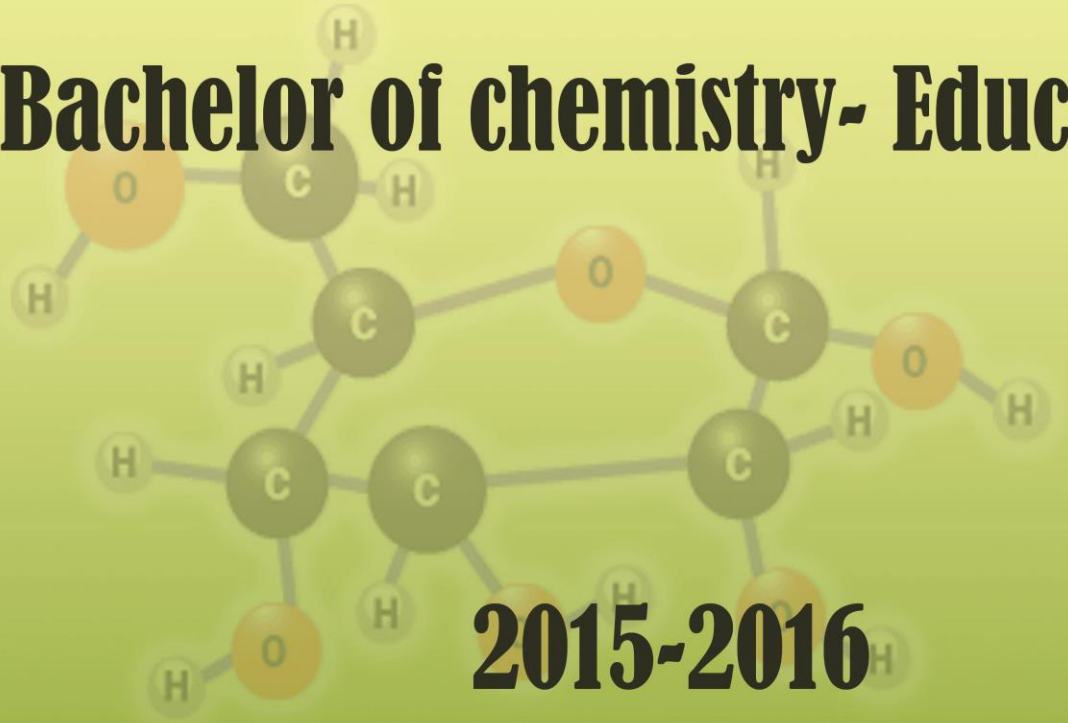
Ministry of education
Majmaah University
College of education
Department of Chemistry

جامعة المجمعة
Majmaah University
كلية التربية بالزلفي

HANDBOOK OF MODULES

Bachelor of chemistry- Educational



2015-2016

CHEMISTRY

General preliminary remarks

The consecutive Bachelor of Education -Chemistry study program is designed to enable students to directly change over to a chemistry-oriented occupational field or to begin the Master program in chemistry on the basis of an in-depth scientific education. In particular, students are to acquaint themselves with modern theoretical and experimental developments in the field of study in its entire breadth and moreover be enabled to develop strategies for solving complex issues individually and in teams and to act with scientific and social responsibility. Variable specialization and prioritization in this Degree program is to allow students to put together an individual educational profile for themselves in the course of Chemistry study program.

This handbook has been written to provide information to all our undergraduate students. It aims not only to explain the workings of the Department but also to provide information that will require throughout degree program. Its contents will:

- outline the structure and organization of the Department;
- outline the program structures and module content
- outline on study skills and written work
- explain the teaching and assessment methods
- outline on the aims and objectives of each module

Prioritization in the compulsory optional field and specialization practical comprise the following areas:
– Chemistry: Inorganic Chemistry, Organic Chemistry, Physical Chemistry, Analytical Chemistry.
Basically, all modules are marked. As a rule, written examinations are designated as final module examination or partial module examination. For marking, however, the following assessment methods can also be used: a) final oral module examinations or b) partial oral module examinations, c) seminar presentations, d) written assignments, e) marked lab-course performance. Designated assessment methods are specified in the relevant module descriptions. Students must expressly be notified of any deviations from the details contained in the module descriptions by the responsible lecturer at the beginning of the course, i.e. during the first lecture week.

The basic unit of the studies is a credit hours. A course is completed by successfully completing all the assessment required to pass it.

The complete studies of one academic year requires two semesters. Average of 745 contact hours are required by semester, which corresponds to 36 credit hours in the KSA system (60 ECTS credits points) Obligatory training of 6 credit hours is required for the Bachelor's degree However, at least 100% credits of the Bachelor's degree must be completed at MU One credit point equals to approximately 25 hours' workload, including face-to-face teaching hours, individual studying, as well as preparation for and taking part in the examinations.

Course code	Course number	Course name
CHEM	**111**	**general chemistry (1)**
CHEM	**121**	**Organic chemistry (1)**
CHEM	**122**	**Inorganic chemistry (main group elements)**
CHEM	**211**	**Organic chemistry 2**
CHEM	**212**	**Physical chemistry- Phase Rule**
CHEM	**213**	**General chemistry 2**
CHEM	**221**	**Heterocyclic Compounds chemistry**
CHEM	**222**	**Quantum Chemistry (1)**
CHEM	**223**	**Physical organic chemistry**
CHEM	**224**	**Descriptive Analytical Chemistry**
CHEM	**225**	**Electro-Reversible Chemistry 1**
CHEM	**311**	**Quantum Chemistry (2)**
CHEM	**312**	**Thermodynamic chemistry**
CHEM	**314**	**organic chemistry (polymers and patrol)**
CHEM	**315**	**Quantitative Analytical Chemistry**
CHEM	**316**	**Physical Chemistry (Surfaces, Colloid s & Catalysis)**
CHEM	**321**	**Biochemistry 1**
CHEM	**322**	**inorganic chemistry(transition elements)**
CHEM	**323**	**Electro-Reversible Chemistry 2**
CHEM	**324**	**Coordination chemistry**
CHEM	**411**	**Instrumental Analysis Chemistry**

CHEM	**412**	**Kinetic Chemistry**
CHEM	**413**	**Dyes chemistry**
CHEM	**414**	**Biochemistry 2**
CHEM	**421**	**Natural Products Chemistry**
CHEM	**422**	**Chemistry of organic reactions mechanisms**
CHEM	**423**	**organic chemistry (Organic Compounds Spectra)**
CHEM	**424**	**Nuclear and Radiation Chemistry**

A **Module Handbook or collection of module descriptions that is also available for students to consult** should contain the following information about the individual modules:

<table>
<tr><td>Module designation</td><td>Chemistry</td></tr>
<tr><td>Module level, if applicable</td><td>Frist Level</td></tr>
<tr><td>Code, if applicable</td><td>CHEM111</td></tr>
<tr><td>Subtitle, if applicable</td><td>Physical chemistry (general chemistry physical1)</td></tr>
<tr><td>Courses, if applicable</td><td>Not applicable</td></tr>
<tr><td>Semester(s) in which the module is taught</td><td>First and second Semester</td></tr>
<tr><td>Person responsible for the module</td><td>Dr. Gehan Elaemary</td></tr>
<tr><td>Lecturer</td><td>Ibtehag Elhassan</td></tr>
<tr><td>Language</td><td>Arabic</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory course (first level)</td></tr>
<tr><td>Type of teaching, contact hours</td><td>
<table>
<tr><td>Contact hours per weak</td><td>Teaching Methods</td><td>Class size</td></tr>
<tr><td>1</td><td>Lecture</td><td>23</td></tr>
<tr><td>2</td><td>Laboratory</td><td>23</td></tr>
</table>
</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><td>Contact hours per weak</td><td>Private study per weak</td><td>Total work load</td><td>ECTS credits</td></tr>
<tr><td>5</td><td>٤</td><td>١٠٥</td><td>3.4</td></tr>
</table>
</td></tr>
<tr><td>Credit points</td><td>2 KSA(3.4 ECTS)</td></tr>
<tr><td>Requirements according to the examination regulations</td><td>The student shall be debarred from the final examination if the percentage of his absence exceeds (25%) out of the total lectures of the course without an acceptable excuse.
The student who is debarred from the examination because of absence is considered as a failure in the course.</td></tr>
</table>

Recommended prerequisites	None
Module objectives/intended learning outcomes	To know that **Knowledge** • Define the basic concepts of physical chemistry. • Define Vapour pressure of liquid and boiling Surface tension Viscosity, boiling point, Latent heat of vaporization, freezing point Understand the main theories and laws of thermo chemistry, gases and equilibrium **Cognitive Skills** Use the knowledge of physical chemistry to solve problems List different types of solids Explain the basics of the kinetic theory of gases **Interpersonal Skills & Responsibility** • work in teams as well as independently • Taking responsibility for Learning. • To think and solve problems in cooperative work with others. **Communication, Information Technology, Numerical** • Using a computer as a tool in writing, drawing chemical structures and data analysis to communicate scientific information • Use software and Surf internet for course contents. Report writing
Content	A-Theoretical , Liquid State Solid State, Modes of expressing Gaseous State concentration of solution, Chemical equilibrium. B-Practical: Laboratory safety rules - detection of Acid and basic radicals of simple salt
Study and examination requirements and forms of examination	quizzes: 15% seminar: 5% Mid-semester test: 20% Final practical test 20% Final theoretical test: 40%

Media employed	e-learning: Desire to Learn system. Data Show.Smart Board. White Board .Power point slides. Demonstration of lab examples and experiments ,lab development tools and and equipment
Reading list	General chemistry (alkimya'a ala'amah by Adel Ahmed) Principles and Reactions by William L. Masterton, Cecile N. Hurley, Hardcover Matter and Its Changes, James E. Brady, Fred Senese

Module designation	Chemistry
Module level, if applicable	Second Level
Code, if applicable	CHEM121
Subtitle, if applicable	Organic Chemistry (1)
Courses, if applicable	none
Semester(s) in which the module is taught	First and second Semester
Person responsible for the module	Dr.Gehan Elaemary
Lecturer	Dr.Nawal Mahgoub suleman
Language	Arabic
Relation to curriculum	Compulsory course (2nd level)
Type of teaching, contact hours	Contact hours per weak / Teaching Methods / Class size 3 / Lecture / 43 2 / Laboratory / 22
Workload	Contact hours per weak / Private study per weak / Total work load / ECTS credits 5 / 7 / 180 / ٧
Credit points	4 KSA(7 ECTS)
Requirements according to the examination regulations	The student shall be debarred from the final examination if the percentage of his absence exceeds (25%) out of the total lectures of the course without an acceptable excuse. The student who is debarred from the examination because of absence is considered as a failure in the course.
Recommended prerequisites	none

Module objectives/intended learning outcomes	**Knowledge** To know that : types of hybridization in the carbon atom - types of chemical bonds in organic compounds-and polarization in organic molecules Can write equations for organic compounds preparations or reactions under study Can listed physical properties of organic compounds under study Describe alkanes , alkenes , alkynes and aromatic compounds in terms of structure Defines the tools used in the experiments under study. Remember the rules for naming organic compounds under study **Cognitive Skills** Can rewrite equations for organic compounds preparations or reactions under study Can apply rules to the naming of organic compounds The distinction between the student alkanes and alkenes and alkynes in terms of structure The re-installation of devices requesting some experiments alone Preparation of aspirin and acetanilide The estimated value of machinery and chemicals used in the experiments **Interpersonal Skills & Responsibility** Distribution of students into groups to conduct experiments Cleaning tools before and after the experiment Cleanliness of the place in laboratory Maintain herself and her colleagues by applying the security and safety in the laboratory **Communication, Information Technology, Numerical** .Deal with the computer through the use of the World Wide Web Calculating the ratio of outputs Research in the form of PowerPoint Homework through the D2l program

Content	First :Theoretical: General introduction –Alkanes-Alkenes and alkynes-Aromatic compounds and Benzene Isomerism .and optical isomerism Second :Lab rotary
Study and examination requirements and forms of examination	Oral and written exercises: 10% Presentation: 5% Practical reports :5% Mid-semester test: 20% Final theoretical test: 40%
Media employed	e-learning: Desire to Learn system. Data Show.Smart Board. White Board .Power point slides. Demonstration of lab examples and experiments ,lab development tools and equipment
Reading list	Principles of Organic Chemistry - Mohammed bin Ibrahim al-Hassan, Hassan bin Mohammed Al-Hazmi. "Practical Organic Chemistry," Part I, Hassan Amin and al-Hazmi

