6. Render Chemistry-related technical services to both public and private sectors.

Work opportunities

Students:

- As demonstrators in the University or other universities, military colleges, or higher education institutes depending on the grades obtained.
- As research assistants or laboratory technicians in the universities.
- As quality control technicians in government or hospitals laboratories.
- Chemical industry companies.
- Defense industry.
- As schoolteachers for science subjects.

Degree Program

Chemistry Department offers the Bachelor of Science in Chemistry (B.Sc)

Degree Requirements:

The Curriculum Leading to the Degree of Bachelor of Science in Chemistry

Students must successfully complete 138) credits to earn a bachelor's degree in Chemistry as shown in the following table:

Requirements	No. of Courses	Credit Hours
Preparatory year requirements	11	31
University requirements	4	8
Specialized compulsory requirements (inside department)	26	70
Specialized elective requirements (inside department)	3	6
Compulsory requirements (outside department)	3	11
Elective requirements (outside department)	2	6
Free elective requirements (outside department)	2	6
Total	**51**	**138**

First: Preparatory Year Requirements (31 credits):

Course Code	Course Name	Credit Hours	Prerequisite
1210 ENG	Reading Skills	3	---
1220 ENG	Writing Skills	3	---
1230 ENG	Listening and Speaking Skills	3	---
1604 ENG	Scientific English Language	3	---
1050 MATH	Differential Calculus	3	---
1060 MATH	Integral Calculus	3	---
PHYS 1010	General Physics (1)	4	---
1400 COM	Communication Skills	2	---
1400 TECH	Computer Skills	3	---
101 SALAM	Introduction to Islamic Culture	2	---
101 ARAB	Language Skills	2	---
Total Credit Hours		**31**	

Second: University Requirements (8 credits):

Course Code	Course Name	Units	Prerequisite
102 SALAM	Islam and Building of Society	2(2,0,0)	---
103 SALAM	Economic System in Islam	2(2,0,0)	---
104 SALAM	Fundamentals of the Political System in Islam	2(2,0,0)	---
103 ARAB	Arabic Composition	2(2,0,0)	---
Credit Hours		**8(8, 0, 0)**	

Third: Department Requirements:

A) Compulsory Courses at the Department (70 credits):

Course Code	Course Name	Units	Prerequisite
CHEM 2010	General Chemistry (1)	4(3,0,1)	---
CHEM 2020	General Chemistry (2)	4(3,0,1)	---
CHEM 2110	Inorganic Chemistry (1)	3(2,1,0)	CHEM 2010
CHEM 3120	Inorganic Chemistry (2)	3(3,0,0)	CHEM 2110
CHEM 3130	Coordination Chemistry	2(2,0,1)	CHEM 3120
CHEM 4140	Organometallic Chemistry	2(2,0,0)	CHEM 2110, CHEM 2410
CHEM 4150	Selected Topics in Inorganic Chemistry	2(2,0,0)	CHEM 3130
CHEM 2210	Analytical Chemistry (1)	4(3,0,1)	CHEM 2010
CHEM 3220	Analytical Chemistry (2)	4(3,0,1)	CHEM 2210
CHEM 3230	Spectroscopic Methods of Analysis	3(2,0,1)	CHEM 3220
CHEM 4240	Chromatography	2(2,0,0)	CHEM 3220
CHEM 3310	Physical Chemistry (1)	4(3,1,1)	CHEM 2020

CHEM 3320	Physical Chemistry (2)	4(3,1,1)	CHEM 3310
CHEM 4330	Electrochemistry	2(2,0,0)	CHEM 3320
CHEM 4340	Surface and Catalysis Chemistry	2(2,0,0)	CHEM 3320
CHEM 2410	Organic Chemistry (1)	4(3,0,1)	CHEM 2010
CHEM 3420	Organic Chemistry (2)	4(3,0,1)	CHEM 2410
CHEM 3430	Polymer Chemistry	2(2,0,0)	CHEM 3420
CHEM 4440	Natural Products Chemistry	2(2,0,0)	CHEM 3420
CHEM 4450	Organic Reaction Mechanism	2(2,0,0)	CHEM 3420
CHEM 4460	Organic Spectroscopy	3(2,0,1)	CHEM 3420
CHEM 4470	Petroleum Chemistry	2(2,0,0)	CHEM 3420
CHEM 4980	Research Project (1)	1(0,0,1)	CHEM 3120, CHEM 3420 CHEM 3220, CHEM 3320
CHEM 4990	Research Project (2)	2(0,0,2)	CHEM 4980
CHEM 4010	Ethics	1(1,0,0)	---
CHEM 4590	Summer Training	2(0,0,15)	---
Credit Hours		**70(54, 3, 29)**	

B) Obligatory Courses at other Departments (11 credits):

Course Code	Course Name	Units	Prerequisite
PHYS 2310	General Physics (2)	4(3,1,1)	PHYS 1010
BIOCHEM 3010	General Biochemistry	3(2,0,1)	Chem 2010
BIO 2010	General Biology (1)	4(3.0,1)	---
Credit Hours		**11(8, 1, 3)**	

C) Elective Courses at the Department (6 credits):

The student selects three courses from the following list:

Course Code	Course Name	Units	Prerequisite
CHEM 4160	Applications of Transition Metals	2(2,0,0)	CHEM 3130
CHEM 4170	Nuclear and Radiochemistry	2(2,0,0)	CHEM 2110
CHEM 4270	Statistical Methods in Analytical Chemistry	2(2,0,0)	CHEM 3220
CHEM 4260	Environmental and Pollution Chemistry	2(2,0,0)	CHEM 2210
CHEM 4370	Corrosion Chemistry	2(2,0,0)	CHEM 4340
CHEM 4350	Industrial Chemistry	2(2,0,0)	CHEM 3320
CHEM 4360	Quantum Chemistry	2(2,0,0)	CHEM 3320
CHEM 4480	Carbohydrates Chemistry	2(2,0,0)	CHEM 3420
CHEM 4490	Fundamentals of Nanochemistry	2(2,0,0)	CHEM 2010

E) Elective Courses at other Departments (6 credits):

The student selects two courses from the following list:

Course Code	Course Name	Units	Prerequisite
STAT 2010	Fundamentals of Statistics and Probabilities	3(3,1,0)	MATH 1060
MATH 3410	Differential Equations	3(3,1,0)	MATH 1060
ZOO 2410	Animal Physiology	3(2,0,1)	BIO 2010
PHYS 2110	Optics (1)	3(3,1,0)	PHYS 1010
PHYS 2230	Advanced Physics	3(3,1,0)	PHYS 1010
PHYS 2410	Thermodynamics	3(3,1,0)	PHYS 1010 MATH 1060

F) Free Elective Courses (6 credits):

Students may select up to six credit hours for the development of their professional skills either from the core courses or outside the College of Science and Humanity Studies. The selected courses must meet the prerequisite.

G) Field Training:

Each student will be required to complete a training period for seven weeks appropriate to their studies in an approved place after passing 95 credit hours.

Study Plan:

First Level:

Course Code	Course Name	Units	Prerequisite
1050 MATH	Differential Calculus	3(3,1,0)	--
1210 ENG	Reading Skills	3(2,1,1)	--
1220 ENG	Writing Skills	3(2,1,1)	--
1230 ENG	Listening and Speaking Skills	3(2,1,1)	--
1400 TECH	Computer Skills	3(2,0,1)	--
Credit Hours		**15(11, 4, 4)**	

Second Level:

Course Code	Course Name	Units	Prerequisite
101 SALAM	Introduction to Islamic Culture	3(2,0,0)	---
101 ARAB	Language Skills	3(2,0,0)	---
1010 PHYS	General Physics (1)	4(3,1,1)	---
1060 MATH	Integration Calculus	3(3,1,0)	---
1400 COM	Communication Skills	2(0,0,0)	---
1604 ENG	Scientific English Language	3(1,0,2)3	---
Credit Hours		**16(14, 2, 2)**	---

Third Level:

Course Code	Course Name	Units	Prerequisite	Accompanied Requirement
***	University Requirement	2(2,0,0)	---	---
CHEM 2010	General Chemistry (1)	4(3,0,1)	---	---
CHEM 2020	General Chemistry (2)	4(3,0,1)	---	---
PHYS 2310	General Physics (2)	4(3,1,1)	PHYS 1010	---
BIO 2010	General Biology (1)	4(3,0,1)	---	---
Credit Hours		**18(14, 1, 4)**	---	---

Forth Level:

Course Code	Course Name	Units	Prerequisite	Accompanied Requirement
***	University Requirement	2(2,0,0)	---	---
CHEM 2210	Analytical Chemistry (1)	4(3,0,1)	CHEM 2010	---
CHEM 2110	Inorganic Chemistry (1)	3(2,1,0)	CHEM 2010	---
CHEM 2410	Organic Chemistry (1)	4(3,0,1)	CHEM 2010	---
***	Free Elective	3(3,0,0)	---	---
Credit Hours		**16(13, 1, 2)**		

