

# MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

المرحلة الثالثة

Module Information			
معلومات المادة الدراسية			
Module Title	<b>Natural products</b> النواتج الطبيعية		Module Delivery
Module Type			<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture
Module Code			
Administering Department	Department of Chemistry	College	College of Sciences
Module Leader	Name	e-mail	E-mail
Module Leader's Acad. Title	Asst. Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	15/04/2024		

Module Aims, Learning Outcomes and Indicative Contents

## أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p><b>Module Aims</b></p> <p>أهداف المادة الدراسية</p>	<ol style="list-style-type: none"> <li>1. To develop third-stage students' information on the subject of natural products and their medical and industrial important</li> <li>2. To understand and know the classes of active chemical compounds that are produced by living organisms</li> <li>3. This course deals with the basic concepts of secondary metabolites and their classifications</li> <li>4. This course is important for teaching students the active chemical structures and their use as pharmaceuticals</li> <li>5. The course study the bio-synthesis of natural products pathways</li> </ol>
<p><b>Module Learning Outcomes</b></p> <p>مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> <li>1. Identify the nature of secondary metabolites</li> <li>2. Identify the difference between primary and secondary metabolites</li> <li>3. An important summary of how to identification chemical active compounds by different techniques</li> <li>4. Discuss the interaction and participation of natural active chemical compounds in pharmaceutical use.</li> <li>5. Description of terpenes, alkaloids, phenols, glycosides and antibiotics</li> <li>6. Determination of classes of active compounds of natural products</li> <li>7. Study of biosynthesis and metabolic pathways</li> <li>8. Identifying the class and characteristics of each type of natural products</li> <li>9. Identify the chemical structures of all secondary metabolite compounds</li> </ol>
<p><b>Indicative Contents</b></p> <p>المحتويات الإرشادية</p>	<p>indicative content includes the following.</p> <p>Part A - Introducing Natural Products</p> <p>metabolism, definitions of primary and secondary metabolism,</p> <p>Why do we study natural products, classification of natural products compounds, ways to identify the structural composition of natural products. [15 hours]</p> <p>Part A Classes of Natural Products: 1- (Terpenoids) 2- D (Steroids)</p>

	<p>3- (Alkaloids)</p> <p>4- (Flavonoids and Anthocyanins)</p> <p>5- Glycosides 6. (Coumarins)</p> <p>7- (Phenanthernoids)</p> <p>9- Vitamins 10- (Xanthones)</p> <p>[15 hours]</p> <p>Revision problem classes [6 hrs]</p> <p>Part B - Study of antibiotics. [10 hours]</p>
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### Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

<b>Strategies</b>	<p>Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.</p>
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## Delivery Plan (Weekly Syllabus)

### المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction of Natural Product مدخل الى النواتج الطبيعية
Week 2	Metabolism التمثيل الغذائي
Week 3	Classification of natural products تصنيف النواتج الطبيعية
Week 4	Terpenoids + quiz الترينينات
Week 5	Biosynthesis of terpenes التصنيع الحيوي للترينينات
Week 6	Alkaloids القلويدات
Week 7	Classification of Alkaloids تصنيف القلويدات
Week 8	Phenols Compounds + midterm exam مركبات الفينول
Week 9	Biosynthesis of phenols التصنيع الحيوي للفينول
Week 10	Flavonoids+ quiz

		الفلافونيدات
Week 11	Lignin and Biosynthesis of lignin	اللجنين وتصنيع اللجنين
Week 12	Tannins and Glycosides	التانيس والجليكوسيدات
Week 13	Essential Oils + quiz	الزيوت الاساسية
Week 14	Antibiotics and Classification of antibiotic	المضادات الحيوية وتصنيفها
Week 15	<i>Pencillins</i>	البنسلينات
Week 16	Preparatory week before the final Exam	اسبوع مراجعة قبل الامتحان

### Learning and Teaching Resources

#### مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	<b>Harborne, J.B. (1998).</b> <i>Phytochemical Methods; A guide to Modern Techniques of Plant Analysis</i> , Chapman and Hall Ltd., London, Great Britain.	Yes
Recommended Texts	Chemistry of Natural Products	Yes
Websites	<a href="https://en.wikipedia.org/wiki/Natural_product">https://en.wikipedia.org/wiki/Natural_product</a>	

## Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	F - Fail	راسب	(0-49)	Considerable amount of work required

## Module Information

معلومات المادة الدراسية

Module Title	<b>Physical Chemistry</b> الكيمياء الفيزيائية/1 (المرحلة الثالثة)		Chemical Kinetics
Module Type			<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial
Module Level	1	Semester of Delivery	1
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Samah Hussein Kadhim سماح حسين كاظم	e-mail	<a href="mailto:samah.h_chem_chem@sci.utq.edu.iq">samah.h_chem_chem@sci.utq.edu.iq</a>