Module designation	Chemistry
Module level, if applicable	2th Level
Code, if applicable	CHEM122
Subtitle, if applicable	Inorganic chemistry (main group elements)
Courses, if applicable	Not applicable
Semester(s) in which the module is taught	First and second Semester
Person responsible for the module	Dr.gehan Elaemary
Lecturer	Dr.Mai Makki Mahmoud
Language	Arabic
Relation to curriculum	Compulsory course (2th level)
Type of teaching, contact hours	Contact hours per weak: ٢ — Teaching Methods: Lecture — Class size: ٥١
Workload	Contact hours per weak: ٢ — Private study per weak: ٤ — Total work load: ٩٠ — ECTS credits: 3.4

Credit points	2KSA(3.4 ECTS)
Requirements according to the examination regulations	The student shall be debarred from the final examination if the percentage of his absence exceeds (25%) out of the total lectures of the course without an acceptable excuse. The student who is debarred from the examination because of absence is considered as a failure in the course.
Recommended prerequisites	none
Module objectives/intended learning outcomes	To know that : **Knowledge** Show the main aspects of main group elements chemistry Draw the key features of ionic and covalent compounds Make accurate statements about facts, concepts and relationships relating to the main group Chemistry **Cognitive Skills** Use the knowledge of Inorganic Chemistry to solve problems Analyze novel problems and make Strategies for their solution Explain the periodicity in electro negativity- electron affinity of the elements across the table **Interpersonal Skills & Responsibility** • Work in teams as well as independently • Taking responsibility for Learning. To think and solve problems in cooperative **Communication, Information Technology, Numerical** • Using a computer as a tool in writing, drawing chemical structures and data analysis to communicate scientific information • Use software and Surf internet for course contents. Report writing

Content	Ionic and covalent bonding, The Nature of Solids, some of ionic compounds. lattice energy, calculation of lattice energy, some applications of lattice energies, Born-Haber cycle An introduction to covalent compounds, Valence bond theory, Valence bond theory of hydrogen molecule H_2, Hybridization of hydrogen molecule H_2 Molecular orbital (MO) theory, Molecular Orbital (MO) Theory of the H_2 molecule. Building Molecular Orbital Diagrams for Homonuclear and Heteronuclear diatomic molecules Types of Solids , Band Theory, State that silicon and germanium are semiconductor materials , Hydrogen and its compounds, Physical and chemical properties of hydrogen. Chemical properties of s and p block elements. Diagonal relationship Li and Mg. Chemical properties of Beryllium. The difference between Beryllium and Aluminum. Introduction to Electron-deficient compound. Chemistry of boron.
Study and examination requirements and forms of examination	assignment: 10% Quizzes: 10% Practical exam :20% Mid-semester test: 20% Final theoretical exam: 40%
Media employed	e-learning: Desire to Learn system. Data Show.Smart Board. White Board .Power point slides.

Reading list	Main Group Chemistry (Khalifa Mohammed Ali Saleh) Chemistry: Principles and Reactions by William L. Masterton, Cecile N. Hurley, Hardcover: 756 pages, Publisher: Brooks Cole, 5 edition, 2003 Chemistry, 7th edition , Chang, 2006 Chemistry: Matter and Its Changes, James E. Brady, Fred Senese General Chemistry: Principles and Modern Applications. 8th Edition by: Petrucci, Harwood, Herring Chemistry, 5th edition by Mortimer

Module designation	Chemistry
Module level, if applicable	3th Level
Code, if applicable	CHEM 211
Subtitle, if applicable	Organic Chemistry II
Courses, if applicable	non
Semester(s) in which the module is taught	First and second Semester
Person responsible for the module	Dr.Gehan Elaemary
Lecturer	Dr.Amani Hasssan Ahmed
Language	Arabic
Relation to curriculum	Compulsory course (3th level)
Type of teaching, contact hours	Contact hours per weak / Teaching Methods / Class size 3 / Lecture / 17 2 / Laboratory / 17
Workload	Contact hours per weak / Private study per weak / Total work load / ECTS credits 5 / 8 / 195 / 6.8
Credit points	4 KSA(6.8 ECTS)

Requirements according to the examination regulations	The regular student must attend the lectures. She shall be debarred from the final examination if the percentage of his attendance is less than the percentage fixed by the University Council, provided it is not less than (75%) of the lectures for each course during the semester.
Recommended prerequisites	Organic chemistry I
Module objectives/intended learning outcomes	**By the end of this course the student will be able to:** **Knowledge** • Acquire basic knowledge on classifications of organic compounds according to functional groups, nomenclature of organic compounds, structural characteristics, physical properties, synthesis of organic compounds and chemical reactions. • Draw structural and molecular and formulas of organic compounds **Cognitive Skills** • Analyze and discuss the Information and data related to organic compounds. • Apply organic chemical knowledge to solve some problems**.** **Interpersonal Skills & Responsibility** • Students will effectively and respectfully communicate and collaborate with colleagues. • Acquire the skill of team work. • Acquire the skill of respect colleagues **Communication, Information Technology, Numerical** • Using a computer as a tool in writing, drawing • Students will demonstrate proficiency in writing and speaking about organic chemistry topics in a clear and concise manner to both chemists and non-chemists according to professional standards.
Content	Organic halides, Alcohol,Ether, Phenols Aldehydes and ketones, Carboxylic acids, derivatives, Amiens main topics(nomenclature, structural characteristics classification , physical properties, synthesis and reactions) Laboratory part :- study the methods of synthesis and reaction of different function groups in organic chemistry.

Study and examination requirements and forms of examination	Regular participation at lecture and lab. Quizzes: 5% Assignment: 5% Home-Work :5% Seminar: 5% first-semester Exam.: 10% second-semester Exam.: 10% Final lab exam: 20% Final theoretical exam: 40%
Media employed	e-learning: Desire to Learn system. Data Show.Smart Board. White Board .Power point slides. Demonstration of lab examples and experiments ,lab development tools and equipment.
Reading list	Alhazimi H.M Organic Chemistry Alkheraije books 1428 H

Module designation	Chemistry
Module level, if applicable	Third Level
Code, if applicable	CHEM212
Subtitle, if applicable	Physical chemistry (phase rule)
Courses, if applicable	Not applicable
Semester(s) in which the module is taught	First and second Semester
Person responsible for the module	Dr. Gehan Elaemary
Lecturer	Ibtehag Elhassan
Language	Arabic
Relation to curriculum	Compulsory course (third level)
Type of teaching, contact hours	Contact hours per weak / Teaching Methods / Class size 1 / Lecture / 19 2 / Laboratory / 19
Workload	Contact hours per weak / Private study per weak / Total work load / ECTS credits ٣ / ٤ / ١٠٥ / 3.4
Credit points	2 KSA(3.4 ECTS)

Requirements according to the examination regulations	The student shall be debarred from the final examination if the percentage of his absence exceeds (25%) out of the total lectures of the course without an acceptable excuse. The student who is debarred from the examination because of absence is considered as a failure in the course.
Recommended prerequisites	(General chemistry physical1)
Module objectives/intended learning outcomes	To know that : **Knowledge** Understand the basics of phase rule demonstrate single-component system Discuss the structure of tow-component system Understand – Multi component system **Cognitive Skills** Apply the phase rule low to determine the number of components - phases- degrees of freedom of the different systems Explain the graphs and the results obtained in the laboratory Analyses of mono- two-and three-component system practically **Interpersonal Skills & Responsibility** Demonstrate the ability to work effectively as apart of group ,involving leadership Solve problem and provide presentations and research Requesting that act responsibly towards colleagues **Communication, Information Technology, Numerical** Development appropriate effective written and oral communication skills Development of numerical skills Solve problem using appropriate ideas and techniques
Content	A-Theoretical Study the basics of the phase rule , the one component system ,two component system , multi- component system . B-Practical: solubility of tow Liquid low-mixing, Boiling point of two-component system, coefficient of distribution of ammonia between chloroform and water,multi system applecation
Study and examination requirements and forms of examination	quizzes: 15% seminar: 5% Mid-semester test: 20% Final practical test 20% Final theoretical test: 40%

Media employed	e-learning: Desire to Learn system. Data Show.Smart Board. White Board .Power point slides. Demonstration of lab examples and experiments ,lab development tools and equipment
Reading list	- General Chemistry.,Abbas Abbas Al-Awadi. - Phase contrast balance and phase rule , D.Amin Braka

Module designation	*Chemistry*
Module level, if applicable	*3th Level*
Code, if applicable	*CHEM213*
Subtitle, if applicable	General Chemistry (2) In Organic
Courses, if applicable	*Not* applicable
Semester(s) in which the module is taught	*First and second Semester*
Person responsible for the module	*Dr.gehan El aemary*
Lecturer	*Enas Aljohani*
Language	*Arabic*
Relation to curriculum	*Compulsory course (3th level)*
Type of teaching, contact hours	Contact hours per weak / Teaching Methods / Class size 2 / Lecture / 31 2 / Laboratory / 31
Workload	Contact hours per weak / Private study per weak / Total work load / ECTS credits ٤ / ٦ / ١٥٠ / ٥
Credit points	*3 KSA(5 ECTS)*
Requirements according to the examination regulations	The student shall be debarred from the final examination if the percentage of his absence exceeds (25%) out of the total lectures of the course without an acceptable excuse. The student who is debarred from the examination because of absence is considered as a failure in the courses
Recommended prerequisites	*none*

Module objectives/intended learning outcomes	*To know that :* **Knowledge** *know comprehensive scientific facts about the structure of* **-** *the atom* *punctuate the types of chemical bonds* **-** *Define ionization potential and electron affinity Ionic - covalent bonds, ionic and covalent compounds, Electron affinity* *name elements, provide their symbols and determine the number of protons, neutrons, electrons and nuclei in elements and compounds* *list the physical properties of metals nonmetals and metalloids* **Cognitive Skills** analyze an atom or ion of a given element providing the full electronic configu ration evaluate the molecular geometry, hybridization and polarity of a covalent molecule determine whether a bond is metallic, ionic, covalent or polar covalent represent covalent and ionic bonding using Lewis dot structures **Interpersonal Skills & Responsibility** **.***Cooperative work in the laboratory* **-** **.***Work independently and as part of a team***-** *Acquire the skill* of respect colleague**s-** **Communication, Information Technology, Numerical** Use software and Surf internet for course contents • Use computational tools Use mathematical and statistical methods when solving problems Effective communication both oral and written

Content	*A-Theoretical* The atomic structure Atomic spectra- continuous spectrum -linear spectrum (atomic emission spectrum) Bohr theory of the hydrogen atom modern periodic table and electronic structure of the elements Covalent bonds and partial structure Molecular shapes and dissonance theory pairs valence VSEPR. Theory of covalent bonds. modern periodic table and electronic structure of the elements *B-Practical:* Identify the tools and methods of laboratory Preparation of solutions Determination the concentration of hydrochloric acid solution using sodium carbonate solution Standarization sodium hydroxide solution. Using the standard hydrochloric acid solution Estimate the strength and titrate each of sodium carbonate and sodium hydroxide in a mixture of them using the standard hydrochloric acid
Study and examination requirements and forms of examination	homework*: 10%* *Presentation: 5%* in class quizzes*: 5%* *Mid-semester test: 20%* *Final theoretical test: 40%* *Final Practical test : 20%*
Media employed	e-learning: Desire to Learn system. Data Show.Smart Board. White Board .Power point slides. Demonstration of lab examples and experiments ,lab development tools and equipment

Reading list	General Chemistry, " Abdul Aziz Al Owais, S. Khwaiter, A.. Al Wasil, A . Alsuhaibani General Chemistry" Adel Ahmed unit, Kamal Ibrahim Abu-Dari, Fawaz Izzat al-Khalili Fundamentals of General Chemistry," Prof. Ahmed Hassan Shehata, Arab House library for the book, first edition 2006