Fifth Level:

Course Code	Course Name	Units	Prerequisite	Accompanied Requirement
***	University Requirement	2(2,0,0)	---	---
CHEM 3120	Inorganic Chemistry (2)	3(3,0,0)	CHEM 2110	---
CHEM 3310	Physical Chemistry (1)	4(3,1,1)	CHEM 2020	---
CHEM. 3420	Organic Chemistry (2)	4(3,0,1)	CHEM 2410	---
CHEM 3220	Analytical Chemistry (2)	4(3,0,1)	CHEM 2210	---
Credit Hours		**17(14, 1, 3)**		

Sixth Level:

Course Code	Course Name	Units	Prerequisite	Accompanied Requirement
***	University Requirement	2(2,0,0)	---	---
BIOCHEM 3010	General Biochemistry	3(2,0,1)	---	---
CHEM 3320	Physical Chemistry (2)	4(3,1,1)	CHEM 3310	---
CHEM 3230	Spectroscopic Methods of Analysis	3(2,0,1)	CHEM 3220	---
CHEM 3130	Coordination Chemistry	2(2,0,1)	CHEM 3120	---
CHEM 3430	Polymer Chemistry	2(2,0,0)	CHEM 3420	---
CHEM***	Elective course in Chemistry	2(2,0,0)	---	---
Credit Hours		**18(15, 1, 4)**		---

Field Trimester

Course Code	Course Title	Units	Prerequisite	Accompanied Requirement
CHEM 4590	Field Training	2(0,0,15)	---	---
Credit Hours		**2(0, 0, 15)**		

(Field Training): The student will be encouraged to obtain a period of seven week's approved industrial training experience in Chemistry as a major requirement after passing 95 credit hours.

Seventh Level:

Course Code	Course Name	Units	Prerequisite	Accompanied Requirement
CHEM 4330	Electrochemistry	2(2,0,0)	CHEM 3310	---
CHEM 4140	Organometallic Chemistry	2(2,0,0)	CHEM 2110 CHEM 2410	---
CHEM 4440	Natural Products Chemistry	2(2,0,0)	CHEM 3420	---
CHEM 4450	Organic Reaction Mechanism	2(2,0,0)	CHEM 3420	---
CHEM 4240	Chromatography	2(2,0,0)	CHEM 3220	---
CHEM 4980	Research Project (1)	1(0,0,1)	CHEM 3120 CHEM 3420 CHEM 3220 CHEM 3320	---
CHEM***	Chem. Elective	2(2,0,0)	---	---
CHEM 4340	Surface and Catalysis Chemistry	2(2,0,0)	CHEM 3320	---
***	Elective (outside Dept.)	3(3,0,0)	---	---
Credit Hours		**18(17, 0, 1)**		

Eighth Level:

Course Code	Course Name	Units	Prerequisite	Accompanied Requirement
CHEM 4460	Organic Spectroscopy	3(2,0,1)	CHEM 3420	---
CHEM 4470	Petroleum Chemistry	2(2,0,0)	CHEM 3420	---
CHEM 4150	Selected Topics in Inorganic Chemistry	2(2,0,0)	CHEM 3130	---
CHEM 4990	Research Project (2)	2(0,0,2)	CHEM 4980	---
CHEM 4010	Ethics	1(1,0,0)	---	---
***	Elective (outside Dept.)	3(3,0,0)	---	---
CHEM***	Elective Course in Chemistry	2(2,0,0)	---	---
***	Free course	3(3,0,0)	---	---
Credit Hours		**18(15, 0, 3)**		

Service Courses:

The courses offered by the Department of Chemistry to other departments inside and outside the College of Science and Humanity Studies.

Course Code	Course Name	Units	Remarks
CHEM 1010	General Chemistry for Engineering Students	4(3,1,1)	---
CHEM 2170	Fundamentals of Inorganic Chemistry for Physics Students	2(2,0,0)	---
CHEM 2470	Fundamentals of Organic Chemistry for Physics Students	2(2,0,0)	---
CHEM 2480	Organic Chemistry for Biology Students	2,0,1)(2	---
CHEM 106	Organic Chemistry for Health College Students	2(2,0,0)	---

Courses for Labor Market:

Course code	Course Title	Units	Remarks
CHEM 4140	Organometallic Chemistry	2(2,0,0)	---
CHEM 3230	Spectroscopic Methods of Analysis	3(2,0,1)	---
CHEM 4240	Environmental and Pollution Chemistry	2(2,0,0)	---
CHEM 4440	Natural Products Chemistry	2(2,0,0)	---
CHEM 4360	Industrial Chemistry	2(2,0,0)	---
CHEM 4340	Surface and Catalysis Chemistry	2(2,0,0)	---
CHEM 4470	Petroleum Chemistry	2(2,0,0)	---
CHEM 4460	Fundamentals of Nanochemistry	2(2,0,0)	---
CHEM 4980	Research Project	)0,0,2(2	---

Description of B.Sc. Courses:

Course Code: CHEM 2010	**الرمز والرقم: 2010 كيم**
Course Title: General Chemistry I	**أسم المقرر: كيمياء عامة (1)**
Credit Hours: 4(3،0،1)	**الوحدات الدراسية: 4(3،0،1)**
Level: 3rd	**المستوى: الثالث**
Prerequisites: -	**متطلب سابق: -**

Course contents

Measurements and significant figures, chemical reactions; stoichiometry; the gaseous state;; electronic structure and periodicity; chemical bonding; states of matter and intermolecular forces; introduction to Organic Chemistry

The experimental section includes experiments dealing with the following topics: safety and laboratory rules; chemical observations; stoichiometry; volumetric analysis; oxidation and reduction; colligative properties; chemical kinetics; equilibrium.

Course Code: CHEM 2110	**الرمز والرقم: 2110 كيم**
Course Title: Inorganic Chemistry I	**أسم المقرر: كيمياء غير عضوية (1)**
Credit Hours: 3(2،1،0)	**الوحدات الدراسية: 3(2،1،0)**
Level: 4th	**المستوي: الرابع**
Prerequisites: CHEM 2010	**متطلب سابق: 2010 كيم**

Course contents

The Electronic Structure of Atoms (Basic structure of atoms – The nature of light – The Photoelectric effect – Bohr's theory of the hydrogen atom – Quantum mechanics – Quantum number – Atomic orbitals – Electronic configuration – the building-up principle) – The Periodic Table (Development of the periodic table – Periodic classification of the element – Periodic variation in physical properties – Ionization energy – Electron affinity) – Chemical Bonding (Lewis dot symbols – Ionic bond – Covalent bond – Electronegativity – Lewis structures – Resonance – Exceptions to the octet rule) - Molecular Geometry (The VSEPR model – Dipole moment – Valance bond theory –Hybridization – description of multiple bonds – Molecular orbital theory). The tutorial section includes solving problems, Inorganic nomenclature and Molecular Geometry

Course Code: CHEM 3120	**الرمز والرقم: 3120 كيم**
Course Title: Inorganic Chemistry II	**أسم المقرر: كيمياء غير عضوية (2)**
Credit Hours: 3(3،0،0)	**الوحدات الدراسية: 3(3،0،0)**
Level: 5th	**المستوي: الخامس**
Prerequisites: CHEM 2110	**متطلب سابق: 2110 كيم**

Course contents

Chemistry of hydrogen and its compounds – Chemistry of main groups (Metallic and nonmetallic properties – Oxidation states – Study the main elements from group one to group eight) – Chemistry of transition metals (Properties – Oxidation states – study the chemistry of some selected transition metals).

Course Code: CHEM 3130	**الرمز والرقم: 3130 كيم**
Course Title: Coordination Chemistry	**أسم المقرر: كيمياء تناسقية**
Credit Hours: 2(2،0،1)	**الوحدات الدراسية: 2(2،0،1)**
Level: 6th	**المستوي: السادس**
Prerequisites: CHEM 3120	**متطلب سابق: 3120 كيم**

Course contents

Coordination Chemistry (Formation of complexes – Types of ligands- Verner Theory- naming coordination compounds – different types of isomerism in coordination compounds)-Valance bond theory – Crystal field theory – molecular orbital theory – Structure in coordination compounds – Color and Magnetic properties of complexes

The experimental section includes preparation, characterization and spectral studies of some transition metal complexes.

Course Code: CHEM 4140	**الرمز والرقم: 4140 كيم**
Course Title: Organometallic Chemistry	**أسم المقرر: كيمياء عضوية معدنية**
Credit Hours: 2(2،0،0)	**الوحدات الدراسية: 2(2،0،0)**
Level: 7th	**المستوي: السابع**
Prerequisites: CHEM 2110, CHEM 2410	**متطلب سابق: 2110 كيم، 2410 كيم**

Course contents

Definition and stability of organometallic compounds – derivatives of metals of group 1A to 5A – electron deficient bonds – transition metal complexes – classification of ligands – 18 electron rule-theoretical background of the rule – carbonyl complexes bonding structure and synthesis – pi-complexes bonding and reactions – oxidative addition reactions – insertion reactions – homogeneous catalysis examples.