<b>Module Leader's Acad. Title</b>	Professor	<b>Module Leader's Qualification</b>	Ph.D.
<b>Module Tutor</b>	Name (if available)	<b>e-mail</b>	E-mail
<b>Peer Reviewer Name</b>	Name	<b>e-mail</b>	E-mail
<b>Scientific Committee Approval Date</b>	15/04/2024		

## Module Aims, Learning Outcomes and Indicative Contents

### أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p><b>Module Aims</b></p> <p>أهداف المادة الدراسية</p>	<p>1-To derive and use integrated rate expressions for first and second order reactions.</p> <p>2- To understand how rates and reaction order can be determined from experimental data.</p> <p>3- To describe the temperature dependence of rate in terms of the Arrhenius equation and simple collision theory (SCT) and activated complex theory (ACT).</p> <p>4-To discuss elementary, complex non-chain and chain reactions.</p> <p>5- To introduce the use of the steady state treatment in the disentangling of rate data.</p> <p>6-To consider the kinetics of chain reactions, e.g. ozone depletion, radical polymerisation.</p> <p>7- To consider the kinetics catalysis, using of enzyme-catalyzed reactions as an example.</p>
<p><b>Module Learning Outcomes</b></p> <p>مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> <li>1. Chemical Kinetics: rate equations and reaction rate constant; activation energy, its determination and interpretation.</li> <li>2. List the various terms associated with chemical kinetics.</li> <li>3. Summarize what is meant by a rate law, order and molecularity.</li> <li>4. Discuss the Arrhenius law; reaction kinetics of complex heterogeneous reactions; consecutive and competing reactions and rate determining steps; catalysis.</li> <li>5. Describe Polymerization kinetics- Enzymes- The Michaelis-Menten mechanism of enzyme catalysis</li> <li>6. Define the steady – state approximation.</li> <li>7. Apply mass and energy balances to chemical reactions. Use chemical thermodynamics to define problems. Acquire kinetic data from literature and</li> </ol>

	<p>laboratory. Interpret such data.</p> <p>8. Discuss the kinetic model of gases-the kinetic theory of gases viscosity</p> <p>9. Discuss the Maxwell-Boltzmann distribution of molecules.</p> <p>10. Discuss thermal conductivity.</p>
<p><b>Indicative Contents</b></p> <p>المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><u>Part A – Chemical kinetics</u></p> <p>Introduction - Chemical kinetics- The rate of chemical reaction -factors influencing reaction rate- The rate law and rate constant- Order of reaction-Properties of reaction orders- Molecularity of a reaction-Derivation of differential and integral velocity equations-determination the reaction order- half-life time-first order reactions [ hrs]</p> <p>Zero order reactions- Pseudo first order reactions- Determination of the reaction order-Temperature and Reaction Rate- Arrhenius equation-determination the activation energy- Collision theory. Transition state theory. [ hrs]</p> <p>Catalysts and Reaction Rates -Reaction mechanisms – the rate determination step and reaction mechanism- The steady – state approximation-Kinetics of complex reactions - Types of complex reactions - The parallel reactions- consecutive or sequential reactions. [ hrs]</p> <p>Reversible reactions- Chain reactions- explosions-Polymerization kinetics- Enzymes- The Michaelis-Menten mechanism of enzyme catalysis. [ hrs]</p> <p>Revision problem classes [hrs]</p> <p><u>Part B - Molecular motion in gases</u></p> <p>Fundamentals</p> <p>Introduction – molecular motion in gases-the kinetic model of gases-the kinetic theory of gases viscosity. [ hrs]</p> <p>The molecular velocity distribution of gases- The Maxwell-Boltzmann distribution of molecules-The mean free path, collision diameter-Thermal conductivity-Degrees of freedom of gaseous molecules. [ hrs]</p> <p>The principle of equal power distribution- some numerical values of molecular kinetic</p>



	energy for ideal gases only. [ hrs]
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### Learning and Teaching Strategies

#### استراتيجيات التعلم والتعليم

#### Strategies

The module is delivered through a series of lectures, supported by appropriate case study material as necessary. Lectures are supported with tutorial sessions, which promote teamwork, development of oral presentation and ICT skills, e-learning, peer feedback and self-learning. Learning outcomes are assessed by formal examination and coursework.

### Delivery Plan (Weekly Syllabus)

#### المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction – Chemical kinetics- The rate of chemical reaction -factors influencing reaction rate
Week 2	The rate law and rate constant- Order of reaction-Properties of reaction orders- Molecularity of a reaction
Week 3	Derivation of differential and integral velocity equations-determination the reaction order- half-life time-first order reactions
Week 4	Second order reactions- Third order reactions
Week 5	Zero order reactions- Pseudo first order reactions- Determination of the reaction order
Week 6	Temperature and Reaction Rate- Arrhenius equation-determination the activation energy-
Week 7	Collision theory. Transition state theory
Week 8	Catalysts and Reaction Rates -Reaction mechanisms – the rate determination step and reaction mechanism- The steady – state approximation
Week 9	Kinetics of complex reactions - Types of complex reactions - The parallel reactions- consecutive or sequential reactions