Module designation	Chemistry
Module level, if applicable	4th Level
Code, if applicable	CHEM 221
Subtitle, if applicable	Chemistry of Heterocyclic Compounds
Courses, if applicable	non
Semester(s) in which the module is taught	First and second Semester
Person responsible for the module	Dr.Gehan Elaemary
Lecturer	Dr.Amani Hasssan Ahmed
Language	Arabic language
Relation to curriculum	Compulsory course (3th level)
Type of teaching, contact hours	Contact hours per weak / Teaching Methods / Class size 2 / Lecture / ٢٠ ٤ / Laboratory / ٢٠
Workload	Contact hours per weak / Private study per weak / Total work load / ECTS credits ٦ / ٨ / ٢١٠ / 6.8
Credit points	4 KSA(6.8 ECTS)
Requirements according to the examination regulations	The regular student must attend the lectures. She shall be debarred from the final examination if the percentage of his attendance is less than the percentage fixed by the University Council, provided it is not less than (75%) of the lectures for each course during the semester.
Recommended prerequisites	Organic Chemistry II

Module objectives/intended learning outcomes	**By the end of this course the student will be able to:** **Knowledge** • Acquire basic knowledge on classifications of Heterocyclic Compounds ,nomenclature of Heterocyclic Compounds, structural characteristics, physical properties, synthesis of Heterocyclic Compounds and chemical reactions. • Draw structural and molecular and formulas of Heterocyclic Compounds • Recognize the nomenclature, structure, physical properties synthesis and chemical reactions of Heterocyclic Compounds. **Cognitive Skills** • Analyze and discuss the Information and data related to Heterocyclic Compounds. • Apply organic chemical knowledge to solve some problems**.** **Interpersonal Skills & Responsibility** • Students will effectively and respectfully communicate and collaborate with colleagues. • Acquire the skill of team work. • Acquire the skill of respect colleagues **Communication, Information Technology, Numerical** • Using a computer as a tool in writing, drawing • Students will demonstrate proficiency in writing and speaking about Heterocyclic compounds topics in a clear and concise manner to both chemists and non-chemists according to professional standards.
Content	Nonaromatic and aromatic heterocyclic, Chemistry of five membered aromatic heterocyclic compounds, Chemistry of Indoles, Chemistry of six membered aromatic heterocyclic compounds, Chemistry of quinoline, isoquinolin, Chemistry of five membered ring heterocycles with two or more than one heteroatom, Chemistry of six membered ring heterocycles with two or more than one heteroatom. Chemistry of six membered ring heterocycles with two or more than one heteroatom. Laboratory part
	Synthesis and reactions of selected heterocyclic compounds Chemistry of mixtures compounds

Study and examination requirements and forms of examination	Regular participation at lecture and lab. Quizzes: 5% Assignment: 5% Home-Work :5% Seminar: 5% first-semester Exam.: 10% second-semester Exam.: 10% Final lab exam: 20% Final theoretical exam: 40%
Media employed	e-learning: Desire to Learn system. Data Show.Smart Board. White Board .Power point slides. Demonstration of lab examples and experiments ,lab development tools and equipment
Reading list	• Hetrocyclic Chemistry ,2nd Ed.T.L.Gilchrist Longman Scientific & Technical Longman group UK Co published in the United State with John Wily , Sons and Inc. New York 2nd Ed. 1993. • John A. Joule and Keith Mills: *Heterocyclic Chemistry*, 5th Edition.

Module designation	Chemistry
Module level, if applicable	4th Level
Code, if applicable	CHEM222
Subtitle, if applicable	Physical chemistry (Quantum Chemistry (1))
Courses, if applicable	Not applicable
Semester(s) in which the module is taught	First and second Semester
Person responsible for the module	Dr. Gehan Elaemary
Lecturer	Ibtehag Elhassan
Language	Arabic
Relation to curriculum	Compulsory course (4th level)
Type of teaching, contact hours	Contact hours per weak: 2 — Teaching Methods: Lecture — Class size: ٣٠
Workload	Contact hours per weak: ٢ — Private study per weak: ٤ — Total work load: ٩٠ — ECTS credits: ٣.٤
Credit points	2 KSA(3.4 ECTS)

Requirements according to the examination regulations	The student shall be debarred from the final examination if the percentage of his absence exceeds (25%) out of the total lectures of the course without an acceptable excuse. The student who is debarred from the examination because of absence is considered as a failure in the course.
Recommended prerequisites	(general chemistry physical1
Module objectives/intended learning outcomes	To know that: **Knowledge** Discuss the phenomena that classical mechanics failed to .interpretation Understand the principle of quantization of energy demonstrate the property of modern quantum wave -particle theory **Cognitive Skills** Determine the wave length of particle Application of The uncertainty principle Conclusion of the energy equation for the particle in a box and free particle **Interpersonal Skills & Responsibility** Demonstrate the ability to work effectively as apart of group ,involving leadership . Solve problem and provide presentations and research Requesting that act responsibly towards colleagues **Communication, Information Technology, Numerical** Development appropriate effective written and oral communication skills Development of numerical skills Solve problem using appropriate ideas and techniques

Content	A-Theoretical failure of classical mechanics and Electromagnetic theory to phenomena . principle to quantum theory. Principle of quantization of angular momentum. Planck's constant and his physical interpretation as a representative to quantum .Principle of quantization Wilson , A free particle in one dimension, dual property of the particle and the wave, Wavelength of Dbrolli, The Uncertainty Principle, Wave function associated with the movement of the particle, factors influence in quantum mechanics, Self-Wave function, Average value, Linear combination of self-functions ,Condition of orthogonality, The consistency condition of functions, Independent Schrodinger Equation and time-dependent, a free particle in one dimension,Simple harmonic motion, movement of particle in a peaceful effort, particle in three dimensions
Study and examination requirements and forms of examination	quizzes: 5% seminar: 5% Mid-semester test1: 15% Mid-semester test2: 15% Final theoretical test: 60%
Media employed	e-learning: Desire to Learn system. Data Show.Smart Board. White Board .Power point slides.
Reading list	- Quantum chemistry, Rashed Abdul -Aziz Al-Mubarak - The principles of quantum chemistry, D / Salem Mohammed Khalil

Module designation	Chemistry
Module level, if applicable	4th Level
Code, if applicable	CHEM213
Subtitle, if applicable	physical Organic Chemistry
Courses, if applicable	none
Semester(s) in which the module is taught	First and second Semester
Person responsible for the module	Dr.gehan Elaemary
Lecturer	Dr.Nawal Mahgoub suleman
Language	Arabic

<table>
<tr><td>Relation to curriculum</td><td>Compulsory course (4th level)</td></tr>
<tr><td>Type of teaching, contact hours</td><td><table>
<tr><td></td><td>Contact hours per weak</td><td>Teaching Methods</td><td>Class size</td></tr>
<tr><td></td><td>2</td><td>Lecture</td><td>20</td></tr>
</table></td></tr>
<tr><td>Workload</td><td><table>
<tr><td>Contact hours per weak</td><td>Private study per weak</td><td>Total work load</td><td>ECTS credits</td></tr>
<tr><td>٢</td><td>٤</td><td>٩٠</td><td>٣.٤</td></tr>
</table></td></tr>
<tr><td>Credit points</td><td>2KSA(3.4 ECTS)</td></tr>
<tr><td>Requirements according to the examination regulations</td><td>The student shall be debarred from the final examination if the percentage of his absence exceeds (25%) out of the total lectures of the course without an acceptable excuse.
The student who is debarred from the examination because of absence is considered as a failure in the course.</td></tr>
<tr><td>Recommended prerequisites</td><td>Organic chemistry (2)CHEM 211</td></tr>
</table>

Module objectives/intended learning outcomes	**Knowledge** To know that : relations between electronic effects of replaced groups and free energy (Can write Hammat and Taffet equations Can listed the different reaction intermediates Describe the effect of giving and withdrawing groups on the acidity of organic acids Defines resonance and hyperconjugation effects Remember the rules for group electronic effects on phenol acidity **Cognitive Skills** (Can rewrite Hammat and Taffet equations Can apply rules of Hammat equations at different compounds The distinction between different types of reactions intermediates applications of some conclusions **Interpersonal Skills & Responsibility** Solving some of the exercises in groups Doing a search as a group write the equations of the interaction of materials under study alone Communication, Information Technology, Numerical .Deal with the computer through the use of the World Wide Web Calculating the ratio of outputs Research in the form of PowerPoint Homework through the D2l program
Content	free energy relations (Hammat and Taffet equations) -Applications in the field of study of electronic effects of replaced groups
Study and examination requirements and forms of examination	Oral and written exercises: 10% Search paper and presentation: 10% Mid-semester test: 20% Final theoretical test: 60%
Media employed	e-learning: Desire to Learn system. Data Show.Smart Board. White Board .Power point slides.

Reading list	• Physical Organic Chemistry," Abdul Aziz Mohiuddin Khoja, Ahmed Sami Abdul Shakoor Hwala, King Abdul Aziz University, 1985 • "Mechanics of organic reactions," Salim bin Schoeman and others, Deanship of Library Affairs, King Saud University, Riyadh 1407/1987 Entrance to the mechanics of organic reactions, "D.alsidik Abdullah Obaid and Dr. Ali Mohammed cobra, University Publications, October6,Libya,2010

Module designation	*Chemistry*
Module level, if applicable	*4th Level*
Code, if applicable	*CHEM 224*
Subtitle, if applicable	Descriptive Analytical Chemistry
Courses, if applicable	*Not* applicable
Semester(s) in which the module is taught	*First and second Semester*
Person responsible for the module	*Dr.gehan El aemary*
Lecturer	*Enas Aljohani*
Language	*Arabic*
Relation to curriculum	*Compulsory course (4th level)*
Type of teaching, contact hours	Contact hours per weak / Teaching Methods / Class size 2 / Lecture / ٢٤ ٢ / Laboratory / ٢٤
Workload	Contact hours per weak / Private study per weak / Total work load / ECTS credits ٤ / ٦ / ١٥٠ / ٥
Credit points	*3 KSA(5 ECTS)*
Requirements according to the examination regulations	The student shall be debarred from the final examination if the percentage of his absence exceeds (25%) out of the total lectures of the course without an acceptable excuse. The student who is debarred from the examination because of absence is considered as a failure in the courses
Recommended prerequisites	*none*

Module objectives/intended learning outcomes	*To know that :* **Knowledge** demonstrate acquired knowledge and understanding of the basic facts, terms, principles and theories of qualitative .chemical analysis Define the basic concepts of chemical equilibrium constant – for some reactions neutralization (such as a weak acid with a - strong base - weak base with strong acid identify cations and anions present in a sample, applying standard separation techniques, and analyze data obtained by ؛qualitative analysis of mixtures Illustrate the theoretical bases for separating and analyzing - .mixtures **Cognitive Skills** apply appropriate laboratory procedures in solving practical ؛problems in qualitative analysis of the given samples calculate concentration using different units and convert between different concentration units (molarity, %, ppm, g/L, (.etc Use scientific thinking to solve problems and solve overlaps in the separation of Basic radicals and that depending on the .different solubility product calculate equilibrium concentrations given initial concentrations and an equilibrium constan **Interpersonal Skills & Responsibility** .Cooperative work in the laboratory - .Work independently and as part of a team- Acquire the skill of respect colle**agues-** **Communication, Information Technology, Numerical** Use software and Surf internet for course contents Use mathematical and statistical methods when solving problems. Effective communication both oral and written.