Course Code: CHEM 4150	**الرمز والرقم: 4150 كيم**
Course Title: Selected Topics in Inorganic Chemistry	**أسم المقرر: موضوعات مختارة في الكيمياء غير العضوية**
Credit Hours: 2(2،0،0)	**الوحدات الدراسية: 2(2،0،0)**
Level: 6th	**المستوي: السادس**
Prerequisites: CHEM 3130	**متطلب سابق: 3130 كيم**

Course contents

This course contains some selected topics in inorganic chemistry such as inorganic chains,clusters and cages, inorganic reaction mechanisms, the chemistry of aqueous and non-aqueous solvents, essential and trace elements in biological systems and the chemistry of noble gases., parallels between main groups and organometallic chemistry (isolobl analogy).

Course Code: CHEM 4490	**الرمز والرقم: 4490 كيم**
Course Title: Fundamentals of Nanochemistry	**أسم المقرر: أساسيات كيمياء النانو**
Credit Hours: 2(2،0،0)	**الوحدات الدراسية: 2(2،0،0)**
Level: -	**المستوي: -**
Prerequisites: CHEM 2010	**متطلب سابق: 2010 كيم**

Course contents

Introduction (A Brief History of Nanorevolution – Physical Limitations of traditional semiconductor Electronics – Revolutionary Nanotechnologies – Solid state against soft matter in Nanotechnologies) – Wet Technologies for the formation of organic Nanostructures (Traditional Chemical Routes for Nanostructure Processing – Electrostatic self assembly – Spin coating) – Structure study of Organic/Inorganic Nanocomposities (Morphology and Crystallography of Nanostructured Materials Prepared by Chemical Routes – Elemental and Chemical composition of organic/inorganic Nanostructures) – Optical properties of organic/inorganic Nanostructures (Optical constants of organic /inorganic Nanostructures – The effect of quantum Confinement on optical properties of low Dimensional Systems – Optical spectra semiconductor Nanoparticles in organic films)

Course Code: CHEM 4160	**الرمز والرقم: 4160 كيم**
Course Title: Applications of Transition Metals	**أسم المقرر: تطبيقات معادن انتقالية**
Credit Hours: 2(2،0،0)	**الوحدات الدراسية: 2(2،0،0)**
Level: -	**المستوي: -**
Prerequisites: CHEM 3130	**متطلب سابق: 3130 كيم**

Course contents

Homogeneous Transition Metal Catalysts (Carbonylation of alkenes and alkenes catalyzed by metal – Preparation of organotransition metal complexes) – Basic Chemistry of transition metal complexes and their reaction patterns (Formation of transition metal complexes – Fundamental reactions of transition metal complexes – Comparisons of transition metal catalyzed reactions with Grignard reactions) – Synthetic reactions via transition metal carbine complexes (Chemistry of transition metal carbine complexes – Catalytic metatheses of Alkenes and Alkynes and their synthetic applications)

Course Code: CHEM 2170	**الرمز والرقم: 2170 كيم**
Course Title: Fundementals of Inorganic Chemistry for Physics Students	**أسم المقرر: مبادئ الكيمياء غير العضوية لطلاب الفيزياء**
Credit Hours: 2(2،0،0)	**الوحدات الدراسية: 2(2،0،0)**
Level: -	**المستوي: -**
Prerequisites: -	**متطلب سابق: -**

Course contents

The Electronic Structure of Atoms (Basic structure of atoms – The nature of light – The Photoelectric effect – Bohr's theory of the hydrogen atom – Quantum mechanics – Quantum number – Atomic orbitals – Electronic configuration – the building-up principle) – The Periodic Table (Development of the periodic table – Periodic classification of the element – Periodic variation in physical properties – Ionization energy – Electron affinity) – Chemical Bonding (Lewis dot symbols – Ionic bond – Covalent bond – Electronegativity – Lewis structures – Resonance – Exceptions to the octet rule) - Molecular Geometry

Course Code: CHEM 1010	**الرمز والرقم: 1010 كيم**
Course Title: General Chemistry for Engineering Students	**أسم المقرر: كيمياء عامة لطلاب الهندسة**
Credit Hours: 4(3،1،1)	**الوحدات الدراسية: 4(3،1،1)**
Level: -	**المستوى: -**
Prerequisites: -	**متطلب سابق: -**

Course contents

Chemical reactions; stoichiometry; the gaseous state;; electronic structure and periodicity; chemical bonding; states of matter and intermolecular forces; acid and base

The experimental section includes experiments dealing with the following topics: safety and laboratory rules; chemical observations; stoichiometry; volumetric analysis; oxidation and reduction; colligative properties; chemical kinetics; equilibrium.

Course Code: CHEM 2210	**الرمز والرقم: 2210 كيم**
Course Title: Analytical Chemistry I	**أسم المقرر: كيمياء تحليلية (1)**
Credit Hours: 4(3،0،1)	**الوحدات الدراسية: 4(3،0،1)**
Level: 4th	**المستوي: الرابع**
Prerequisites: CHEM 2010	**متطلب سابق: 2010 كيم**

Course contents

Introduction to Analytical Chemistry, Calculation used in Analytical Chemistry, Types of reaction used in titrimetric methods, Aqueous solutions and chemical equilibria of acids and bases, Titrimetric methods (neutralization, complex formation, precipitation and Redox titrations).

The experimental section includes selected experiments of different types of Titrimetric methods of analysis.

Course Code: CHEM 3220	**الرمز والرقم: 3220 كيم**
Course Title: Analytical Chemistry II	**أسم المقرر: كيمياء تحليلية (2)**
Credit Hours: 4(3،0،1)	**الوحدات الدراسية: 4(3،0،1)**
Level: 5th	**المستوي: الخامس**
Prerequisites: CHEM 2210	**متطلب سابق: 2210 كيم**

Course contents

Electro-analytical methods of analysis (Potentiometry, Conductometry, Electrogravimetry, Coulometry, polarography and Voltammetry) - Introduction to Chemical separation (Solvent extraction).

The experimental section includes selected experiments of Potentiometric, Conductometric methods of analysis and Solvent extraction.

Course Code: CHEM 3230	**الرمز والرقم: 3230 كيم**
Course Title: Spectroscopic Methods of Analysis	**أسم المقرر: طرق التحليل الطيفي**
Credit Hours: 3(2،0،1)	**الوحدات الدراسية: 3(2،0،1)**
Level: 6th	**المستوي: السادس**
Prerequisites: CHEM 3220	**متطلب سابق: 3220 كيم**

Course objectives

1- The student should know the spectrometric methods of analysis at UV-visible absorption region.
2- To understand the atomic absorption spectrometry and atomic and molecular emission spectrometry.

Course contents

Spectrometric methods of analysis (UV-vis. absorption spectroscopy, atomic absorption Spectroscopy and molecular and atomic emission spectroscopy).

The experimental section includes selected experiments of spectrophotometric methods of analysis.

Course Code: CHEM 4240	**الرمز والرقم: 4240 كيم**
Course Title: Chromatography	**أسم المقرر: طرق الفصل الكروماتوجرافى**
Credit Hours: 2(2،0،0)	**الوحدات الدراسية: 2(2،0،0)**
Level: 7th	**المستوي: السابع**
Prerequisites: CHEM 3220	**متطلب سابق:** 3220 كيم

Course contents

A general description of chromatography-techniques of column chromatography-ion exchange chromatography-size Exclusion chromatography-gas chromatography-HPLC chromatography-paper chromatography-thin-layer chromatography-capillary electrophoresis.

Course Code: CHEM 4270	**الرمز والرقم: 4270 كيم**
Course Title: Statistical Methods in Analytical Chemistry	**أسم المقرر: الطرق الإحصائية في الكيمياء التحليلية**
Credit Hours: 2(2،0،0)	**الوحدات الدراسية: 2(2،0،0)**
Level:	**المستوي:**
Prerequisites: CHEM 3220	**متطلب سابق: 3220 كيم**

Course contents

Introduction of statistical methods in Analytical Chemistry – Errors in chemical analysis – Statistical evaluation of analytical data – Expressions of analytical results – Application of analytical chemistry in industry.