<b>Week 10</b>	Reversible reactions- Chain reactions- explosions
<b>Week 11</b>	Polymerization kinetics- Enzymes- The Michaelis-Menten mechanism of enzyme catalysis
<b>Week 12</b>	Introduction – molecular motion in gases-the kinetic model of gases-the kinetic theory of gases viscosity
<b>Week 13</b>	The molecular velocity distribution of gases- The Maxwell-Boltzmann distribution of molecules-The mean free path, collision diameter
<b>Week 14</b>	Thermal conductivity-Degrees of freedom of gaseous molecules
<b>Week 15</b>	The principle of equal power distribution- some numerical values of molecular kinetic energy for ideal gases only
<b>Week 16</b>	<b>Preparatory week before the final Exam</b>

### Delivery Plan (Weekly Lab. Syllabus)

#### المنهاج الاسبوعي للمختبر

	<b>Material Covered</b>
<b>Week 1</b>	Lab 1: Hydrolysis of an ester catalyzed by acid.
<b>Week 2</b>	Lab 2: Determination the rate constant of base catalyzed hydrolysis of an ester by titration.
<b>Week 3</b>	Lab 3: Determination the rate constant of base catalyzed hydrolysis of an ester by electrical conductivity measurements.
<b>Week 4</b>	Lab 4: Determination of rate constant of reaction between iodide and persulfate ions by titration.
<b>Week 5</b>	Lab 5: A Study of Reaction Kinetics the Iodination of Acetone.
<b>Week 6</b>	Lab 6: The mechanism study of hydrogen peroxide and hydrogen iodide.
<b>Week 7</b>	Lab 7: Hydrolysis of an Ester in the Presence of Base Using Different Concentration
<b>Week 8</b>	Lab 8: Determination the rate constant of a second order reaction using equal initial concentration
<b>Week 9</b>	Lab 9: The effect of change of temperature on the rate of reaction between H <sub>2</sub> O <sub>2</sub> and HI.
<b>Week 10</b>	Lab 10: Study the effect of change of solvent on the reaction between iodide and persulfate ions.

<b>Week 11</b>	Lab 11: Study the effect of change of temperature on the reaction between iodide and persulfate ions.
<b>Week 12</b>	Lab 12: Determination of rate constant for the hydrolysis of benzilidene spectrophotometry.
<b>Week 13</b>	Lab 13: Study the autocatalytic reaction between potassium permanganate and oxalic acid.
<b>Week 14</b>	Lab 14: A kinetic study of potassium iodide with potassium persulfate using iodide clock reaction.
<b>Week 15</b>	Lab 15: The effect of concentration and temperature on the rate of reaction between sodium thiosulphate and hydrochloric acid.

### Learning and Teaching Resources

#### مصادر التعلم والتدريس

	Text	Available in the Library?
<b>Required Texts</b>	Essentials of physical chemistry A Run Bahl B.S. Bahl G.D. Tull S. Chan company LTD. 2000	No
<b>Recommended Texts</b>	P.W. Atkins Physical chemistry 8th edition	No
<b>Websites</b>		

### Grading Scheme

#### مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
<b>Success Group</b> (50 - 100)	<b>A</b> - Excellent	امتياز	90 - 100	Outstanding Performance
	<b>B</b> - Very Good	جيد جدا	80 - 89	Above average with some errors
	<b>C</b> - Good	جيد	70 - 79	Sound work with notable errors
	<b>D</b> - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	<b>E</b> - Sufficient	مقبول	50 - 59	Work meets minimum criteria
<b>Fail Group</b> (0 - 49)	<b>F</b> - Fail	راسب	(0-49)	Considerable amount of work required

<b>Module Information</b> معلومات المادة الدراسية			
<b>Module Title</b>	<b>Physical Chemistry/2</b> الكيمياء الفيزيائية 2/ (المرحلة الثالثة)		<b>Electrical and photochemistry</b>
			<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial
<b>Module Level</b>	1	<b>Semester of Delivery</b>	1
<b>Administering Department</b>	Type Dept. Code	<b>College</b>	Type College Code
<b>Module Leader</b>	Samah Hussein Kadhim سماح حسين كاظم	<b>e-mail</b>	<a href="mailto:samah.h_chem_chem@sci.utq.edu.iq">samah.h_chem_chem@sci.utq.edu.iq</a>
<b>Module Leader's Acad. Title</b>	Professor	<b>Module Leader's Qualification</b>	Ph.D.
<b>Module Tutor</b>	Name (if available)	<b>e-mail</b>	E-mail
<b>Peer Reviewer Name</b>	Name	<b>e-mail</b>	E-mail
<b>Scientific Committee Approval Date</b>	15/04/2024		