Content	*A-Theoretical* *First Part:* A general introduction in analytical chemistry types includes the importance of the study of analytical chemistry in the areas of pharmacy, the environment and nature. Descriptive analysis and methods used in the expression of different concentrations.Equilibrium and the formation of complexes. Descriptive analysis and methods used in the expression of different concentrations. Equilibrium and the formation of complexes. The theoretical basis for the separation and analysis of mixtures and analysis of various samples *B-Practical:* identify cations and anions present in a sample, applying standard separation techniques, and analyze data obtained by qualitative analysis of mixtures
Study and examination requirements and forms of examination	homework*: 10%* *Presentation: 5%* in class quizzes*: 5%* *Mid-semester test: 20%* *Final theoretical test: 40%* *Final Practical test : 20%*
Media employed	e-learning: Desire to Learn system. Data Show.Smart Board. White Board .Power point slides. Demonstration of lab examples and experiments ,lab development tools and equipment
Reading list	Analytical Chemistry volumetric analysis and weighted, Ibrahim Al-Zamel. 1993. Quantitative analytical .chemistry, 5th edition by j.S. Fritz and G.H. Schneck. 1987

Module designation	Chemistry
Module level, if applicable	4th Level
Code, if applicable	CHEM225
Subtitle, if applicable	Physical chemistry (Electro-Reversible Chemistry 1)
Courses, if applicable	Not applicable
Semester(s) in which the module is taught	First and second Semester

<table>
<tr><td>Person responsible for the module</td><td>Dr. Gehan Elaemary</td></tr>
<tr><td>Lecturer</td><td>Ibtehag Elhassan</td></tr>
<tr><td>Language</td><td>Arabic</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory course (4th level)</td></tr>
<tr><td>Type of teaching, contact hours</td><td>
<table>
<tr><th>Contact hours per weak</th><th>Teaching Methods</th><th>Class size</th></tr>
<tr><td>2</td><td>Lecture</td><td>٢٩</td></tr>
<tr><td>٢</td><td>Laboratory</td><td>٢٩</td></tr>
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<tr><td>Workload</td><td>
<table>
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<tr><td>٤</td><td>٦</td><td>١٥٠</td><td>٥</td></tr>
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</td></tr>
<tr><td>Credit points</td><td>3 KSA(5 ECTS)</td></tr>
<tr><td>Requirements according to the examination regulations</td><td>The student shall be debarred from the final examination if the percentage of his absence exceeds (25%) out of the total lectures of the course without an acceptable excuse.
The student who is debarred from the examination because of absence is considered as a failure in the course.</td></tr>
<tr><td>Recommended prerequisites</td><td>General chemistry physical1</td></tr>
</table>

Module objectives/intended learning outcomes	To know that **Knowledge** ،Understand the basics of electrochemistry Define of electrical conductivity Discuss the reversible electrochemical processes To know the types of polar demonstrate the absolute and relative potential **Cognitive Skills** Measurement and applications e.m.f Apply laws to resolve proplems Explain the graphs and the results obtained in the laboratory **Interpersonal Skills & Responsibility** Demonstrate the ability to work effectively as apart of group ,involving leadership . Solve problem and provide presentations and research Requesting that act responsibly towards colleagues **Communication, Information Technology, Numerical** Development appropriate effective written and oral communication skills Development of numerical skills Solve problem using appropriate ideas and techniques

Content	A-Theoretical electrical conductivity, Faraday's Law, Arrhenius theory, reverse electrochemical processes, The electrical driving force, Standard cells, Effect of concentration and temperature on the electrical driving forc, Nernst equation, Electrode potential, polarity types , the absolute and relative potential, Electrochemical series, types of cells, measuring applications emf. B-Practical: solubility by conductivity, Conductivity titration, electrical driving force and specifies standard potential , Measurement of the redox potential, Specifies the concentration of solvent by polarity, Specifies a solubility of silver chloride, Measure the pH of the solution
Study and examination requirements and forms of examination	quizzes: 15% seminar: 5% Mid-semester test: 20% Final practical test 20% Final theoretical test: 40%
Media employed	e-learning: Desire to Learn system. Data Show.Smart Board. White Board .Power point slides. Demonstration of lab examples and experiments ,lab development tools and equipment
Reading list	Ahmed Chemistry electrical electrolytic conductivity Abdulaziz Al Owais - Foundations of physical chemistry, Adel Ahmed Jrare

Module designation	Chemistry
Module level, if applicable	5th Level
Code, if applicable	CHEM311
Subtitle, if applicable	Physical chemistry (Quantum Chemistry (2))
Courses, if applicable	Not applicable
Semester(s) in which the module is taught	First and second Semester
Person responsible for the module	Dr. Gehan Elaemary
Lecturer	Ibtehag Elhassan

<table>
<tr><td>Language</td><td>Arabic</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory course (5th level)</td></tr>
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<tr><td>Credit points</td><td>2 KSA(3.4 ECTS)</td></tr>
<tr><td>Requirements according to the examination regulations</td><td>The student shall be debarred from the final examination if the percentage of his absence exceeds (25%) out of the total lectures of the course without an acceptable excuse.
The student who is debarred from the examination because of absence is considered as a failure in the course.</td></tr>
<tr><td>Recommended prerequisites</td><td>Quantum Chemistry (1)</td></tr>
</table>

Module objectives/intended learning outcomes	To know that : **Knowledge** Understand ways of resolving systems of atoms containing one electron or atoms and molecules that contain more than .Electron Discuss Molecular orbital theory and Valence bond theory Give a definition to the groups theory and study of systems Symmetric and asymmetric inversely **Cognitive Skills** Calculate the quantum numbers of an electron in a particular .orbital .Apply the rules of transmission electron from orbit to another **.** Calculate both the total energy and the atomic wave functions **Interpersonal Skills & Responsibility** Demonstrate the ability to work effectively as apart of group ,involving leadership . Solve problem and provide presentations and research Requesting that act responsibly towards colleagues Demonstrate the ability to work effectively as apart of group ,involving leadership **.** Solve problem and provide presentations and research Requesting that act responsibly towards colleagues **Communication, Information Technology, Numerical** Development appropriate effective written and oral communication skills Development of numerical skills Solve problem using appropriate ideas and techniques

Content	A-Theoretical Solution of the hydrogen atom equation, wave functions of self- Eigenvalues, Quantum number for electron, angular momentum , Rules of electron transmission from orbit to orbit Approximate methods to solve the Schrödinger Equation, Perturbation theory ,Variational Method , Time independent Perturbation ,Pauli exclusion principle Symmetric Eigen functions antisymmetric Eigen functions Valence Bond Molecular orbital Theory Hackle approximation symmetry in molecules and the types of symmetry, The groups theory .
Study and examination requirements and forms of examination	quizzes: 5% seminar: 5% Mid-semester test1: 15% Mid-semester test2: 15% Final theoretical test: 60%
Media employed	e-learning: Desire to Learn system. Data Show.Smart Board. White Board .Power point slides.
Reading list	Quantum chemistry, Rashed Abdul -Aziz Al-Mubarak - The principles of quantum chemistry, D / Salem Mohammed Khalil

Module designation	*Chemistry*
Module level, if applicable	*5th Level*
Code, if applicable	٢CHEM31
Subtitle, if applicable	*Thermodynamic chemistry*
Courses, if applicable	*None*
Semester(s) in which the module is taught	*First and second Semester*
Person responsible for the module	Dr. Gehan Alaemary
Lecturer	*Dr.Manal Mohamed Mohamed Salem*
Language	Arabic
Relation to curriculum	Compulsory course (5th level)

<table>
<tr><td>Type of teaching, contact hours</td><td>
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<tr><td>٢</td><td>Laboratory</td><td>14</td></tr>
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<tr><td>Workload</td><td>
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<tr><th>Contact hours per weak</th><th>Private study per weak</th><th>Total work load</th><th>ECTS credits</th></tr>
<tr><td>٤</td><td>٦</td><td>١٥٠</td><td>٥</td></tr>
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</td></tr>
<tr><td>Credit points</td><td>3 KSA(5 ECTS)</td></tr>
<tr><td>Requirements according to the examination regulations</td><td>A regular student is required to attend lectures and laboratory sessions. If his/her attendance is less than the limit (75 % of the lectures and laboratory sessions assigned for each course), the student willbe deprived from continuing the course and will be
denied entrance to the respective final examination.</td></tr>
<tr><td>Recommended prerequisites</td><td>differentiation and integration- General physical chemistry (1)</td></tr>
</table>

Module objectives/intended learning outcomes	*To know that :* **Knowledge** recognize the basics of thermodynamics (such as System- types) Introduction of students to be catalysts follow the mechanical interactions Introduce students to connect between the theoretical and practical lessons by conducting laboratory experiments Definitions of surface phenomena important such as surface tension. **Cognitive Skills** The ability of the existence of solutions to unexpected problems in creative ways. .The ability to use laboratory tools accurately .The ability to critical and analytical thinking The ability to analyze the concepts and basics and principles trying to figure out the problems contained testing process and how .to solve it Apply the skills acquired in the academic and professional contexts related to the science of chemistry **Interpersonal Skills & Responsibility** .Cooperative work in the laboratory .Conduct research work as a team .Effective participation in the activities of the methodology .The ability to self-reliance when learning Assume responsibility and individual responsibility towards society Take individual responsibility and responsibility towards the community with a commitment to the values and ethics that are compatible with Islamic values **Communication, Information Technology, Numerical** Use of modern communication technologies and information. Discussion and dialogue during lectures. Application of mathematical and statistical methods when solving problems.

Content	*A-Theoretical* Basics of thermodynamics, laws of thermodynamics *and its applications.* *B-Practical: Set various types of heats of reaction, such as enthalpy neutralization, dilution ,solution and transition, validate Hess's law in labaratory*
Study and examination requirements and forms of examination	*Participation activities students methodological* *Of scientific research – Entries… 10%* *Presentation: 5%* *Practical reports : 5%* *Mid-semester tests: 20%* *Final Practical test: 20%* *Final theoretical test: 40%*
Media employed	e-learning: Desire to Learn system. Data Show.Smart Board. White Board .Power point slides. Demonstration of lab examples and experiments ,lab development tools and equipment
Reading list	1 "Chemical Thermodynamics", Prof. Suleiman Hammad Khwaiter, Prof.. Abdul Aziz Abdullah Alsuhaibani, Dar Khuraiji for publication and distribution, the first edition 1419/1998. 2-Chemical Thermodynamics, Prof.. Abdul Aziz S. Fouda K..Kh. Naimi, House of Culture Doha-Qatar, the first edition .1412/1992 3."Physical Chemistry in kinetic chemistry and thermodynamic" O.d.abd Aleem Sulaiman Aboualemjd, Dar Arab 2001. 4. Experiments in Physical Chemistry (chemical thermodynamics) Prof. Ahmed Abdel-Aziz Ays- first edition, Obeikan Bookstore 1415 / 1995 5."Physical Chemistry"2Ed.Gilbert W. Castellan Addison Wesley Publishing company 1971. 6.Physical Chemistry Walten J.Moor 5nd Ed. 1990 Burnt Mell, Harlow, England.

<table>
<tr><td>Module designation</td><td>Chemistry</td></tr>
<tr><td>Module level, if applicable</td><td>5th Level</td></tr>
<tr><td>Code, if applicable</td><td>CHEM314</td></tr>
<tr><td>Subtitle, if applicable</td><td>organic chemistry (polymers and patrol)</td></tr>
<tr><td>Courses, if applicable</td><td>none</td></tr>
<tr><td>Semester(s) in which the module is taught</td><td>First and second Semester</td></tr>
<tr><td>Person responsible for the module</td><td>Dr.gehan Elaemary</td></tr>
<tr><td>Lecturer</td><td>Dr.Nawal Mahgoub suleman</td></tr>
<tr><td>Language</td><td>Arabic</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory course (5th level)</td></tr>
<tr><td>Type of teaching, contact hours</td><td><table><tr><th>Contact hours per weak</th><th>Teaching Methods</th><th>Class size</th></tr><tr><td>2</td><td>Lecture</td><td>10</td></tr><tr><td>2</td><td>Laboratory</td><td>10</td></tr></table></td></tr>
<tr><td>Workload</td><td><table><tr><th>Contact hours per weak</th><th>Private study per weak</th><th>Total work load</th><th>ECTS credits</th></tr><tr><td>4</td><td>5</td><td>135</td><td>٥</td></tr></table></td></tr>
<tr><td>Credit points</td><td>3 KSA(5 ECTS)</td></tr>
<tr><td>Requirements according to the examination regulations</td><td>The student shall be debarred from the final examination if the percentage of his absence exceeds (25%) out of the total lectures of the course without an acceptable excuse.