Course Code: CHEM 4260	**الرمز والرقم: 4260 كيم**
Course Title: Environmental and Pollution Chemistry	**أسم المقرر: كيمياء البيئة و التلوث**
Credit Hours: 2(2،0،0)	**الوحدات الدراسية: 2(2،0،0)**
Level: -	**المستوي: -**
Prerequisites: CHEM 2210	**متطلب سابق: 2210 كيم**

Course contents

Introduction and identification of environmental chemistry – Atmospheric composition – Gaseous pollutants – Water pollution – Gaseous pollutant control – Water pollutants – Soil pollutants – Medical pollutants – Waste treatment and recycling – Chemical Analysis of Water.

Course Code: CHEM 3310	**الرمز والرقم: 3310 كيم**
Course Title: Physical Chemistry I	**أسم المقرر: كيمياء فيزيائية (1)**
Credit Hours: 4(3،1،1)	**الوحدات الدراسية: 4(3،1،1)**
Level: 5th	**المستوي: الخامس**
Prerequisites: CHEM 2020	**متطلب سابق: 2020 كيم**

Course contents

Gases and kinetic molecular theory - work – heat - thermodynamic laws (Zeroth law - first law and thermochemistry; second law, third law); chemical equilibrium; phases and solutions; phase equilibria, statistical thermodynamics.

Selected experiments representing the following subjects in physical chemistry: Thermal chemistry; thermodynamics & chemical equilibrium; phase equilibria & colligative properties.

Course Code: CHEM 3320	**الرمز والرقم: 3320 كيم**
Course Title: Physical Chemistry II	**أسم المقرر: كيمياء فيزيائية (2)**
Credit Hours: 4(3،1،1)	**الوحدات الدراسية: 4(3،1،1)**
Level: 6th	**المستوي: السادس**
Prerequisites: CHEM 3310	**متطلب سابق: 3310 كيم**

Course contents

Molecular kinetics **(**Molecular motion in gases, the kinetic model of gases, collision, rate of effusion, transport properties of gases, molecular motion in liquids, mobility of ions, diffusion); complexes reaction mechanisms **-** chemical reaction rate laws - concentration, time, temperature dependence of reaction rates- reaction order - half time - unimolecular reaction rates - kinetics of elementary reactions - polymerization reaction rates - photochemistry reaction rates - collision theory, transition state theory - Eyring equation - the dynamic of electron transfer – Catalysis and reaction rate.

Selected experiments representing the following subjects in physical chemistry: Ionic activity; electrical conductivity; electrochemical properties; surface chemistry; electromagnetic spectra; chemical reactions kinetics.

Course Code: CHEM 4340	**الرمز والرقم: 4340 كيم**
Course Title: Surface and Catalysis Chemistry	**أسم المقرر: كيمياء السطوح والحفز**
Credit Hours: 2(2،0،0)	**الوحدات الدراسية:2 (2،0،0)**
Level: 7th	**المستوي: السابع**
Prerequisites: CHEM 3320	**متطلب سابق: 3320 كيم**

Course contents

Introduction to surface Chemistry – Interfaces (gas-liquid interface), (liquid-liquid interface), (solid-gas interface) – Surface tension – Surface free energy - Pressure differences across interfaces - Some theories of adsorption isotherm - Introduction to Catalysis – Types of catalysis – Preparation of some kinds of catalysts – mechanism of catalysis – characterization of catalysts – study of some important catalytic reactions.

Course Code: CHEM 4330	**الرمز والرقم: 4330 كيم**
Course Title: Electrochemistry	**أسم المقرر: الكيمياء الكهربية**
Credit Hours: 2(2،0،0)	**الوحدات الدراسية: 2(2،0،0)**
Level: 7th	**المستوي: السابع**
Prerequisites: CHEM 3320	**متطلب سابق: 3320 كيم**

Course objectives

1- Providing essential concepts of electrical chemistry.
2- Calculating electrochemical and Electrolytic Cells functional.

Course contents

Ionic Interaction - Debye Huckel equation– Ionic Equilibria - Electrical Conductance - Faraday's Law – studying of types of Electrochemical and Electrolytic Cells – relation between current and potential in electrochemical cells - types of potential – electrical analysis reaction - Electrodes – electrons transfer - Applications of measuring of electromotive force and electrodes potential – Electrochemical series.

Course Code: CHEM 4360	**الرمز والرقم: 4360 كيم**
Course Title: Quantum Chemistry	**أسم المقرر: كيمياء الكم**
Credit Hours: 2(2،0،0)	**الوحدات الدراسية: 2(2،0،0)**
Level: 7th	**المستوي: السابع**
Prerequisites: CHEM 3320	**متطلب سابق: 3320 كيم**

Course contents

Introduction to Quantum Chemistry – Old Quantum Mechanics – Postulates of quantum mechanics – Schrödinger equation – Particle in a box – Harmonic oscillator – Particle in ring – Hydrogen atom – Separation of variables – Molecular Orbital Theory.

Course Code: CHEM 4170	**الرمز والرقم: 4170 كيم**
Course Title: Nuclear and Radiochemistry	**أسم المقرر: كيمياء نووية و إشعاعية**
Credit Hours: 2(2،0،0)	**الوحدات الدراسية: 2(2،0،0)**
Level: -	**المستوي: -**
Prerequisites: CHEM 2110	**متطلب سابق: 2110 كيم**

Course contents

Introduction to nuclear chemistry and radioactivity – Radioactive decay process – Nuclear reaction – Equations of radioactive decay and growth – Interaction of radiation with matter – Radiation detection and measurement – Techniques in nuclear chemistry – Radiochemical applications and beneficial used of isotopes – Sources of nuclear bombarding particles – Reactor safety and radiation protection and control – dosimetry –biological effects of radiation-developments of radiation Chemistry – Radiolysis of aqueous solution – Radiolysis of gases – Application of radiation Chemistry.

Course Code: CHEM 4370	**الرمز والرقم: 4370 كيم**
Course Title: Corrosion Chemistry	**أسم المقرر: كيمياء التآكل**
Credit Hours: 2(2،0،0)	**الوحدات الدراسية: 2(2،0،0)**
Level: 7th	**المستوي: السابع**
Prerequisites: CHEM 4340	**متطلب سابق: 4340 كيم**

Course contents

Introduction and definition of corrosion – Corrosion thermodynamics – Corrosion current – Corrosion potential – Kinetics of corrosion – Inertness of metals – Common examples of corrosion – Chemical and Electrical needs for corrosion prohibition – Corrosion inhibitors.

Course Code: CHEM 2410	**الرمز والرقم: 2410 كيم**
Course Title: Organic Chemistry I	**أسم المقرر: كيمياء عضوية (1)**
Credit Hours: 4(3،0،1)	**الوحدات الدراسية: 4(3،0،1)**
Level: 4th	**المستوي: الرابع**
Prerequisites: CHEM 2010	**متطلب سابق: - 2010 كيم**

Course contents

Introduction to organic chemistry – Structure and properties of organic molecules – Structure and stereochemistry of alkanes – The study of chemical reactions – Stereochemistry – Alkyl halides – Structure and synthesis of alkenes – Reactions of alkenes – Alkynes – Aromatic compounds – Reactions of aromatic compounds

Practical part: selected experiments representing the following subjects in organic chemistry: laboratory safety - identification of organic compounds - separation and purification of organic compounds - Column, Thin-Layer chromatography - Preparation of Alkenes and Aspirin.

Course Code: CHEM 3420	**الرمز والرقم: 3420 كيم**
Course Title: Organic Chemistry II	**أسم المقرر: كيمياء عضوية (2)**
Credit Hours: 4(3،0،1)	**الوحدات الدراسية: 4(3،0،1)**
Level: 5th	**المستوي: الخامس**
Prerequisites: CHEM 2410	**متطلب سابق: 2410 كيم**

Course Contents

Organic halides-study of classification, naming, properties, methods of preparation and reactions of: Alcohols, Thiols, Ethers, Epoxides, sulphides, Phenols, Aldehydes, Ketones, Carboxylic acids and their derivatives, amines.
Practical part includes selected experiments related to organic chemistry such as nitration of aromatic compounds - compound Grignard preparing- Prepare Tri vinyl methanol - acylation of ferrocene - esterification: the preparation of benzoquinone- amino reduction- Preparation of Sulfanilamide - Aldol condensation reaction.

Course Code: CHEM 3430	**الرمز والرقم: 3430 كيم**
Course Title: Polymer Chemistry	**أسم المقرر: كيمياء البوليمرات**
Credit Hours: 2(2،0،0)	**الوحدات الدراسية: 2(2،0،0)**
Level: 6th	**المستوي: السادس**
Prerequisites: CHEM 3420	**متطلب سابق: 3420 كيم**

Course contents

Introduction to polymer chemistry, definitions and types of polymeric materials. Homo and copolymers. Classifications of polymers (natural and synthetic polymers, linear, branched and cross-linked polymers thermoplastics and thermosets). Methods of polymerization (condensation, Free radical, Cationic and anionic). Mechanism of polymerizations. Molecular weight and molecular weight determination. Mechanical and thermal properties of polymers. Methods of petrochemical production based on polymers.