<b>Module Aims, Learning Outcomes and Indicative Contents</b> أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
<b>Module Aims</b> أهداف المادة الدراسية	<ol style="list-style-type: none"> <li>1. The aim of this module is to provide students with fundamental concepts of Electrical and photochemistry and their applications and importance in industry, energy and nature.</li> <li>2-To understanding of Theories of electrolytic conductance</li> <li>3-To understand voltage, current, Ohm's, and Faraday's laws of electrolysis.</li> </ol>

	<p>4-This course deals with the basic concept of electrochemical cell.</p> <p>5-To understand the light induced excitation and photochemical reaction</p> <p>6-To understand Beer Lambert law and Einstein's law of photoequivalence.</p> <p>7-To understand molecular electronic structure and electronic spectrum.</p>
<p><b>Module Learning Outcomes</b></p> <p>مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> <li>1. Recognize how electrolysis and electrochemical cells works</li> <li>2. List the various terms associated with Electrical and photochemistry.</li> <li>3. Summarize what is meant by a basic Galvanic Cells.</li> <li>4. Discuss the Variation of conductance with concentration.</li> <li>5. Describe Types of electrodes.</li> <li>6. Define Ohm's law.</li> <li>7. Identify the laws of photochemistry-Beer Lambert law</li> <li>8. Discuss the electronic spectrum-photosensitization</li> <li>9. Discuss the photochemical processes and quantum yield</li> </ol>
<p><b>Indicative Contents</b></p> <p>المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><u>Part A - Electrical</u></p> <p>Introduction-Electrochemistry-Important laws and units-Electrolysis and Faraday's laws of electrolysis- Electrolytic conductivity- equivalent conductance-molar conductance- Variation of conductance with concentration. [ hrs]</p> <p>Determination of <math>\Lambda^\circ</math>- Conductance Measurements Applications-Theory of electrolytic conductance -Electrical migration and transport numbers-Conductometric titrations- Mobilities of hydrogen and hydroxyl ions. [ hrs]</p> <p>Electrochemical Cell- Galvanic Cells, Daniel cell- Electromotive force- galvanic series</p> <p>Types of electrodes. [ hrs]</p> <p>Reversible Galvanic Cell Operation- Changes in Free Energy for Cell Reaction- Nernst Equation -Concentration cells- Types of concentration cells- Potentiometric titrations</p> <p>Batteries- types of batteries. [hrs]</p>

	<p>Revision problem classes [hrs]</p> <p><u>Part B - Photochemistry</u></p> <p>Fundamentals</p> <p>Photochemistry- regions of the electromagnetic spectrum-the laws of photochemistry-Beer Lambert law-Einstein's law of photoequivalence-quantum yield-photochemical processes. [ hrs]</p> <p>Selective chemical reactions-molecular orbitals and types of electronic transfers- Molecular electronic structure-multiplicity, singlet and triplet states-selection rules-Types of transfers forbidden and allowed- potential energy curves for diatomic molecules. [ hrs]</p> <p>electronic spectrum-photosensitization-half-life of excited state –quantum yield for fluorescence and phosphorescence. [ hrs]</p>
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### Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

<b>Strategies</b>	<p>The module is delivered through a series of lectures, supported by appropriate case study material as necessary. Lectures are supported with tutorial sessions, which promote teamwork, development of oral presentation and ICT skills, e-learning, peer feedback and self-learning. Learning outcomes are assessed by formal examination and coursework.</p>
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### Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction-Electrochemistry-Important laws and units-Electrolysis and Faraday's laws of electrolysis
Week 2	Electrolytic conductivity- equivalent conductance-molar conductance- Variation of conductance with concentration
Week 3	Determination of $\Lambda^\circ$ - Conductance Measurements Applications
Week 4	Theory of electrolytic conductance -Electrical migration and transport numbers
Week 5	Conductometric titrations- Mobilities of hydrogen and hydroxyl ions
Week 6	Electrochemical Cell- Galvanic Cells, Daniel cell- Electromotive force- galvanic series
Week 7	Types of electrodes
Week 8	Reversible Galvanic Cell Operation- Changes in Free Energy for Cell Reaction- Nernst Equation
Week 9	Concentration cells- Types of concentration cells- Potentiometric titrations
Week 10	Batteries- types of batteries
Week 11	Photochemistry- regions of the electromagnetic spectrum-the laws of photochemistry-Beer Lambert law
Week 12	Einstein's law of photoequivalence-quantum yield- photochemical processes
Week 13	Selective chemical reactions-molecular orbitals and types of electronic transfers- Molecular electronic structure
Week 14	multiplicity, singlet and triplet states-selection rules- Types of transfers forbidden and allowed-potential energy curves for diatomic molecules
Week 15	electronic spectrum-photosensitization-half-life of excited state –quantum yield for fluorescence and phosphorescence
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

## المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction - Determination of cell constant.
Week 2	Lab 2: Conductometric titration of strong acid with strong base.
Week 3	Lab 3: Conductometric titration of an acid mixture (HCl+HAC) with strong base.
Week 4	Lab 4: Variation of conductance with concentration strong and weak electrolytes.
Week 5	Lab 5: Determination of equivalent conductance at infinite dilution ( $\Lambda^\infty$ ) and dissociation constant of weak acid (acetic and benzoic acid).
Week 6	Lab 6: Quantitative analysis of aspirin pills by electrical conductivity measurements.
Week 7	Lab 7: Determination of solubility of sparingly soluble salts from conductivity measurements.
Week 8	Lab 8: Determination of hydrolysis constant of aniline hydrochloride by conductivity.
Week 9	Lab 9: Titration of KCl vs AgNO <sub>3</sub> (Precipitation Titration)
Week 10	Lab 10: Determination the hydrolysis constant by conductometric measurements.
Week 11	Lab 11: Determination the dissociation constant of a weak acid (approximate E.M.F.) PH method.
Week 12	Lab 12: The standard electrode potentials zinc and copper.

## Learning and Teaching Resources

### مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Physical chemistry Gordon . m. barrow	NO
Recommended Texts	P.W. Atkins Physical chemistry 8th edition	No
Websites		



## Grading Scheme

### مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
<b>Success Group</b> <b>(50 - 100)</b>	<b>A</b> - Excellent	امتياز	90 - 100	Outstanding Performance
	<b>B</b> - Very Good	جيد جدا	80 - 89	Above average with some errors
	<b>C</b> - Good	جيد	70 - 79	Sound work with notable errors
	<b>D</b> - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	<b>E</b> - Sufficient	مقبول	50 - 59	Work meets minimum criteria
<b>Fail Group</b> <b>(0 – 49)</b>	<b>F</b> – Fail	راسب	(0-49)	Considerable amount of work required

Module Information			
معلومات المادة الدراسية			
Module Title	<b>Inorganic chemistry</b>		Module Delivery
Module Type			<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code			
ECTS Credits			
SWL (hr/sem)			
Module Level	1	Semester of Delivery	
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Nuha Hussain Mzher & Haider Abbas Mahdi نهى حسين مزهر حيدر عباس مهدي		e-mail Nuh.hussain@sci.utq.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	<ol style="list-style-type: none"> <li>To develop the ability to correlate the chemical and physical properties of elements and their compounds with their positions in the periodic table.</li> <li>To establish the link between theory and laboratory practice by conducting laboratory experiments</li> </ol>

	<ol style="list-style-type: none"> <li>3. A major application of coordination compounds is their use as catalysts, which serve to alter the rate of chemical reactions.</li> <li>4. Certain complex metal catalysts, for example, play a key role in the production of polyethylene and polypropylene</li> </ol>
<b>Module Learning Outcomes</b>  مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"> <li>1. discuss the properties of coordination compounds</li> <li>2. Categorize Coordination Compounds</li> <li>3. Relate Valence Bond Theory and Hybridization</li> <li>4. Discuss Valence Bond Theory</li> <li>5. consider Effective Atomic Number Theory and Werner Complexes</li> <li>6. Correlate Electroneutral Principle and Connecting Back</li> </ol>
<b>Indicative Contents</b>  المحتويات الإرشادية	

<b>Learning and Teaching Strategies</b> استراتيجيات التعلم والتعليم	
<b>Strategies</b>	

<b>Delivery Plan (Weekly Syllabus)</b> المنهاج الاسبوعي النظري	
	<b>Material Covered</b>
<b>Week 1</b>	Coordination Compounds: Nomenclature of Coordination Compounds,, Transition Metals,

	Magnetic Properties.
<b>Week 2</b>	Werner Theory, Geometric Isomer
<b>Week 3</b>	Covalent, ionic and coordinate Bond
<b>Week 4</b>	Hybridization
<b>Week 5</b>	Effective Atomic Number Theory: Werner Complexes
<b>Week 6</b>	Valence Bond Theory
<b>Week 7</b>	Electroneutral Principle and Connecting Back
<b>Week 8</b>	Molecule Structure; Lewis Structure
<b>Week 9</b>	Octet Rules, VSEPR Rules
<b>Week 10</b>	Molecular Symmetry; Point Group
<b>Week 11</b>	Character Tables
<b>Week 12</b>	Symmetry Applications
<b>Week 13</b>	Group theory
<b>Week 14</b>	Double salts and complexes
<b>Week 15</b>	Stability of coordination compounds
<b>Week 16</b>	<b>Preparatory week before the final Exam</b>

### Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
<b>Week 1</b>	Lab 1: Chemistry of iron .. Detection of iron ions
<b>Week 2</b>	Lab 2: Preparation of the complex tri-oxalato ferrate (III) potassium trihydrate
<b>Week 3</b>	Lab 3: Isomers: Geometrical isomers