The student who is debarred from the examination because of absence is considered as a failure in the course.</td></tr>
<tr><td>Recommended prerequisites</td><td>Organic chemistry(2)CHEM 211</td></tr>
</table>

Module objectives/intended learning outcomes	**Knowledge** To identify the nature of the polymerization process Identify technical conditions used in the polymerization processes Identify the physical and chemical and thermal. characteristics of - polymers Remember that the physical properties of Plastic To describe the task petrochemical industries Define the basic compounds that make up the oil **Cognitive Skills** Can rewrite equations for polymer preparations under study Apply mechanisms of polymerization operations The distinction between different types of polymers Summarizes the most important phases of oil extraction Preparation of some polymers and soap The estimated value of machinery and chemicals used in the .experiments **Interpersonal Skills & Responsibility** Distribution of students into groups to conduct experiments Cleaning tools before and after the experiment Cleanliness of the place in laboratory Maintain herself and her colleagues by applying the security and safety in the laboratory **Communication, Information Technology, Numerical** Deal with the computer through the use of the World Wide Web Calculating the ratio of outputs Research in the form of PowerPoint Homework through the D2l program

Content	A-Theoretical First Part: Plastics and polymers Second part: Oil Chemistry B-Practical: Soap and detergent manufacturing and prepare some polymers
Study and examination requirements and forms of examination	Oral and written exercises: 10% Presentation: 5% Practical reports :5% Mid-semester test: 20% Final theoretical test: 40%
Media employed	e-learning: Desire to Learn system. Data Show.Smart Board. White Board .Power point slides. Demonstration of lab examples and experiments ,lab development tools and equipment
Reading list	The foundations of stereochemistry and organic polymers, "Abdullah Hijazi, Salem bin Sulayem Thiyabi, Faculty of Science, King Saud University. Petroleum and petrochemical industries," Salem Bin Sulayem Thiyabi, Faculty of Science, King Saud University, 1418/1997

Module designation	Chemistry
Module level, if applicable	5th Level
Code, if applicable	CHEM315
Subtitle, if applicable	Quantitative analytical Chemistry
Courses, if applicable	Not applicable
Semester(s) in which the module is taught	First and second Semester
Person responsible for the module	Dr.Gehan Elaemary
Lecturer	Dr.Mai Makki Mahmoud
Language	Arabic
Relation to curriculum	Compulsory course (5h level)
Type of teaching, contact hours	Contact hours per weak / Teaching Methods / Class size 2 / Lecture / 10 ٢ / Laboratory / 10

<table>
<tr><td>Workload</td><td><table><tr><th>Contact hours per weak</th><th>Private study per weak</th><th>Total work load</th><th>ECTS credits</th></tr><tr><td>4</td><td>5</td><td>135</td><td>٥</td></tr></table></td></tr>
<tr><td>Credit points</td><td>3 KSA(5 ECTS)</td></tr>
<tr><td>Requirements according to the examination regulations</td><td>The student shall be debarred from the final examination if the percentage of his absence exceeds (25%) out of the total lectures of the course without an acceptable excuse.

The student who is debarred from the examination because of absence is considered as a failure in the course.</td></tr>
<tr><td>Recommended prerequisites</td><td>none</td></tr>
<tr><td>Module objectives/intended learning outcomes</td><td>To know that :

Knowledge

To learn the concept of quantitative analytical chemistry and its importance .-

To learn how to solve the various calibrations volumetric calculations of all kinds .-

The ability to deal with different systems laboratory calibrations and the use of volumetric tools .

Cognitive Skills

Describe the various types of volumetric calibrations and to differentiate between them .-

Description Steps gravimetric analysis .

Interpersonal Skills & Responsibility

Teamwork

Communication, Information Technology, Numerical

Calibrations calculations for neutralization interactions , redox , sedimentation and complexes</td></tr>
</table>

Content	A-Theoretical First Part: A general introduction in analytical chemistry and quantitative types of volumetric gravimetric. Calibrations formation of complexes and complexes and their applications. Calibrations deposition (Mohr- way Foherd- Fagan) Redox titrations and applications Introduction to gravimetric analysis and gravimetric analysis steps. - Photos deposited with an explanation of the theoretical foundations of the deposition. completion of the deposition and the factors effected with an explanation of organic and inorganic precipitates . B-Practical: By the end of the course students should have the ability to make effective use of lap and chemicals used in Calibrations calculations for neutralization interactions , redox , sedimentation and complexes
Study and examination requirements and forms of examination	assignment: 10% Quizzes: 10% Practical exam :20% Mid-semester test: 20% Final theoretical exam: 40%
Media employed	e-learning: Desire to Learn system. Data Show.Smart Board. White Board .Power point slides. Demonstration of lab examples and experiments ,lab development tools and equipment
Reading list	Analytical Chemistry volumetric analysis and weighted, Ibrahim Al-Zamel. 1993. Quantitative analytical chemistry, 5th edition by j.S. Fritz and G.H. Schneck. 1987 . Key creativity in Chemistry, Omar Helwah

Module designation	Chemistry
Module level, if applicable	5th Level
Code, if applicable	CHEM316
Subtitle, if applicable	Chemistry Physical(Surfaces, Colloid s & Catalysis)
Courses, if applicable	Not applicable
Semester(s) in which the module is taught	First and second Semester

<table>
<tr><td>Person responsible for the module</td><td>Dr.gehan Elaemary</td></tr>
<tr><td>Lecturer</td><td>Dr.gehan Elaemary</td></tr>
<tr><td>Language</td><td>Arabic</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory course (5th level)</td></tr>
<tr><td>Type of teaching, contact hours</td><td>
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<tr><td>Workload</td><td>
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<tr><th>Contact hours per weak</th><th>Private study per weak</th><th>Total work load</th><th>ECTS credits</th></tr>
<tr><td>4</td><td>5</td><td>135</td><td>٥.١</td></tr>
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<tr><td>Credit points</td><td>3 KSA(5.1 ECTS)</td></tr>
<tr><td>Requirements according to the examination regulations</td><td>The student shall be debarred from the final examination if the percentage of his absence exceeds (25%) out of the total lectures of the course without an acceptable excuse.
The student who is debarred from the examination because of absence is considered as a failure in the course.</td></tr>
<tr><td>Recommended prerequisites</td><td>none</td></tr>
</table>

Module objectives/intended learning outcomes	**Knowledge** Remeber definitions of surface phenomena important such .as surface tension Introduction of students to be catalysts follow the mechanical interactions Introduce students to connect between the theoretical and practical lessons by conducting laboratory experiments Definitions of surface phenomena important such as surface Introduce students to the concepts of colloids .tension chemistry **Cognitive Skills** The ability of the existence of solutions to unexpected .problems in creative ways .The ability to analyze the concepts and basics and principles trying to figure out the problems contained testing process and .how to solve it Apply the skills acquired in the academic and professional **.**contexts related to the science of chemistry **Interpersonal Skills & Responsibility** .Cooperative work in the laboratory .Effective participation in the activities of the methodology .The ability to self-reliance when learning Assume responsibility and individual responsibility towards society Take individual responsibility and responsibility towards the community with a commitment to the values and ethics that are compatible with Islamic values **Communication, Information Technology, Numerical** **.***Use of modern communication technologies and information* .Discussion and dialogue during lectures Application of mathematical and statistical methods when .solving problems

Content	The surface tension , the concept and methods of measurement Adsorption ,the concept ,types, curves , theories and ion exchange Chromatography Adsorption Colloids, types, and examples and their properties Catalysis and characteristics, types and theories
Study and examination requirements and forms of examination	Seminar and Quizzes : 10% Home-Work: 5% Mid-semester test1: 15% Mid-semester test2: 10% Practical Exam:20% Final theoretical test: 40%
Media employed	e-learning: Desire to Learn system. Data Show.Smart Board. White Board .Power point slides. Demonstration of lab examples and experiments ,lab development tools and equipment
Reading list	Principles of Physical Chemistry - electrochemistry – surfaces chemistry -Catalysis-photochemistry, A. Hassan, M.Badr al-Din, Al-Azhar University in 1998 (third part). 2-"Heterogeneous catalysis", Charles N.. Satterfield. 3- "Surface Chemistry and Catalysis", H. Shehata, Faculty of Science, Al-Azhar University, 2004. 4-Principles of Colloid &Surface Chemistry" , Paula C. Hermes. 5-"Physical Chemistry of Surface ",Arthur W Admass. Principles of Physical

<table>
<tr><td>Module designation</td><td>Chemistry</td></tr>
<tr><td>Module level, if applicable</td><td>6th Level</td></tr>
<tr><td>Code, if applicable</td><td>CHEM321</td></tr>
<tr><td>Subtitle, if applicable</td><td>Biochemistry 1</td></tr>
<tr><td>Courses, if applicable</td><td>not applicable</td></tr>
<tr><td>Semester(s) in which the module is taught</td><td>First and second Semester</td></tr>
<tr><td>Person responsible for the module</td><td>Dr.gehan Elaemary</td></tr>
<tr><td>Lecturer</td><td>Dr.gehan Elaemary</td></tr>
<tr><td>Language</td><td>Arabic</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory course (6th level)</td></tr>
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<tr><td>Credit points</td><td>3 KSA(5.1 ECTS)</td></tr>
<tr><td>Requirements according to the examination regulations</td><td>The student shall be debarred from the final examination if the percentage of his absence exceeds (25%) out of the total lectures of the course without an acceptable excuse.
The student who is debarred from the examination because of absence is considered as a failure in the course.</td></tr>
<tr><td>Recommended prerequisites</td><td>none</td></tr>
</table>

Module objectives/intended learning outcomes	**Knowledge** :Students will learn and train the followings .Carbohydrates, Protein and Lipids Specifications Differentiation between Saturated and un-saturated fatty acids Experiment's design and Record keeping Differentiation between Mono, Di and Poly Saccharides **Cognitive Skills** Use Bio chemical theories to explain and predict observable .phenomena, using the principles developed in Biochemistry Use knowledge and understanding of essential facts, concepts .principles and theories relating to course problems Use Testing Standards to achieve success in Practical **.**Experiments **Interpersonal Skills & Responsibility** Constructive Competition Acquiring Team work spirit Lead a group in different situation **Communication, Information Technology, Numerica** .Effective communication both oral and written Use of Communication Techniqueslike P.C, smart Board ….etc .Applying Statistical and Mathematical Techniques Using a computer as a tool in writing, drawing chemical structures and data analysis to communicate scientific information **.**Use software and Surf internet for course contents

Content	Biochemistry Introduction and Objectives Chemistry of Carbohydrates- Digestion- Absorption - Metabolism Chemistry of Proteins- Digestion- Absorption Chemistry of Lipids- Digestion- Absorption- Metabolism Protein Metabolism
Study and examination requirements and forms of examination	Seminar and Quizzes : 10% Mid-semester test1: 15% Mid-semester test2: 15% Practical Exam:20% Final theoretical test: 40%
Media employed	e-learning: Desire to Learn system. Data Show.Smart Board. White Board .Power point slides. Demonstration of lab examples and experiments ,lab development tools and equipment
Reading list	Biochemistry by Donald Voet and Judith G.Voet (Last edition)John Wiely&Sons Inc. (New York , Chichester ,Torronto , Singapore) 2- Biochemistry by Lubert Stryer (Last edition)W.H.Freeman and Company (Nyo York) 3-Principles of Biochemistry by Albert L.Lehninger, David L . Nelson & Michael M.Cox(Last edition) Worth Publishers (New York).