Course Code: CHEM 4440	**الرمز والرقم: 4440 كيم**
Course Title: Natural Products Chemistry	**أسم المقرر: كيمياء المنتجات الطبيعية**
Credit Hours: 2(2،0،0)	**الوحدات الدراسية: 2(2،0،0)**
Level: 7th	**المستوي: السابع**
Prerequisites: CHEM 3420	**متطلب سابق: 3420 كيم**

Course contents

Introduction to chemistry of natural products - Idefinition of natural products resulting from secondary metabolites – Isolation and separation – Terpenes study: Classification, Chemistry of Terpenes, biosynthesis – Steroids study: classification, examples on some Steroid compounds, biological importance, biosynthesis – Alkaloids: isolation from plants, classification, examples on some alkaloidal compounds of various classes – Plant phenolics: examples (flavonoids and coumarins), biosynthesis

Course Code: CHEM 4460	**الرمز والرقم: 4460 كيم**
Course Title: Organic Spectroscopy	**أسم المقرر: أطياف المركبات العضوية**
Credit Hours: 3(2،0،1)	**الوحدات الدراسية: 3(2،0،1)**
Level: 8th	**المستوي: الثامن**
Prerequisites: CHEM 3420	**متطلب سابق: 3420 كيم**

Course contents

Introduction to spectroscopy - absorption spectroscopy and its applications – Infrared spectroscopy – Nuclear magnetic resonance spectroscopy – Electron paramagnetic resonance or electron spin resonance spectroscopy -Ultra violet spectroscopy .

Course Code: CHEM 4470	**الرمز والرقم: 4470 كيم**
Course Title: Petroleum Chemistry	**أسم المقرر: كيمياء البترول ومنتجاته**
Credit Hours: 2(2،0،0)	**الوحدات الدراسية: 2(2،0،0)**
Level: 8th	**المستوي: الثامن**
Prerequisites: CHEM 3420	**متطلب سابق: 3420 كيم**

Course contents

History and Terminology – Origin and occurrence – Properties – Composition – Classification – Structural models – Exploration (Gravity methods – Magnetic methods – Electrical methods) - Drilling operations – Recovery (Primary recovery – Secondary recovery – Enhanced oil recovery) – Chemical composition (Elemental composition – Chemical components – Solvent treatment – Chemical methods) – Petroleum analysis (Physical properties – Thermal properties – Electrical properties) – Introduction to refining processes – Product improvement – Product treating.

Course Code: BIOCHEM 3010	**الرمز والرقم: 3010 كيح**
Course Title: General Biochemistry	**أسم المقرر: كيمياء حيوية عامة**
Credit Hours: 3(2،0،1)	**الوحدات الدراسية: 3(2،0،1)**
Level: 6th	**المستوي: السادس**
Prerequisites: -	**متطلب سابق: -**

Course contents

Carbohydrates – fatty acids and Lipids – amino acids and proteins – enzymes –nucleic acids - vitamin and minerals.

Practical part: different experiments about the detection and identification of carbohydrates, lipids and proteins

Course Code: CHEM 4480	**الرمز والرقم: 4480 كيم**
Course Title: Carbohydrates Chemistry	**أسم المقرر: كيمياء الكربوهيدرات**
Credit Hours: 2(2،0،0)	**الوحدات الدراسية: 2(2،0،0)**
Level: 7th	**المستوي: السابع**
Prerequisites: CHEM 3420	**متطلب سابق: 3420 كيم**

Course contents

The development of Carbohydrate Chemistry and Biology (Nomenclature of Carbohydrates – General elucidation of Carbohydrate structure – Monosaccharide structure – Oligosaccharide structure – Polysaccharide structure – Carbohydrate Antibiotics – Carbohydrate Biochemistry) – Carbohydrate structure determination by mass spectrometry – Chemical synthesis of complex Carbohydrates - Enzymatic synthesis of oligosaccharides and conversion to Glycolipids – Carbohydrate polymers.

Course Code: CHEM 4140	**الرمز والرقم: 4140 كيم**
Course Title: Organometallic Chemistry	**أسم المقرر: كيمياء عضوية معدنية**
Credit Hours: 2(2,0,0)	**الوحدات الدراسية: 2(2،0،0)**
Level: 7th	**المستوي: السابع**
Prerequisites: CHEM 2110, CHEM 2410	**متطلب سابق: 2110 كيم، 2410 كيم**

Course contents

Definition and stability of organometallic compounds – derivatives of metals of group 1A to 5A – electron deficient bonds – transition metal complexes – classification of ligands – 18 electron rule-theoretical background of the rule – carbonyl complexes bonding structure and synthesis – pi-complexes bonding and reactions – oxidative addition reactions – insertion reactions – homogeneous catalysis examples.

Course Code: CHEM 4980	**الرمز والرقم: 4980 كيم**
Course Title: Research Project (1)	**أسم المقرر: مشروع بحث (1)**
Credit Hours: 1(0،0،1)	**الوحدات الدراسية: 1(0،0،1)**
Level: 7th	**المستوي: السابع**
Prerequisites: CHEM 3120,CHEM3420, CHEM3220, CHEM 3320	**متطلب سابق: 3120 كيم ، 3420 كيم، 3220 كيم 3320 كيم**

Course contents

Become familiar with laboratory safety, Scientific research ethics, and the various resources available within the library and on-line for searching chemically related information, also develop scientific writing skills and establish a working research relationship with a faculty mentor.

Course Code: CHEM 4990	**الرمز والرقم: 4990 كيم**
Course Title: Research Project (2)	**أسم المقرر: مشروع بحث (2)**
Credit Hours: 2(0،0،2)	**الوحدات الدراسية: 2(0،0،2)**
Level: 8th	**المستوي: الثامن**
Prerequisites: CHEM 4980	**متطلب سابق: 4980 كيم**

Course contents

The students are allowed to work in conjunction with faculty on faculty research. A written report would be required at the end. The students should present their work orally to a committee consisting of three members of the faculty.

Course Code: CHEM 4450	**الرمز والرقم: 4450 كيم**
Course Title: Organic Reaction Mechanism	**أسم المقرر: ميكانيكية التفاعلات العضوية**
Credit Hours: 2(2،0،0)	**الوحدات الدراسية: 2(2،0،0)**
Level: 7th	**المستوي: السابع**
Prerequisites: CHEM 3420	**متطلب سابق: 3420 كيم**

Course contents

Introduction of organic reaction mechanism – Determination of reaction mechanism by physical and chemical properties – Acid and bases - Nucleophilic substitution reaction – Elimination reactions – Electrophilic addition to carbon carbon double bond – Nucleophilic addition to carbonyl group – Rearrangement reactions.

Course Code: CHEM 4350	**الرمز والرقم: 4350 كيم**
Course Title: Industrial Chemistry	**أسم المقرر: الكيمياء الصناعية**
Credit Hours: 2(2،0،0)	**الوحدات الدراسية: 2(2،0،0)**
Level: -	**المستوي: -**
Prerequisites: CHEM 3320	**متطلب سابق: 3320 كيم**

Course contents

Introduction (The Chemical process industry – Development of the chemical industry – Characteristics of the chemical industry – Raw materials – Manufacturing and Engineering) – Safety considerations in process industries – Risk management plan – Industrial Pollution Prevention (Definition of industrial Waste – Types of Industrial Wastes – Industrial Pollution Prevention – Waste management – Recycling – Waste treatment) – Edible Oils, fats and Waxes (Fatty acids – Glycerides – Physical and Chemical properties of Triglycerides – Methods of analysis and testing of Fats and Oils) – Soaps and Detergents (Raw materials – Chemical Soaps – Classification of Soaps – Manufacturing of Soaps – Principle Groups of Synthetic Detergents – Manufacturing of Detergents) – Dyes: Chemistry and Applications – The Pharmaceutical industry (Discovery and development of Drugs – Classification and the Chemistry of Pharmaceutical Products – Manufacturing of Pharmaceutical Products.