<b>Week 4</b>	Lab 4: Preparation of the complex trans chloride bis (ethylene diamine) dichlorocobalt (III)
<b>Week 5</b>	Lab 5: Preparation of the complex cis chloride bis (ethylene diamine) dichlorocobalt (III)
<b>Week 6</b>	Lab 6: Preparation of the complex cis di-aqua-di-oxalato-chromate (III) potassium trihydrate
<b>Week 7</b>	Lab 7: Preparation of the complex trans di-aqua-di-oxalato-chromate (III) potassium trihydrate
<b>Week 8</b>	Lab 8: A study of the rate of isomerization rate of the trans complex to the cis complex
<b>Week 9</b>	Lab 9: Isomers: Linkage isomers
<b>Week 10</b>	Lab 10: Preparation of the complex Pentachloroamine tri-cobalt chloride
<b>Week 11</b>	Lab 11: Complex preparation of pentaamine nitro cobalt( III) chloride
<b>Week 12</b>	Lab 12: Complex preparation of pentaamine nitrito cobalt( III) chloride
<b>Week 13</b>	Lab 13: Perform spectroscopic measurements of the linkage isomer complexes
<b>Week 14</b>	Lab 14: Preparation of the complex hexaisothiocyanate potassium chromate ( III) hexahydrate
<b>Week 15</b>	Lab 15: Examination
<b>Week 16</b>	<b>Preparatory week before the final Exam</b>

### Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
<b>Required Texts</b>	Text Book of Coordination Chemistry, R. K. Sharma, Discovery Publishing House, 2007	No Online only
<b>Recommended Texts</b>	Coordination Chemistry, George B. Kauffman, 1994	No Online only
<b>Websites</b>		

## Grading Scheme

### مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
<b>Success Group</b> (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
<b>Fail Group</b> (0 - 49)				
	F - Fail	راسب	(0-49)	Considerable amount of work required

## Module Information

### معلومات المادة الدراسية

<b>Module Title</b>	<b>Inorganic chemistry</b>		<b>Module Delivery</b>	
<b>Module Type</b>			<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar	
<b>Module Code</b>				
<b>ECTS Credits</b>				
<b>SWL (hr/sem)</b>				
<b>Module Level</b>	1	<b>Semester of Delivery</b>		
<b>Administering Department</b>	Type Dept. Code	<b>College</b>	Type College Code	
<b>Module Leader</b>	Nuha Hussain Mzher & Haider Abbas Mahdi نهى حسين مزهر		<b>e-mail</b>	Nuh.hussain@sci.utq.edu.iq

	حيدر عباس مهدي		
<b>Module Leader's Acad. Title</b>	Professor	<b>Module Leader's Qualification</b>	Ph.D.
<b>Module Tutor</b>	Name (if available)	<b>e-mail</b>	E-mail
<b>Peer Reviewer Name</b>	Name	<b>e-mail</b>	E-mail
<b>Scientific Committee Approval Date</b>	01/06/2023	<b>Version Number</b>	1.0

### Module Aims, Learning Outcomes and Indicative Contents

#### أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<b>Module Aims</b> أهداف المادة الدراسية	<ol style="list-style-type: none"> <li>5. Coordination compounds are a major feature of the chemistry of over half the elements.</li> <li>6. Coordination compounds have important roles as industrial catalysts in controlling reactivity, and they are essential in biochemical processes</li> <li>7. Coordination Compounds Are Involved in the Treatment of Patients Poisoned with Heavy Metal Ions</li> <li>8. Coordination Complexes Are Used in X-Ray Crystallography and Nuclear Magnetic Resonance</li> </ol>
<b>Module Learning Outcomes</b> مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"> <li>7. Determine Molecule Structure</li> <li>8. Correlate Lewis Structure, Octet Rules, VSEPR Rules</li> <li>9. recognize Molecular Orbital Theory and The Combination Of Atomic Orbitals</li> <li>10. Explain to bonding in complexes using Molecular Orbital Theory and The Combination Of Atomic Orbitals</li> <li>11. Explain the spectroscopic properties of coordination compounds.</li> <li>12. Refer to the reaction mechanisms of coordination compounds.</li> </ol>
<b>Indicative Contents</b> المحتويات الإرشادية	

### Learning and Teaching Strategies

#### استراتيجيات التعلم والتعليم

<b>Strategies</b>	
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## Delivery Plan (Weekly Syllabus)

### المنهاج الاسبوعي النظري

	Material Covered
Week 1	The introduction of bonding theory: Ionic and Covalent Bonding
Week 2	Electrostatic and Crystal Field Theory
Week 3	Crystal Field Theory to octahedral system
Week 4	Crystal Field Theory to tetrahedral system
Week 5	John Teller Event
Week 6	Ionic Bond and Metallic Bond; Crystal Structure, Lattice Energy
Week 7	Molecular Orbital Theory and The Combination Of Atomic Orbitals, Heteronuclear polyatomic molecules
Week 8	Molecular Orbital Theory and The Combination Of Atomic Orbitals, Homonuclear diatomic molecules
Week 9	Molecular Orbital Theory to complexes
Week 10	Magnetic Properties of Coordination Compounds
Week 11	Color in Coordination Compounds
Week 12	Thermodynamics and Kinetics of Complex Formation
Week 13	Reactions in Octahedral Complexes
Week 14	Reactions in Square Planar Complexes
Week 15	electronic transition