<table>
<tr><td>Module designation</td><td>Chemistry</td></tr>
<tr><td>Module level, if applicable</td><td>6th Level</td></tr>
<tr><td>Code, if applicable</td><td>CHEM322</td></tr>
<tr><td>Subtitle, if applicable</td><td>inorganic chemistry(transition elements)</td></tr>
<tr><td>Courses, if applicable</td><td>Not applicable</td></tr>
<tr><td>Semester(s) in which the module is taught</td><td>First and second Semester</td></tr>
<tr><td>Person responsible for the module</td><td>Dr.gehan El aemary</td></tr>
<tr><td>Lecturer</td><td>Enas Aljohani</td></tr>
<tr><td>Language</td><td>Arabic</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory course (6th level)</td></tr>
<tr><td>Type of teaching, contact hours</td><td>
<table>
<tr><td>Contact hours per weak</td><td>Teaching Methods</td><td>Class size</td></tr>
<tr><td>2</td><td>Lecture</td><td>١٢</td></tr>
<tr><td>٢</td><td>Laboratory</td><td>١٢</td></tr>
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<tr><td>Workload</td><td>
<table>
<tr><td></td><td>Contact hours per weak</td><td>Private study per weak</td><td>Total work load</td><td>ECTS credits</td></tr>
<tr><td></td><td>4</td><td>8</td><td>180</td><td>7</td></tr>
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<tr><td>Credit points</td><td>4 KSA(7 ECTS)</td></tr>
<tr><td>Requirements according to the examination regulations</td><td>The student shall be debarred from the final examination if the percentage of his absence exceeds (25%) out of the total lectures of the course without an acceptable excuse.
The student who is debarred from the examination because of absence is considered as a failure in the course.</td></tr>
<tr><td>Recommended prerequisites</td><td>None</td></tr>
</table>

Module objectives/intended learning outcomes	**Knowledge** Show the main aspects of the chemistry of Transition (elements (d- block and f- block • Use knowledge of Inorganic Chemistry to explain observations and phenomena • Define transition metal ions, paramagnetic elements, Lanthanides, Actinides .Show the Position of d –f block elements in the periodic table .Name the elements of 3d series Understand the differences and similarities of .the two groups of inorganic elements **Cognitive Skills** .Use the knowledge of transition metal to solve problems Explain the existence of variable oxidation number in ions of transition elements **.**Distinguish between lanthanides and actinides **Interpersonal Skills & Responsibility** .Work independently and as part of a team- Acquire the skill of respect colleagues- **Communication, Information Technology, Numerical** • Use software and Surf internet for course contents. • Use computational tools • Report writing
Content	General features of transition metal chemistry First transition series 3d series Crystal field theory Valence bond theory Chemistry of Lanthanides and Actinides Chemistry of titanium – vanadium – chromium – magnesium – iron- cobalt – nickel – platinum- copper- Yttrium and Scandium.
Study and examination requirements and forms of examination	homework: 10% Presentation: 5% in class quizzes: 5% Mid-semester test: 20% Final theoretical test: 60%
Media employed	e-learning: Desire to Learn system. Data Show.Smart Board. White Board .Power point slides.
Reading list	Inorganic Chemistry, Second Edition [James E. hehe]

<table>
<tr><td>Module designation</td><td>Chemistry</td></tr>
<tr><td>Module level, if applicable</td><td>6th Level</td></tr>
<tr><td>Code, if applicable</td><td>CHEM323</td></tr>
<tr><td>Subtitle, if applicable</td><td>Physical Chemistry (Electroreversible 2)</td></tr>
<tr><td>Courses, if applicable</td><td>None</td></tr>
<tr><td>Semester(s) in which the module is taught</td><td>First and second Semester</td></tr>
<tr><td>Person responsible for the module</td><td>Dr. Gehan Alaemary</td></tr>
<tr><td>Lecturer</td><td>Dr.Manal Mohamed Mohamed Salem</td></tr>
<tr><td>Language</td><td>Arabic</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory course (5th level)</td></tr>
<tr><td>Type of teaching, contact hours</td><td>
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<tr><th>Contact hours per weak</th><th>Teaching Methods</th><th>Class size</th></tr>
<tr><td>٣</td><td>Lecture</td><td>١٥</td></tr>
<tr><td>٢</td><td>Laboratory</td><td>١٥</td></tr>
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<tr><td>Workload</td><td>
<table>
<tr><th>Contact hours per weak</th><th>Private study per weak</th><th>Total work load</th><th>ECTS credits</th></tr>
<tr><td>5</td><td>8</td><td>195</td><td>7</td></tr>
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<tr><td>Credit points</td><td>4 KSA(7 ECTS)</td></tr>
<tr><td>Requirements according to the examination regulations</td><td>A regular student is required to attend lectures and laboratory sessions. If his/her attendance is less than the limit (75 % of the lectures and laboratory sessions assigned for each course), the student willbe deprived from continuing the course and will be
denied entrance to the respective final examination.</td></tr>
<tr><td>Recommended prerequisites</td><td>Physical Chemistry (Electroreversible 1)</td></tr>
</table>

Module objectives/intended learning outcomes	*To know that :***Knowledge** *Identify the differences between the reversible and irreversible process.* *- multiply foundations and theories of electro chemistry reversible potential such as over-polarization ..* *-Know the types of over potential, the methods of measuring the overvoltage and the distinction between types* *-Identify the differences between cathodic and anodic polarization .* *- Know of foundations, scientific theories operations precipitation of metals and explain examples.* *-Know of the phenomenon of erosion* *The distinction between the types of corrosion.* *-Know the corrosion prevention methods.* *- Study of factors affecting the corrosion* **Cognitive Skills** ***.*** *Compare between the reversible and irreversible processes and between the types of over-voltag-remmber how scientific facts and theories of irreversible chemistry in the electrical surveyCommunication, Information Technology, Numerical* *explain the results and realize how to analyze and critique practice of analytical and* creative thinking in problem-solving skills, according to the electrical studied *of the reversible* *. chemistry* *Apply the skills acquired in the academic and professional - contexts connected to the electro* **Interpersonal Skills & Responsibility** *Collaborate by work in team in the laboratory* *.Conduct research work as a team* *.participate Effective in curricular activities* *.able to self-reliance when learning* *afford individual responsibility towards the community responsibility with a commitment to professional values and ethics that are consistent with Islamic values* ***C Communicate verbally and in writing during the*** *lectureommunication, Information Technology, Numeric**a*** *Use of the Internet in some of the vocabulary such as over-* ***voltage polarization -alamilit Almassadah and the phenomenon of corrosionl***

Content	*A-Theoretical:* *Comparison between reversible and irreversible processes* *polarization- over -voltage and types and methods of measurement and the necessary precaution as* *Cathodic and Anodic Processes, Cathodic precipitation of metals The phenomenon of corrosion , types and factors affecting it and methods of prevention of corrosion* *B-Practical: Corrosion rate measurement of iron and Alumium in dufferent medium by chemical and electro chemical techniques* *Corrosion inhibition of Fe & Al metals by organic and environment-friendly compounds, cathodic Precipitation of copper and Measuring of decomposition potential for acids, bases and salt,* *Anodic Polarization of iron in acidic media and aluminum in basic media.*
Study and examination requirements and forms of examination	*Participation activities students methodological* *Of scientific research – Entries… 10%* *Presentation: 5%* *Practical reports : 5%* *Mid-semester tests: 20%* *Final Practical test: 20%* *Final theoretical test: 40%*
Media employed	e-learning: Desire to Learn system. Data Show.Smart Board. White Board .Power point slides. Demonstration of lab examples and experiments ,lab development tools and equipment
Reading list	*1- Electro-irreversible Chemistry , Prof. Ahmed Jadallah Ibrahim Gad d. Flares Khalidi, a library of majority, the first edition 1425-2004 m* *2- Theoretical Electrochemistry ",L.I.Antropove,Mir,Publishers in Moscow,English — Translation in (1977).* *3-G.Wranglen, " An Introduction to Corrosion and Protection of Metals" , Chapman and Hall, New York, London 1985.* *4.An Introduction to Electrochemical Corrosion Testing For Practicing Engineers and Scintists,William S. Tait (1994).*

<table>
<tr><td>Module designation</td><td>Chemistry</td></tr>
<tr><td>Module level, if applicable</td><td>6th Level</td></tr>
<tr><td>Code, if applicable</td><td>CHEM324</td></tr>
<tr><td>Subtitle, if applicable</td><td>Inorganic chemistry (Coordination Chemistry)</td></tr>
<tr><td>Courses, if applicable</td><td>Not applicable</td></tr>
<tr><td>Semester(s) in which the module is taught</td><td>First and second Semester</td></tr>
<tr><td>Person responsible for the module</td><td>Dr.gehan Elaemary</td></tr>
<tr><td>Lecturer</td><td>Dr.Mai Makki Mahmoud</td></tr>
<tr><td>Language</td><td>Arabic</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory course (6th level)</td></tr>
<tr><td>Type of teaching, contact hours</td><td>
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<tr><th>Contact hours per weak</th><th>Teaching Methods</th><th>Class size</th></tr>
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<tr><td>٢</td><td>Laboratory</td><td>١٢</td></tr>
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<tr><td>Workload</td><td>
<table>
<tr><th>Contact hours per weak</th><th>Private study per weak</th><th>Total work load</th><th>ECTS credits</th></tr>
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<tr><td>Credit points</td><td>3 KSA(5 ECTS)</td></tr>
<tr><td>Requirements according to the examination regulations</td><td>The student shall be debarred from the final examination if the percentage of his absence exceeds (25%) out of the total lectures of the course without an acceptable excuse.

The student who is debarred from the examination because of absence is considered as a failure in the course.</td></tr>
<tr><td>Recommended prerequisites</td><td>none</td></tr>
</table>

Module objectives/intended learning outcomes	To know that : **Knowledge** . To know basic concepts of coordination compounds State and give examples of coordination compounds Explain how the coordination compounds pounded To know deferent theories explain the behavior of coordination compounds Explain the chemical and physical properties of coordination compounds Describe the molecular orbital theory of coordination bonding **Cognitive Skills•** work in terms as well as independently-١ To think and solve problems by work with others Manage resources, time and other members **Interpersonal Skills & Responsibility** make effective use of lap and chemicals used in coordination chemistry Using computer as a tool in writing drawing chemical structures and data analy ses to communicate scientific information Report writing Use software and PowerPoint to improve student skills **Communication, Information Technology, Numerical** Write and draw the the electron configuration and hyprdaizion of moluclelar orbitals Draw an electronic energy level diagrm Work with others .Manage resources, time and other members of the group

Content	A-Theoretical First Part: introduction to coordination chemistry ,naming of coordination compounds, crystal field theory compare between valence bond theory and molecular orbital theory ,and spectroscopic behaviour of coordination compounds. B-Practical: Synthesis,reactivity's and prepare of some coordination compounds.
Study and examination requirements and forms of examination	assignment: 10% Quizzes: 10% Practical exam :20% Mid-semester test: 20% Final theoretical exam: 40%
Media employed	e-learning: Desire to Learn system. Data Show.Smart Board. White Board .Power point slides. Demonstration of lab examples and experiments ,lab development tools and equipment
Reading list	Chemistry ;principles and reactions by William l.masterton, cecile Chemistry of coordination compounds;d.mohamed Abdulrahman gohar F.A..Cotton,g.Wilkenson and P.L.Gaus, "Basic Inorganic Chemistry " 3rd Ed .John Wiley and Sons ,New York 1998. 1-S.F.A.Kette,"Coordination Compounds "Thomas Nelson and sones ltd,1969. 2-D.Satton ," Electronic Spectra of transition metal complexes " Mc-Graw Hill ,Lpndon,1968.

<table>
<tr><td>Module designation</td><td>Chemistry</td></tr>
<tr><td>Module level, if applicable</td><td>7th Level</td></tr>
<tr><td>Code, if applicable</td><td>CHEM411</td></tr>
<tr><td>Subtitle, if applicable</td><td>Instrumental Analysis Chemistry</td></tr>
<tr><td>Courses, if applicable</td><td>Not applicable</td></tr>
<tr><td>Semester(s) in which the module is taught</td><td>First and second Semester</td></tr>
<tr><td>Person responsible for the module</td><td>Dr.gehan Elaemary</td></tr>
<tr><td>Lecturer</td><td>Dr.Mai Makki Mahmoud</td></tr>
<tr><td>Language</td><td>Arabic</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory course (7th level)</td></tr>
<tr><td>Type of teaching, contact hours</td><td>
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<tr><th>Contact hours per weak</th><th>Teaching Methods</th><th>Class size</th></tr>
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<tr><td>٢</td><td>Laboratory</td><td>7</td></tr>
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<tr><td>Workload</td><td>
<table>
<tr><th>Contact hours per weak</th><th>Private study per weak</th><th>Total work load</th><th>ECTS credits</th></tr>
<tr><td>5</td><td>8</td><td>195</td><td>7</td></tr>
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<tr><td>Credit points</td><td>4KSA(6.8 ECTS)</td></tr>
<tr><td>Requirements according to the examination regulations</td><td>The student shall be debarred from the final examination if the percentage of his absence exceeds (25%) out of the total lectures of the course without an acceptable excuse.