Course Code: CHEM 2470	**الرمز والرقم: 2470 كيم**
Course Title: Fundamentals of Organic Chemistry for Physics Students	**أسم المقرر: مباديء الكيمياء العضوية لطلاب الفيزياء**
Credit Hours: 2(2،0،0)	**الوحدات الدراسية: 2(2،0،0)**
Level: -	**المستوي: -**
Prerequisites: -	**متطلب سابق: -**

Course Contents

Introduction to organic chemistry – Structure and properties of organic molecules –study of the Hydrocarbons : Alkane, Alkenes ,Alkyne: Identification, Nomenclature, Physical properties, preparation, chemical reactions- Aromatic compounds, aromaticity, Huckel rule Alkyl halides: : Identification, Nomenclature, Physical properties, preparation, chemical reactions. Spectroscopy (Introduction – Ultra violet spectroscopy- Infrared spectroscopy - NMR spectroscopy)

Course Code: CHEM 2480	**الرمز والرقم: 2480 كيم**
Course Title: Organic Chemistry for Biology Students	**أسم المقرر: مبادئ الكيمياء العضوية لطلاب الأحياء**
Credit Hours: 2(2، 0، 1)	**الوحدات الدراسية: 2(2،0،1)**
Level: -	**المستوي:-**
Prerequisites: -	**متطلب سابق: -**

Course contents

Introduction to organic chemistry – Study of structure and properties of organic molecules –Study of the Hydrocarbons (Alkane, Alkenes ,Alkyne): Identification, Classifications, Nomenclature, Properties, Preparation, Reactions, Study of stereostructure of Alkane & Alkenes - Aromatic compounds (aromaticity, Stereoisomers, Huckel rule, Reactions) - Alkyl halides, Alcohols, Phenols, Aldehydes & Ketones, Ethers, Carboxylic acids, Amines (Identification, Classifications, Nomenclature, Chemical & Physical properties, Preparation, Reactions)- Organic chemistry applications in medicine, agriculture and Dietetics.
Selected experiments representing the following subjects in Organic Chemistry: laboratory safety - purification and identification of crystalline organic compounds - separation and purification of organic compounds - column, thin-Layer, gas-liquid, and paper chromatography - preparation of Alkenes - formation of aromatic compounds and electrophilic aromatic substitution reactions.

Course Code: CHEM 106	**الرمز والرقم: 106 كيم**
Course Title: Organic Chemistry for Health College Students	**أسم المقرر: الكيمياء العضوية لطلاب العلوم الصحية**
Credit Hours: 2(2،0،0)	**الوحدات الدراسية: 2(2،0،0)**
Level: -	**المستوي:-**
Prerequisites: -	**متطلب سابق: -**

Course contents

Introduction to organic chemistry – Structure and properties of organic molecules –study of the Hydrocarbons : Alkane, Alkenes, Alkyne: Identification, Nomenclature, Physical properties, preparation, chemical reactions- Aromatic compounds, aromaticity, Huckel rule Alkyl halides, Alcohols, Phenols, Aldehydes & Ketones, Ethers, Carboxylic acids, Amines (Identification, Classifications, Nomenclature, Chemical & Physical properties, Preparation, Reactions)- Carbohydrates, Classification, Structure ,Nomenclature- Fatty acids: Classification, Structure , Physical properties.

Course Code: CHEM 4010	**الرمز والرقم: 4010 كيم**
Course Title: Professional Ethics in Chemistry	**أسم المقرر: أخلاقيات المهنة**
Credit Hours: 1(1،0،0)	**الوحدات الدراسية: 1(1،0،0)**
Level: 8th	**المستوى: الثامن**
Prerequisites:-	**متطلب سابق: -**

Course contents

The concept of ethics and its importance - standards of ethical conduct in science - ethical requirements of researcher in science - data management and record keeping - ethical issues in the laboratory - scientific writing and journal publications - responsibilities of editors and reviewers - directing research - grant administration and conflict of interest - case study discussion.

Course Code: CHEM 2020	**الرمز والرقم: 2020 كيم**
Course Title: General Chemistry 2	**أسم المقرر: كيمياء عامة (2)**
Credit Hours: 4(3،0،1)	**الوحدات الدراسية: 4(3،0،1)**
Level: 3rd	**المستوى: الثالث**
Prerequisites:-	**متطلب سابق: -**

Course contents

Physical properties of solutions; chemical kinetics; chemical equilibrium; chemical thermodynamics; acid-base equilibria in aqueous solutions; solubility and complex ion equilibria and electrochemistry.

The experimental section includes experiments dealing with the following topics: thermochemistry, chemical kinetics; equilibrium; electrochemistry and thermodynamics.

Since the study plan has variety of courses, the student needs academic advice so that he/she may know (1) to plan his/her academic track, (2) choose the right elective courses that fit his/her interests and im- prove his academic capabilities. The academic advising helps students to achieve success and primacy in their academic endeavor. It also helps to encounter challenges and other academic problems that might hinder their progress. Accordingly, it is imperative to maintain channels of communication open between students and the academic advisors who can help to arrange the students' study plan in a way that would fit their future profession. Each student is assigned an academic advisor in his/her department or from the Department of Student Affairs or through the College web-site. To gain the utmost desired benefit from the experience of the academic advisory, students are advised to note the following:

1. The responsibilities as a student and as an academic adviser to go side by side.
2. The advisor is readily available to guide you whenever a need arises.
3. Do not hesitate to seek the advisor's help.

The Study System at the Chemistry Department

Teaching at the Chemistry Department is subject to the following scheme:

1- The school year consists mainly of two regular semesters and a summer semester, if available.
2- The stage of academic progress is indicated by the academic level since the number of levels to graduate is at least eight levels in conformity with the approved study plan.
3- The duration of the level is a full semester (not less than 15 weeks) and this period does not include the periods of registration and final exams.
4- The duration of the summer semester is not less than eight weeks where the teaching time allocated for each course is doubled.
5- Students have to study 138 class units (credit hours) to obtain a Bachelor's Degree as follows:
   A- The student studies a number of 31 credit hours during the Preparatory Year (two semesters in one academic year).
   B- University Requirements: The student studies 8 credit hours during the period of the study at the Department.
   C- The students studies 76 credit hours (compulsory + elective) from the chemistry department throughout the six semester following the preparatory year (beginning with the third semester).
   D- The students studies 17 credit hours (compulsory + elective) from other department.
   E- The students studies 6 credit hours (free elective) from other departments.

The New Academic System (e-Register)

Registration is the cornerstone of the academic system, the center of the educational process, and the first step to start university life. The new Academic System (e-Register) offers students the following opportunities:

1- Online Registration (registration, adding, and dropping) using the link https://eserve.psau.edu.sa/ku/init helps the student to register, in person, from any location during the periods of registration and dropping plus an additional period specified in the academic calendar; thus, without having to visit the College or the Department, the student can perform the following:
   A- Registration: Registration of courses and deciding the required number of credit hours.
   B- Adding and dropping: The student may drop and add courses during the first week of teaching provided that the study load does not go above, or lower than, the allowed course load.
2- To view the course schedule of the college and the available/ closed groups.
3- To view the study schedule and print it.
4- To view the academic record and print a copy (an unofficial copy).
5- To view the results of the final exams as soon as they are put online.
6- To view the study plan, the courses passed by the student, and the ones remaining to be studied.
7- To know about the penalties imposed upon the student.
8- To view the financial rewards.
9- To male suggestion and submit complaints.
10- To write the academic performance evaluation of faculty members.
11- To exchange electronic messages and change the password.

Rules and Mechanisms for Registration of Courses

- The Course is a module that meet the needs of the level specified in the approved Study Plan in each specialty (Program). The Course has a number, a code, a title, and a description depend on the different departments (see the Department's Manual Guide).
- The Course is divided into a set of theoretical lectures and practical lessons (study units) taught weekly during the academic level.
- The Credit Hour is a weekly theoretical lecture that is not less than fifty minutes, or a practical lesson which is not less than one hundred minutes.
- The registration of the courses for all students is done automatically through the website https://eserve.psau.edu.sa/ku/init
- The academic levels vary in the number of the units of study, from 12 units to 20 units, for each level.
- The Courses are registered automatically at the beginning of the following semester foe the student's convenience. Then, the student can modify the course schedule by adding or dropping.
- The following table shows the student's study loud corresponding to the cumulative average:

GPA	2	2.5	3	3.5	4	4.5	5
Hours allowed for registration	14	15	16	17	18	19	20

- The Processes of dropping and adding and adding are performed by the student electronically in the first week of the semester through accessing the gat of the academic system of the University Deanship of Admission and Registration (https://eserve.psau.edu.sa/ku/init).
- No student has the right to register a course without passing its per-requisite course.
- Students, who pass all courses without failures, are registered in the courses of the level beginning gradually with the lower levels according to the study plans approved.

- Students, who fail in some courses, are registered in the courses that ensure their minimum study load in each semester taking into account the following point:
  - No conflict in the course study schedule.
  - Satisfying the previous requirements of the course or courses to be registered.