<b>Week 16</b>	<b>Preparatory week before the final Exam</b>
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### Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	<b>Material Covered</b>
<b>Week 1</b>	Lab 1: cobalt ion reactions
<b>Week 2</b>	Lab 2: Preparation of the complex ethylenediaminetetrachloride barium cobaltate ( III ) tetrahydrate
<b>Week 3</b>	Lab 3: Preparation of the complex tricarbonate sodium cobaltate (III) trihydrate
<b>Week 4</b>	Lab 4: Preparation of the complex hexaamine cobalt ( III )
<b>Week 5</b>	Lab 5: Preparation of the complex triamine trinitro cobalt ( III )
<b>Week 6</b>	Lab 6: Preparation of the complex potassium cobalt( III ) tri-oxalate
<b>Week 7</b>	Lab 7: Preparation and spectroscopic study of some complexes of copper(II).
<b>Week 8</b>	Lab 8: Preparation of the complex bis-clasinito copper(II) dihydrate
<b>Week 9</b>	Lab 9: Preparation of the complex bis sulfate (ethylene diamine) copper(II) dihydrate
<b>Week 10</b>	Lab 10: Preparation of the complex dioxalato-copper (II) potassium dihydrate
<b>Week 11</b>	Lab 11: Spectroscopic study of the prepared copper complexes
<b>Week 12</b>	Lab 12: Nickel ion interactions
<b>Week 13</b>	Lab 13: Preparation of the complex hexaamine nickel(II) chloride
<b>Week 14</b>	Lab 14: Preparation of complex bis (dimethylglyoxime) nickel ( II )
<b>Week 15</b>	Lab 15: Examination
Week 16	Preparatory week before the final Exam

### Learning and Teaching Resources

## مصادر التعلم والتدريس

	Text	Available in the Library?
<b>Required Texts</b>	Text Book of Coordination Chemistry, R. K. Sharma, Discovery Publishing House, 2007	No Online only
<b>Recommended Texts</b>	Coordination Chemistry, George B. Kauffman, 1994	No Online only
<b>Websites</b>		

## Grading Scheme

### مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
<b>Success Group (50 - 100)</b>	<b>A</b> - Excellent	امتياز	90 - 100	Outstanding Performance
	<b>B</b> - Very Good	جيد جدا	80 - 89	Above average with some errors
	<b>C</b> - Good	جيد	70 - 79	Sound work with notable errors
	<b>D</b> - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	<b>E</b> - Sufficient	مقبول	50 - 59	Work meets minimum criteria
<b>Fail Group (0 - 49)</b>	<b>FX</b> – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	<b>F</b> – Fail	راسب	(0-44)	Considerable amount of work required

**Note:** Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

<b>Indicative Contents</b> المحتويات الإرشادية	Indicative content includes the following.  1-Use of known learning methods through the explanation of the theoretical material -2 Use the blackboard and electronic screen as a means of showing important information during the explanation -3 Adoption of the basic book in giving the student the scientific foundations -4 Stirring a group of Thinking questions during lectures, which increases and motivates students to analyze and conclude
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### Learning and Teaching Strategies

#### استراتيجيات التعلم والتعليم

<b>Strategies</b>	1-Stirring a group of Thinking questions during lectures, which increases and motivates students to analyze and conclude  2- Giving students homework that requires self-explanation Assessment methods 3-Monthlywrittentests -4 Asking deductive questions during the lecture and preparing homework 5- Conducting a quick daily exam during the lecture time
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### Delivery Plan (Weekly Syllabus)

#### المنهاج الاسبوعي النظري

	Material Covered
<b>Week 1</b>	Aldehydes and Ketones
<b>Week 2</b>	Introduction of ald. and ket.
<b>Week 3</b>	Naming of aldehydes and ketones

<b>Week 4</b>	Structure and physical properties of ald. and ket.
<b>Week 5</b>	Synthesis of aldehydes and ketones
<b>Week 6</b>	Reaction of aldehydes and ketones
<b>Week 7</b>	Stereochemistry
<b>Week 8</b>	Types of stereoisomers
<b>Week 9</b>	Chirality. Enantiomers and Diastereomers
<b>Week 10</b>	R&S Configuration
<b>Week 11</b>	E& Z Isomers
<b>Week 12</b>	Optically Active
<b>Week 13</b>	
<b>Week 14</b>	
<b>Week 15</b>	
<b>Week 16</b>	

### Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
<b>Week 1</b>	Preparation of aspirin
<b>Week 2</b>	Sulphonation of aromatic hydrocarbons
<b>Week 3</b>	Preparation of p-toluenesulphonic acid
<b>Week 4</b>	Preparation of esters
<b>Week 5</b>	Preparation of ethyl benzoate