The student who is debarred from the examination because of absence is considered as a failure in the course.</td></tr>
<tr><td>Recommended prerequisites</td><td>none</td></tr>
</table>

Module objectives/intended learning outcomes	To know that : **Knowledge** To learn the electrolytic methods include Potentiometric , **-** .colomtric and gravimetric analysis and Electrolytic To learn methods used in the expression of different **-** .concentrations, Equilibrium and the formation of complexes Describe the spectral analysis methods include visible **.**spectroscopy **Cognitive Skills•** .Describe the Methods of molecular spectroscopy - Describe the Methods of atomic spectroscopy - **Interpersonal Skills & Responsibility** Teamwork **Communication, Information Technology, Numerical** Calibrations calculations for neutralization interactions , redox , sedimentation and complexes
Content	A-Theoretical First Part: introduction to electrolytic methods, and spectral analysis methods, methods of molecular, atomic spectroscopy, introduction to chromatography and chromatographic methods. B-Practical: instrumental practsing investgation to identfy and separation of some chemical compounds .using spectrophotometer,ph meter ,chrommatographic separation.
Study and examination requirements and forms of examination	assignment: 10% Quizzes: 10% Practical exam :20% Mid-semester test: 20% Final theoretical exam: 40%
Media employed	e-learning: Desire to Learn system. Data Show.Smart Board. White Board .Power point slides. Demonstration of lab examples and experiments ,lab development tools and equipment

Reading list	• Instrumental Analysis Chemistry, Ibrahim Al-Zamel. 1993. • Quantitative analytical chemistry, 5th edition by j.S. Fritz and G.H. Schneck. 1987 . Key creativity in Chemistry, Omar Helwah • Quantitative analytical chemistry, 5th edition by j.S. Fritz and G.H. Schneck. 1987

Module designation	Chemistry
Module level, if applicable	Seven Level
Code, if applicable	CHEM412
Subtitle, if applicable	Physical chemistry (Kinetic chemistry)
Courses, if applicable	Not applicable
Semester(s) in which the module is taught	First and second Semester
Person responsible for the module	Dr. Gehan Elaemary
Lecturer	Ibtehag Elhassan
Language	Arabic
Relation to curriculum	Compulsory course (seven level)
Type of teaching, contact hours	Contact hours per weak / Teaching Methods / Class size ٢ Lecture 23 ٢ Laboratory 23
Workload	Contact hours per weak / Private study per weak / Total work load / ECTS credits 4 / 6 / 150 / 5
Credit points	3 KSA(5 ECTS)
Requirements according to the examination regulations	The student shall be debarred from the final examination if the percentage of his absence exceeds (25%) out of the total lectures of the course without an acceptable excuse. The student who is debarred from the examination because of absence is considered as a failure in the course.
Recommended prerequisites	Thermodynamic chemistry

Module objectives/intended learning outcomes	To know that **Knowledge** Understand the Rate and Classification Of Chemical Reaction Determination of order of Chemical Reaction Study the effect of temperature on the rate of reaction Discuss the mechanism of complex reaction demonstrate ttheories that explain the occurrence of chemical reactions **Cognitive Skills•** Apply the rate of reactions lows Explain the graphs and the results obtained in the laboratory Solving problem and exercises using kinetic laws **Interpersonal Skills & Responsibility** Demonstrate the ability to work effectively as apart of group ,involving leadership . Solve problem and provide presentations and research Requesting that act responsibly towards colleagues **Communication, Information Technology, Numerical** Development appropriate effective written and oral communication skills Development of numerical skills Solve problem using appropriate ideas and techniques

Content	A-Theoretical Definitions for kinetic,Chemistry The rate of raction. Kinetics of particles, order of a chemical reaction, Law of speed of reaction, Measuring the order of reaction, The applications of types of order of reaction, Complex interactions, Effect of temperature, Activation energy, Theories that explain the occurrence of chemical reactions B-Practical: Measure the rate and order of chemical reaction, effect of concentration on the rate of reaction, Effect of temperature on the rate.
Study and examination requirements and forms of examination	quizzes: 15% seminar: 5% Mid-semester test: 20% Final practical test 20% Final theoretical test: 40%
Media employed	e-learning: Desire to Learn system. Data Show.Smart Board. White Board .Power point slides. Demonstration of lab examples and experiments ,lab development tools and equipment
Reading list	- Kinetic chemistry - Reda Mohamed Saeed - Kinetic chemistry and chemical reactions - Suleiman Khwaiter - developer Physical Chemistry

Module designation	Chemistry
Module level, if applicable	7^{th} Level
Code, if applicable	CHEM 413
Subtitle, if applicable	Chemistry of dyes
Courses, if applicable	non
Semester(s) in which the module is taught	First and second Semester
Person responsible for the module	Dr.Gehan Elaemary
Lecturer	Dr.Amani Hasssan Ahmed
Language	Arabic
Relation to curriculum	Compulsory course (3^{th} level)

<table>
<tr><td>Type of teaching, contact hours</td><td>
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<tr><th>Contact hours per weak</th><th>Teaching Methods</th><th>Class size</th></tr>
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<tr><td>Workload</td><td>
<table>
<tr><th>Contact hours per weak</th><th>Private study per weak</th><th>Total work load</th><th>ECTS credits</th></tr>
<tr><td>5</td><td>8</td><td>195</td><td>6.8</td></tr>
</table>
</td></tr>
<tr><td>Credit points</td><td>4 KSA(6.8 ECTS)</td></tr>
<tr><td>Requirements according to the examination regulations</td><td>The regular student must attend the lectures. She shall be debarred from the final examination if the percentage of his attendance is less than the percentage fixed by the University Council, provided it is not less than (75%) of the lectures for each course during the semester.</td></tr>
<tr><td>Recommended prerequisites</td><td>Organic chemistry II</td></tr>
<tr><td>Module objectives/intended learning outcomes</td><td>By the end of this course the student will be able to:
Knowledge
• Acquire basic knowledge Basic concepts of colour: Interaction of dyes with electromagnetic radiation
• Acquire basic knowledge on Chemistry and classifications of Dyes Compounds ,.
• Draw structural and molecular and formulas of Dyes Compounds
• Recognize the nomenclature, structure, physical properties synthesis and chemical reactions of Dyes Compounds.
Cognitive Skills
• Analyze and discuss the Information and data related to Dyes Compounds.
• Apply organic chemical knowledge to solve some problems.
Interpersonal Skills & Responsibility
• Students will effectively and respectfully communicate and collaborate with colleagues.
• Acquire the skill of team work.</td></tr>
<tr><td></td><td>• Acquire the skill of respect colleagues</td></tr>
</table>

	Communication, Information Technology, Numerical • Using a computer as a tool in writing, drawing • Students will demonstrate proficiency in writing and speaking about Heterocyclic compounds topics in a clear and concise manner to both chemists and non-chemists according to professional standards.	
Content	Basic concepts of colour: Interaction of dyes with electromagnetic radiation • Classification of dyes: Classification based on chemical structure, Classification • based on application method • Quantification of Colour: Fundamentals of perceived colour, Quantification • Kinetics and thermodynamics of the dyeing process: Kinetics, Thermodynamics • Application of the various dye classes for the respective textile materials: Direct dyes, • Reactive dyes, Acid dyes, Disperse dyes, Other dye classes, Printing, melt dyeing Types of fibers (cotton, wool, cellulose, synthetic fibers, Ryon, Silk) :Practical Preparation of some organic dyes such as azo dyes and phthalene, and doing a process dye on cotton fiber and silk	1
Study and examination requirements and forms of examination	Regular participation at lecture and lab. Assignment: 5% Home-Work :10% Seminar: 5% Med.t-semester Exam.: 20% Final lab exam: 20% Final theoretical exam: 40%	
Media employed	e-learning: Desire to Learn system. Data Show.Smart Board. White Board .Power point slides. Demonstration of lab examples and experiments ,lab development tools and equipment	

Reading list	Color Chemistry, H. Zollinger, VCH (Weinheim), ISBN 3-527-28352-8 • The Theory of Coloration of Textiles, Ed. A. Johnson, Society of Dyers and Colourists • (Bradford), ISBN 0 901956 48 1 • Chemical Principles of Synthetic Fibre Dyeing, S. M. Burkinshaw, Chapman & Hall • (Glasgow), ISBN 0 7514 0043 2 • Basic Principles of Textile Coloration, A.D. Broadbent, Society of Dyers and • Colourists (Bradford), ISBN 0 901956 76 7

Module designation	Chemistry
Module level, if applicable	7th Level
Code, if applicable	CHEM414
Subtitle, if applicable	Biochemistry 2
Courses, if applicable	Not applicaple
Semester(s) in which the module is taught	First and second Semester
Person responsible for the module	Dr.gehan Elaemary
Lecturer	Dr.gehan Elaemary
Language	Arabic
Relation to curriculum	Compulsory course (7th level)
Type of teaching, contact hours	Contact hours per weak / Teaching Methods / Class size ٢ / Lecture / ٨ ٢ / Laboratory / ٨
Workload	Contact hours per weak: 4; Private study per weak: 6; Total work load: 150; ECTS credits: 5.1
Credit points	3 KSA(5.1 ECTS)
Requirements according to the examination regulations	The student shall be debarred from the final examination if the percentage of his absence exceeds (25%) out of the total lectures of the course without an acceptable excuse. The student who is debarred from the examination because of absence is considered as a failure in the course.
Recommended prerequisites	Biochemistry 1

Module objectives/intended learning outcomes	**Knowledge** .Amino Acids Composition; how to distinguish What are Enzymes, it's importance, classification and Factors .affecting Enzymes .Water and Lipid Soluble Vitamins **.**Different Body's Hormones **Cognitive Skills•** Analyze and discuss the Information and data to related to .Biochemistry Use Bio chemical theories to explain and predict observable .phenomena, using the principles developed in Biochemistry Follow logical processes based on well-established scientific principles and demonstrate the ability to use the appropriate .problem-solving techniques to solve emical problems Use knowledge and understanding of essential facts, concepts .principles and theories relating to course problems Use Testing Standards to achieve success in Practical **Interpersonal Skills & Responsibility** Constructive Competition Acquiring Team work spirit Acquiring Respect Colleagues Spirit Lead a group in different situation Sharing in Constructive Solutions findin**g** **Communication, Information Technology, Numerical** .Effective communication both oral and written Use of Communication Techniques like P.C, smart Board etc .Applying Statistical and Mathematical Techniques Using a computer as a tool in writing, drawing chemical structures and data analysis to communicate scientific information .Use software and Surf internet for course contents

Content	Nucleic Acids and Nucleotides. Enzymes General Specifications, Importance, Nomenclature. Enzymes Classification, its Affecting factors. Enzyme Motility, Inhibitor, Isoenzymes and Coenzyme. Importance of Hormones and Mechanism. Hormones Classification(Pituitary gland, Thyroid gland, Parathyroid gland, Pancreas, Sexual Hormones and Adrenal gland). Vitamins Specifications- Water soluble vitamins. Lipid Soluble Vitamins(D,E, K, A). Micro-elements and Macro-elements. Biological Fluids(Blood, Urine and Milk).
Study and examination requirements and forms of examination	Seminar and Quizzes : 10% Mid-semester test1: 15% Mid-semester test2: 15% Practical Exam:20% Final theoretical test: 40%
Media employed	e-learning: Desire to Learn system. Data Show.Smart Board. White Board .Power point slides. Demonstration of lab examples and experiments ,lab development tools and equipment
Reading list	Biochemistry by Donald Voet and Judith G.Voet (Last edition)John Wiely&Sons Inc. (New York , Chichester ,Torronto , Singapore) 2- Biochemistry by Lubert Stryer (Last edition)W.H.Freeman and Company (Nyo York) 3-Principles of Biochemistry by Albert L.Lehninger, David L . Nelson & Michael M.Cox(Last edition) Worth Publishers (New York).....