Calculating the Average and Cumulative GPA

The Average and cumulate

ve GPA are calculated every semester for the student automatically by the system. To know how to calculate the averages, you should follow the following steps:

Calculating the Semester Average:

The GPA is calculated considering the following points:

1. Knowing the number of hours of the courses.
2. Knowing the mark obtained in each courses.
3. Knowing the corresponding grade of each mark.
4. Knowing the value of each grade.
5. Knowing the points = number of hours of the course x value of the grade.
6. Determining the total points obtained in all courses of the semester.
7. Determining the total number of hours registered in the semester.
8. The average is calculated every semester according to the following equation:

GPA =	Total points (item 6)
	Number of hours registered in the semester (item 7)

The following table shows the percentage of marks, grade and value obtained by the student in each course, which is used to calculate the points:

mark	grade	Letter of Grade	Value of Grade
From 95 - 100	+ Excellent	+A	5.00
From 90 to less than 95	Excellent	A	4.75
From 85 to less than 90	+ Very Good	+ B	4.50
From 80 to less than 85	Very Good	B	4.00
From 75 to less than 80	+ Good	+ C	3.50
From 70 to less than 75	Good	C	3.00
From 65 to less than 70	+ Pass	+ D	2.50
From 60 to less than 65	Pass	D	2.00
Less than	Failure	E	1.00
Absence from lectures (25% or more)	Debarred	H	1.00

Calculating the Average cumulative:

The GPA semester average is calculated as follows:

1) The grand total of points (for all semesters that have been student).
2) The grand total of credit hours (for all semesters that have been studied).
3) The cumulative average is calculated according to the following equation:

GPA =	Grand total of points Grand total of credit hours

Here is an example of how to calculate the grades above:

Calculating the grade of the first semester:

Course	Credit Hours	Mark	Grade	Grade Value	Points
MATH 1050	3	67	+ D	2.50	3 X 2.50 = 7.50
ENG 1210	3	73	C	3.00	3 X 3.00 = 9.00
ENG 1220	3	77	+ C	3.50	3 X 3.50 = 10.50
ENG 1230	3	81	B	4.00	3 X 4.00 = 12.00
1400 TECH	3	92	A	4.75	3 X 4.75 = 14.25
	15				53.25
GPA = Total points ÷ No. of hours registered in semester = 53.25÷ 15 = 3.55					

Calculating the grade of the second semester:

Course	Credit Hours	Mark	Grade	Grade Value	Points
SALAM 101	2	67	+ A	5.00	2 X 5.00 = 10.00
ARAB 101	2	73	C	3.00	2 X 3.00 = 6.00
PHYS 1010	4	77	+ C	3.50	4 X 3.50 = 14
MATH1060	3	81	B	4.00	3 X 4.00 = 12.00
COM 1400	2	63	D	2.50	2 X 2.50 = 5.00
ENG 1604	3	88	+ B	4.50	3 X 4.50 = 13.50
	16				60.50
GPA = Total points ÷ No. of hours registered in semester = 60.50 ÷ 16 = 3.78					

Calculating the average cumulative:

GPA = total points ÷ total hours of the semester = 113.75 ÷ 31 = 3.67

Dropping and adding of a course:

1. The process dropping and adding is performed through portal (https://eserve.psau.edu.sa/ku/init) during the first week of the semester only; but the number of credit hours registered has to be at least 12 hours.
2. The student may drop only one course duo to excuse acceptable to the dean of the College. This procedure should occur at least five weeks before the final exams begin. The student has the right to apply for such a procedure at a maximum of four courses during the whole period of study at the College.

Attendance, postponing and dropping out of College:

- The student must be regular in attendance attending at least 75% of the lectures and the practical classes.
- If any student has a percentage of absence of 25 %, or more, in any course, he is denied access to the final exam of this course and his result is F.
- A student may apply for postponement of the study before the beginning of the semester for an excuse accepted by the College Board. The postponement should not exceed two consecutive semesters or three semesters as a maximum limit while studying at the College.
- The University Council may, in case of necessity, exempt the applicant from the previous provision.
- If student drops out of College for one semester without requesting the postponement of his registration, the University has the right to dismiss his registration. The university Council has the right to do this for a lesser period of time.
- The student is not considered as dropping out of College if he is a visiting student at another university.

Visiting student:

The Visiting student is student who studies some courses at another university, or at a branch of the university to which he belongs without being transferred. The courses he studied are accredited according to the following regulations:

- The student has a transcript (including a grade point average) for, at least, two semesters at his college before his applies as a visiting student.
- The student must obtain a prior approval from his college permitting him to study as a visiting student while specifying the courses that will be studied. The college has the right to require a specific grad to be achieved by the student to offset the course. The student should obtain an official letter from the Deanship of Admission and Registration directing him to study as a visiting student.
- The student has to join an officially recognized college or a university.
- The courses, under consideration by the student to be studied outside the university, must be equivalent in their description to the university courses, and their course units should be less than the units of any of the courses contained in the graduation requirement.
- The maximum of the total units of study that can be calculated from outside the University is twenty percent (20%) of the total units required for graduation at Salman bin Abdulaziz University.
- The courses that are student by the visiting student are not included in the cumulative average. These courses are recorded in his academic record.
- The student must provide the Deanship of Admission and Registration with the results he obtained during the first two weeks of study in the semester following the period of study as a visitor. If not reported within that period, the student is considered as dropping out of College during those semesters.

Dismissal from the University:

The student is dismissed from the University in the following cases:

- If he received three consecutive warnings due to a cumulative average below a minimum of 2
- The student may be given a fourth opportunity by the Council of the University based upon the recommendation of the College Council to raise his cumulative GPA by studying the available courses.
- The University Council may give the dismissed students, due to warnings, an opportunity that does not exceed two semesters as a maximum.
- If the student dose not fulfill his graduation requirements at the college in a period of up to half of the period prescribed for graduation in addition to the duration of the Program.
- The student is given an exceptional opportunity by the University Council to meet the graduation requirements during a maximum period not exceeding twice the original term specified for graduation.
- The University Council may allow dismissed students, due to the exhaustion of failure times, to attend twice the duration of the Program. This extension should not exceed a maximum of two semesters.

Examination and Grades:

- Based on a proposed from the Department council, the college council specifies a mark for the student's semester work, varying from 40% to 60% of the final grade of the course.
- The mark of the course's semester work is calculated by one of the following two methods:
  - Oral, practical tests, research, or other forms of classroom activity, or from all the above or some of them, in addition to at least one written exam.
  - Two at least written exams at least.

- Based on the recommendation of the course teacher, it is permissible for the Council of the Department, that teaches the course, to allow the student to complete the requirements of any course in the following semester and to give the student a grade of I (incomplete) in his academic record. Only the grades achieved by the student are included in the GPA or cumulative after the completion of the requirements of that course.
- If one semester passes without changing the grade incomplete (I), the student is given an F which is calculated in the GPA and cumulative.
- The grades obtained by the student in each course are calculated according to the schedule mentioned above.

Restriction of the Final Examination:

1. No student may be tested in more than two courses in on day.
2. The student is not allowed to enter the final exam after half an hour of its beginning and is not allowed to leave the exam room before half an hour after its beginning.
3. Based on a recommendation from the relevant Department Council, the College Council specifies the duration of the final written exam to be within a period not less than one hour, and not more than three hours.
4. Cheating in the exam, initiating it, or violating the instructions and riles of examination procedures are actions punishable in accordance with the Regulation of the students' Discipline issued by the University Council.
5. In cases of necessity, the college council, in charge of teaching a course, has the right to approve re-marking of the answer sheets in a period of time not later than the beginning of the following semester in accordance with the following rules:

- A student may apply for re-marking the answer sheet of only one course per semester.
- The student, who wishes to re-mark his answer sheets, may apply for re-marking to the department that teaches this course, not later than one month after taking the final exam.

- A student, who has already applied for re-marking and proved the invalidity of his application, should never apply for re-marking his answer sheets in any exam in the future.

Transferring:

1) Transferring from one college to another within the University:

- It is permissible, with the consent of the respective dean of the colleges, to transfer from one college to another in accordance with the conditions approved by the College Council to which the student wishes to transfer.
- The student's college academic record has to show all courses previously studied, including grades, semester and cumulative averages throughout the study at the college from which he is transferred.

2) Transferring from one major to another within the college:

- The student may, after the approval of the Dean, transfer to another specialty within the College according to the guidelines established by the College Council.
- The student's college academic record has to show all courses previously studied, including grades, semester and cumulative averages throughout the study at the college from which he is transferred.

Graduation:

The student graduation after completing successfully the graduation requirements in accordance with the study plan, provided that his cumulative average is no less than 2 (pass).

For more information about Regulations governing study and testing at Prince Sattam Bin Abdulaziz University, please see the following link:

https://dar.psau.edu.sa/en/node/6795

Students' Rights and Responsibilities

First: Academic Rights

1- The student has the right to enjoy an educational environment that induces to effective Implementation of educational processes.

2- The student has the right to obtain knowledge and skills from courses taught according to the regulations of the university educational system.

3- The student has the right to access the study plans offered by the college or by the department; and

has the right to access the administrative areas at a reasonable time before the beginning of the

academic semester to register for courses especially whenever his/her preferences cannot be met.

4- The student has the right to drop or add a course or a semester basic to the rules and regulations advanced

to students.

5- Staff members should abide themselves with the timetable of the lectures, exercise lessons, and office

hours. In case of unpredicted interruption, an alternative schedule should be set for compensations.