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<tr><td>Module designation</td><td>Chemistry</td></tr>
<tr><td>Module level, if applicable</td><td>8th Level</td></tr>
<tr><td>Code, if applicable</td><td>CHEM 421</td></tr>
<tr><td>Subtitle, if applicable</td><td>Chemistry of Natural Products</td></tr>
<tr><td>Courses, if applicable</td><td>non</td></tr>
<tr><td>Semester(s) in which the module is taught</td><td>First and second Semester</td></tr>
<tr><td>Person responsible for the module</td><td>Dr.Gehan Elaemary</td></tr>
<tr><td>Lecturer</td><td>Dr.Amani Hasssan Ahmed</td></tr>
<tr><td>Language</td><td>Arabic language</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory course (3th level)</td></tr>
<tr><td>Type of teaching, contact hours</td><td>
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<tr><td>Contact hours per weak</td><td>Teaching Methods</td><td>Class size</td></tr>
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<tr><td>Contact hours per weak</td><td>Private study per weak</td><td>Total work load</td><td>ECTS credits</td></tr>
<tr><td>4</td><td>6</td><td>150</td><td>5</td></tr>
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<tr><td>Credit points</td><td>3 KSA(5 ECTS)</td></tr>
<tr><td>Requirements according to the examination regulations</td><td>The regular student must attend the lectures. She shall be debarred from the final examination if the percentage of his attendance is less than the percentage fixed by the University Council, provided it is not less than (75%) of the lectures for each course during the semester.</td></tr>
<tr><td>Recommended prerequisites</td><td>Organic Chemistry II</td></tr>
<tr><td>Module objectives/intended learning outcomes</td><td>By the end of this course the student will be able to:
Knowledge
• Identify and characterize various classes of natural products by their structure and knows biosynthesis of the various classes of natural products .
• Draw structural and molecular and formulas of natural products compound
• Recognize the structure of terpenes, steroids, alkaloids, flavonoids</td></tr>
</table>

	Cognitive Skills • Analyze and discuss the Information and data related to the various classes of natural products. • Apply organic chemical knowledge to solve some problems**.** **Interpersonal Skills & Responsibility** • Students will effectively and respectfully communicate and collaborate with colleagues. • Acquire the skill of team work. • Acquire the skill of respect colleagues **Communication, Information Technology, Numerical** • Using a computer as a tool in writing, drawing • Students will demonstrate proficiency in writing and speaking about Heterocyclic compounds topics in a clear and concise manner to both chemists and non-chemists according to professional standards.
Content	Introduction on identification ,chemistry of natural products and classification of the various classes of natural products. Topics that are covered include general methods of isolation, separation, purification, and structure determination of the natural product, Chemistry of of terpenes, Chemistry of of alkaloids, Chemistry of flavonoids Laboratory part Techniques and methodologies for the extraction and separation methods of natural products from plants Techniques and methodologies for the isolation and purification methods of natural products from plants
Study and examination requirements and forms of examination	Regular participation at lecture and lab. Assignment: 5% Home-Work :10% Seminar: 5% Med.-semester Exam.: 20% Final lab exam: 20% Final theoretical exam: 40%
Media employed	e-learning: Desire to Learn system. Data Show.Smart Board. White Board .Power point slides. Demonstration of lab examples and experiments ,lab development tools and equipment

Reading list	Natural Products : The Secondary Metabolites.James R Hans Editor E W Abel Copyright: 2003.Print ISBN: 978-0-85404-490-0

Module designation	Chemistry
Module level, if applicable	8th Level
Code, if applicable	CHEM422
Subtitle, if applicable	Chemistry of organic reactions mechanisms
Courses, if applicable	none
Semester(s) in which the module is taught	First and second Semester
Person responsible for the module	Dr.gehan Elaemary
Lecturer	Dr.Nawal Mahgoub suleman
Language	Arabic
Relation to curriculum	Compulsory course (8th level)
Type of teaching, contact hours	Contact hours per weak: 2 / Teaching Methods: Lecture / Class size: 26
Workload	Contact hours per weak: 2 / Private study per weak: 4 / Total work load: 90 / ECTS credits: ٣.٤
Credit points	2KSA(3.4 ECTS)
Requirements according to the examination regulations	The student shall be debarred from the final examination if the percentage of his absence exceeds (25%) out of the total lectures of the course without an acceptable excuse. The student who is debarred from the examination because of absence is considered as a failure in the course.
Recommended prerequisites	Organic chemistry (2)CHEM 211

Module objectives/intended learning outcomes	**Knowledge** Know the mechanisms of nucleophilic substitution reactions on saturated carbon atom Know the mechanisms of electrophilic substitution reactions on aromatic compounds Can write mechanisms of addition reactions on the double bond (carbon-carbon Can listed the different rearrangement reactions Describe addition reactions on the conjugated double bond Defines nucleophilic substitution reactions on aromatic compounds Remember the mechanisms of addition reactions on carbonyl group **Cognitive Skills** Can rewrite mechanisms of electrophilic substitution reactions on aromatic compounds Can apply mechanisms of addition reactions on carbonyl group The distinction between electrophilic and nucleophilic substitution reactions on aromatic compounds applications of different mechanisms under study **Interpersonal Skills & Responsibility** Solving some of the exercises in groups Doing a search as a group write the equations of the mechanism reactions under study alone **Communication, Information Technology, Numerical** .Deal with the computer through the use of the World Wide Web Research in the form of PowerPoint Homework through the D2l program

Content	Nucleophilic substitution reactions on saturated carbon .atom Nucleophilic and electrophonic substitution reactions on .aromatic compounds Elimination reactions Addition reactions on the double bond (carbon-carbon),and (carbon-oxgen Rearrangement reactions
Study and examination requirements and forms of examination	Oral and written exercises: 10% Search paper and presentation: 10% Mid-semester test: 20% Final theoretical test: 60%
Media employed	e-learning: Desire to Learn system. Data Show.Smart Board. White Board .Power point slides
Reading list	"Mechanics of organic reactions," Salim bin Schoeman and others, Deanship of Library Affairs, King Saud University, Riyadh 1407/1987 Entrance to the mechanics of organic reactions, "D.alsidik Abdullah Obaid and Dr. Ali Mohammed cobra, University Publications,October6,Libya,2010

Module designation	Chemistry			
Module level, if applicable	Eighth Level			
Code, if applicable	CHEM 423			
Subtitle, if applicable	organic chemistry (Organic Compounds Spectra)			
Courses, if applicable	none			
Semester(s) in which the module is taught	First and second Semester			
Person responsible for the module	Dr.gehan Elaemary			
Lecturer	Dr.Nawal Mahgoub suleman			
Language	Arabic			
Relation to curriculum	Compulsory course (8th level)			
Type of teaching, contact hours		Contact hours per weak	Teaching Methods	Class size
		3	Lecture	19
		2	Laboratory	19

<table>
<tr><td rowspan="2">Workload</td><td rowspan="2"></td><td>Contact hours per weak</td><td>Private study per weak</td><td>Total work load</td><td>ECTS credits</td><td rowspan="2"></td></tr>
<tr><td>5</td><td>7</td><td>180</td><td>٧</td></tr>
<tr><td>Credit points</td><td colspan="6">4 KSA(7 ECTS)</td></tr>
<tr><td>Requirements according to the examination regulations</td><td colspan="6">The student shall be debarred from the final examination if the percentage of his absence exceeds (25%) out of the total lectures of the course without an acceptable excuse.

The student who is debarred from the examination because of absence is considered as a failure in the course.</td></tr>
<tr><td>Recommended prerequisites</td><td colspan="6">CHEM 411</td></tr>
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Module objectives/intended learning outcomes	**Knowledge** Identify the different types of spectra Remember the properties of different types of spectrophotometers To describe how to use UV spectra in the identifications of organic compounds To write steps of using mass spectra in the identifications of organic compounds Define the NMR spectra Can listed the properties of mass spectra **Cognitive Skills** Can rewrite steps of using NMR in the identifications of organic compounds Apply identification of some organic compounds using UV spectra , visible (Vis), infrared spectra IR, NMR and Mass Spectrometry The distinction between different types of absorptions in infrared spectra Summarizes the most important properties UV spectra Identification formulas of some unknown organic compounds from their spectrum The estimated value of machinery and chemicals used in the .experiments **Interpersonal Skills & Responsibility** Distribution of students into groups to conduct experiments Cleaning tools before and after the experiment Cleanliness of the place in laboratory Maintain herself and her colleagues by applying the security and safety in the laboratory
Content	A:Theoretica:priciples of UV spectra , visible (Vis), infrared spectra IR, NMR and Mass Spectrometry B:Practical :Identification of some organic compounds using UV spectra , visible (Vis), infrared spectra IR, NMR and Mass Spectrometry

Study and examination requirements and forms of examination	Oral and written exercises: 10% Presentation: 5% Practical reports :5% Mid-semester test: 20% Final theoretical test: 40%
Media employed	e-learning: Desire to Learn system. Data Show.Smart Board. White Board .Power point slides .Virtual lab
Reading list	The basic principles in the spectra of organic compounds " Hassan Mohammed al-Hazmi, Salem Schoeman Alchwimman Library Khuraiji,1986. spectrometric identification of organic compounds : Silverstein and G . Gayton Bassler John Wiley and Sons ,Inc New York,London 1994.

Module designation	*Chemistry*
Module level, if applicable	*8th Level*
Code, if applicable	CHEM424
Subtitle, if applicable	*Nuclear and Radiation Chemistry*
Courses, if applicable	*None*
Semester(s) in which the module is taught	*First and second Semester*
Person responsible for the module	Dr. Gehan Alaemary
Lecturer	*Dr.Manal Mohamed Mohamed Salem*
Language	*Arabic*
Relation to curriculum	*Compulsory course (8th level)*
Type of teaching, contact hours	Contact hours per weak: 3 — Teaching Methods: Lecture — Class size: 26
Workload	Contact hours per weak: 3 — Private study per weak: 6 — Total work load: 90 — ECTS credits: 5
Credit points	*3 KSA(5 ECTS)*

Requirements according to the examination regulations	*A regular student is required to attend lectures and laboratory sessions. If his/her attendance is less than the limit (75 % of the lectures and laboratory sessions assigned for each course), the student willbe deprived from continuing the course and will be* *denied entrance to the respective final examination.*
Recommended prerequisites	*None*
Module objectives/intended learning outcomes	*To know that :* **Knowledge** recognize the definition of each from Atom – nucleus differentiate between the proton and neutron and the mass • .number compare between radioactive element**s** • remember the relationship between the radioactivity and mass **.**know the binding energy of the nucleu**s** • recognize the interactions of radiation with material• differentiate between the photographic film and Geiger • counter and solid reagents **Cognitive Skills** .Use laboratory tools accurately Use the critical and analytical thinking analyze the concepts and basics and principles Try the figure out the problems contained testing process and .how to solve it **Interpersonal Skills & Responsibility** Conduct research work as a team Participate Effective in the activities of the methodology Learn by self-reliance Assume responsibility and individual responsibility towards .society **Communication, Information Technology, Numerical** Use of modern communication technologies and information .Discuss & dialogue during lectures Apply the mathematical and statistical methods when solving problems
Content	*A-Theoretical* Introduction in the radioactivity, Types of radiation, The stability of the nucleus, Nuclear Fission, Nuclear fusion, Nuclear accelerators, Neutron sources, The interaction of radiation with the material, Radioactive reagents and Radiation monitors *B-Practical: Non*

Study and examination requirements and forms of examination	*Participation activities students methodological* *Of scientific research – Entries, Presentation 10%* *Mid-semester tests: 30%* *Final theoretical test: 60%*
Media employed	e-learning: Desire to Learn system. Data Show.Smart Board. White Board .Power point slides.
Reading list	*1.Principles of Nuclear Chemistry, T.A.Kandil, the first edition 2001-1424h.* *2. foundations of Radiation Physics, d. M. F. Ahmed, A. M. Highway, Second Edition 1419-1998 .* *3.Introduction in nuclear and radiation chemistry, A.Suleiman , A. Salem Al-Attas, the first edition 1426-2005.* *4. Introduction to the electronic structure of the atom and Nuclear Chemistry, F. M.Hadi, A. H. Shehata, the first edition 1428-2007.* *5."Nuclear and Radio Chemistry", G.Fridlandr, J.W.Kennedy SMacias and J.M.Miller BrdEd.John Wily and Son Inc.1981.* *6."Nuclear Chemistry", Theory and Applications" GR.Choppin and J.Rydberge Pergamon Press1980.*