6- The student has the right to discuss and ask questions (during lectures, office hours, and open meetings) as

long as he/she observes the rules of proper conduct.

7- Questions of the exams should be set to meet the objectives specified in the teaching and learning

processes. Allocation of marks should be planned in a balanced order to achieve a fair assessment and

evaluation.

8- The student has the right to be informed well ahead of time of their academic status when he/she is to be

debarred from attending the final exam. Planned tests for all courses should be

administered unless there

are unforeseen reasons to prevent holding them.

9- In order to enable the student to be better prepared for the final exam, a student has the right to review

his/her answer sheets (basic to rules of tests and exams observed in assigning marks).

10- The student has the right to apply for a reassessment of the final-exam answer sheet within the frame-

work of the university regulations.

11- - The student has the right to access the results of all his/her final tests

Second: Non-academic Rights

1- The university is legally bound to plan social activities stated in the University rules and regulations
2- The university is legally bound to plan a health care programs and make them accessible to all students at hospital and other University health facilities
3- Students should have access to university services e.g., textbooks, hostels, youth houses, libraries, sport yards, restaurants, parking lots, etc.
4- The university is legally bound to provide financial rewards and incentives especially for gifted students.
5- A participation in training courses (held on and off campus) and in cultural activities, community services, and voluntary works.
6- Complains pertinent to practices carried out by teachers, the department, the college or any other department but conducted based on the rules and regulation stipulated by the University.
7- The students have the right to defend themselves in cases relevant to misconduct with their defense heard prior to pronouncing a final verdict.
8- A student should have the right to appeal a judgment as long as he/she observes the University relevant rules and regulations.
9- Maintain the student's right to privacy of personal information. A student's file or record

can be accessed only by parties authorized by the student, e.g., the parents, a guardian or any other person delegated by the student.

Committees and their tasks

1- Quality and Development Committee

Committee's Tasks

- Spreading the culture of quality in the department.
- Review of courses files (Portfolios).
- Review the updating of the files of community service, scientific research and department alumni, and confirm the inclusion of any new activities.
- Preparation of the Annual Program Report for the first and second semesters at both faculty branches (males and females).
- Updating the Self Study Report (SSR) for the program at both faculty branches (males and females).
- Update the Self Evaluation Scales for the program at both faculty branches (males and females).
- Preparing and processing the academic accreditation files of the program.
- Follow up the recent publications of the National Commission for Academic Accreditation and Assessment.
- Communicating with the accreditation bodies recognized by the university.

- Coordinating the meetings of the accreditation team with members of the faculty staff and students in the department.

- Supervising the evaluation and academic accreditation activities of the department.

2- Study Plan and Strategic Plan Committee

Committee's Tasks

• Preparing a strategic plan for the department based on the reality of the college and the university and the needs of the community and the modern directions of planning.

• Updating the vision, mission and objectives of the department in accordance with the vision of the college and the university, their mission and strategic plan.

• Provide advice and suggestions on improving academic and administrative performance within the department.

• Introducing the strategic plan of the department and dissemination of its objectives and components.

• Supervising the implementation of the department's strategic plan.

• Supervising the development plans of the department.

3- Academic Advising Committee

Committee's Tasks

• Raising awareness of the importance of academic advising for the department's program.

• Emphasize the concept of academic advising and the role of academic advising in guiding students to plan for their educational future.

• Follow up the preparation of the necessary questionnaires for academic accreditation regarding academic advising, distribution, collection, analysis of results and advice to all students accordingly.

• Deepening trust between students and faculty members.

4- Laboratories and Instrumentation Committee

Committee's Tasks

• Hold periodic meetings with concerned authorities to develop time plans for the development of the equipment and laboratories to achieve the objectives of this committee.

• Investigate and evaluate the current state of all devices and laboratories, and scheduling start-up of development processes.

• Ensure that all lab equipment and student services are available for all programs offered by the department.

• Ensure availability of plans for the maintenance of equipment and student services.

• Provide a periodic report to the head of the department at the end of each year to make the necessary work on proposals.

• Supervising the availability of guidance procedures for security and safety procedures in laboratories and study halls.

• Raise awareness, prepare guidance publications on safety and safety measures for different risks, and distribute them to students at the beginning of the study year.

• Prepare questionnaires to measure the satisfaction of the beneficiaries of the equipment and laboratories.

• Discuss the preliminary results with the Quality Committee and present proposals and solutions.

• Recommending the application of the required programs, equipment and accessories in each laboratory in accordance with the specialization of the subjects being taught.

• Coordinating with the competent authorities regarding the technical support of the devices.

5- Alumni Affairs Committee

Committee's Tasks

• Building the databases of graduate students.

• Building the databases of the target parties in the employment of graduates

• Studying the job market and its relation to the practical disciplines and programs required.

• Develop a mechanism to contribute to the qualification and development of graduates to join the labor market

• Activate communication with the graduates of the department and benefit from their experiences.

• Coordinating with the alumni affairs department at the college and the university.

• Presenting the success stories of some graduates in various fields.

• Organizing the annual alumni forum.

• Create a webpage for alumni on the department and college websites so that the graduates can register data and communicate with the department.

• Announcing the innovative and distinguished programs of graduates, which serve the community and the university.

6- Field Training, Training and Rehabilitation Committee

Committee's Tasks

- Coordinating with the college administration to provide opportunities for field training for students.
- Proposal to form a committee to evaluate the student's final report and approve it from the department council.
- Follow up the training places through the academic advisor of the student so that the student can perform:
  - The connection between the theoretical and practical aspects.
  - Development of scientific skill in the field of specialization.
  - Deepening the student's ethics and behavior at work, during the training period through discipline and punctuality, responsibility and teamwork.
  - Enable students to demonstrate their scientific and practical abilities, which may allow them to employ in the same training place or be nominated in other places.
  - Enable students to develop their abilities by analyzing strengths and weaknesses during the training period.

7- Timetables and Exams Committee

Committee's Tasks

- Timetables
- Work on the preparation of study schedules to be delivered in a timely manner.
- Review the teaching loads of faculty members.

- Update the file of the faculty schedules periodically to fit the needs of the department.
- Distribute the department's courses to the allocated halls.
- Coordination between departments to achieve proportionality between the capacity of the hall and the number of students per course.
- Follow up the announcement of the classrooms timetables on the halls assigned to the department.
- Exams
- Prepare the final exam schedule.
- Ensure that the classrooms are equipped with chairs, lighting, and air conditioning.
- Distribution of halls and controls in the final exams timetables.
- Follow up the final exams, including:
    - Follow-up attendance of exam supervisors and provide alternatives in case of emergency.
    - Receiving questions and lists of students from the professors of the course, and handing them over to the committees.
    - Receiving of exam answer sheets papers and the signatures lists from the exam committees, and delivering to the course instructors.
    - Provide a daily report on the progress of the final exams.
    - Recognition of denied students and ensuring they have no access to the relevant exam.
    - Arranging halls and seating according to the number of students per course.

- Raise student issues (request for alternative exams - cases of cheating ... etc.) to the relevant committees.
- Preparation of the final exams report.

8- Student Affairs Committee

Committee's Tasks

- Help students solve their academic problems.
- Referral of the academic problems of the competent authority (such as: re-registration of student who have dropped out of school - separated from academia - problems of denied students – excuses of absent students from the final exams).
- Develop a proposed plan to serve students who are failing the plan.
- Follow up on receiving students' complaints and responding to their suggestions.
- Guide students in some academic issues that are difficult for students to deal with.
- Follow students behavior and solve behavioral problems that could be an obstacle to their educational process.
- Communicate with the guardians of students who commit academic or behavioral violation in order to inform them with the conditions those students.

9- Cultural Committee

Committee's Tasks

- Develop a proposal plan for summer activities for the department's students.
- Contribute to the formation of student groups of activities and clubs.
- Plan to improve the student activities within the department in cooperation with the unit of student activities in the college.
- Provide consultations on the organization, activation and implementation of the proposed activities of the department, college and university.
- Forming a student team to educate the importance of activities (Student Advisory Council).

10- Graduation Project

Committee's Tasks

- Making awareness and introductory seminars on graduation projects for seventh-level students.
- Receive the titles of the proposed projects from the faculty in the department and choose the appropriate ones and approve them by the department board, Choose discussion committees and put.
- Supervising project discussions, ensuring that the deliberate standards and models of the department are applied and raising a report to the head of the department. Carry out other tasks assigned to the Committee.

Contacts

Department of Chemistry

College of Science and Humanities Prince Sattam bin Abdulaziz University

P.O box 173, Al-Kharj, 11942

Kingdom of Saudi Arabia

Head of Department's Phone No: +966(11)588050

Female Sector Phone No. : +966(11)588954

Department Web-Site:
https://csh.psau.edu.sa/en/department/Department-of-Chemistry