<b>Week 6</b>	Nitration of aromatic hydrocarbons
<b>Week 7</b>	Preparation of benzoic acid from toluene

### Learning and Teaching Resources

#### مصادر التعلم والتدريس

	Text	Available in the Library?
<b>Required Texts</b>	Boyd and Morrison in Organic Chemistry 2020 دراسه مقصده وامثله محلولة في الكيمياء العضويه المؤلف الدكتور محمود شاكر مكطوف جامعه ذي قار كلية العلوم قسم الكيمياء	Yes
<b>Recommended Texts</b>	Practical organic chemistry by vogal 2020	yes
<b>Websites</b>		

### Module Information

#### معلومات المادة الدراسية

Module Title	<b>Biochemistry</b> الكيمياء الحياتية/1 (المرحلة 3)		Module Delivery
Module Type			<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab
Module Level	1	Semester of Delivery	1
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Dr. Raid M. H. Al-Salih	e-mail	raidstry@gmail.com

	رائد معلك حنون		
<b>Module Leader's Acad. Title</b>	Professor	<b>Module Leader's Qualification</b>	Ph.D.
<b>Module Tutor</b>	Name (if available)	<b>e-mail</b>	E-mail
<b>Peer Reviewer Name</b>	Name	<b>e-mail</b>	E-mail
<b>Scientific Committee Approval Date</b>	01/04/2024		

### Module Aims, Learning Outcomes and Indicative Contents

#### أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<b>Module Aims</b> أهداف المادة الدراسية	<p>9. To learn about the precursors of biological macromolecules.</p> <p>10. To know the functions of carbohydrates, lipids, and Proteins.</p> <p>11. To realize the importance of macromolecules.</p> <p>12. To learn the chemical structures of these macromolecules.</p> <p>13. To know the reactions of mentioned macromolecules in the organisms.</p> <p>14. To be able to recognize among these compounds.</p> <p>15. To know the organization of protein structure.</p>
<b>Module Learning Outcomes</b> مخرجات التعلم للمادة الدراسية	<p>13. Have the ability to describe the origin of macromolecules.</p> <p>14. Have the ability to describe the functions of macromolecules.</p> <p>15. Have the ability to draw the chemical structures of common carbohydrates.</p> <p>16. Have the ability to classify the carbohydrates.</p> <p>17. Have the knowledge about the products of carbohydrates reactions.</p> <p>18. Have the Knowledge about the products of lipid reactions.</p> <p>19. Have the ability to write the chemical structures of fatty acids and amino acids.</p> <p>20. Have the ability to describe the chemical structures of proteins.</p> <p>21. Have the ability to write the alpha helix protein structure.</p> <p>22. Have the knowledge about the classification of lipids.</p>
<b>Indicative Contents</b>	Indicative content includes the following.

المحتويات الإرشادية	<ul style="list-style-type: none"> <li>- Origin of life and the precursors of macromolecules [2 hrs]</li> <li>- Carbohydrates definition, functions, classifications, and reactions [10 hrs]</li> <li>- Problems about carbohydrates [2 hrs]</li> <li>- Lipids definition, functions, classifications, and reactions. [8 hrs]</li> <li>- Problems about lipids. [2 hrs]</li> <li>- Proteins definition, functions, classifications, and reactions [10 hrs]</li> <li>- Problems about proteins [2 hrs]</li> </ul>
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<b>Learning and Teaching Strategies</b> استراتيجيات التعلم والتعليم	
<b>Strategies</b>	<p>Foundational concepts are underlying concepts that students are expected to know prior to entering biochemistry and are essential for understanding big ideas in the discipline. These strategies include bond energy, free energy, pH/pKa, hydrogen bonding, alpha helix, and protein function with subsequent development of a diagnostic instrument to assess student understanding of these concepts at the onset and close of a biochemistry course. Foundational concepts are integral to student success in biochemistry as they provide a scaffold onto which students build threshold concepts, a transformed way of understanding the discipline without which the learner cannot progress. A number of threshold concepts in biochemistry can be added including the physical basis of interactions, macromolecular structure and function, and steady state. Utilization of pre-existing mental structures to build new knowledge is the basis for the constructivist model of learning. Learners create new meaning using what they already know thus information retrieval is integral to making these connections.</p>

## Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
<b>Week 1</b>	Introduction – Origin of life/ precursors of macromolecules
<b>Week 2</b>	Carbohydrates- Definition, functions and classification.
<b>Week 3</b>	Structures of carbohydrates
<b>Week 4</b>	Isomerism of carbohydrates
<b>Week 5</b>	Isomerism of carbohydrates / reactions of carbohydrates
<b>Week 6</b>	Description of some important carbohydrates and there derivatives.
<b>Week 7</b>	Problems about carbohydrates
<b>Week 8</b>	Lipids - Definition, functions and classification.
<b>Week 9</b>	Fatty acids- classification, structures, and reactions
<b>Week 10</b>	Simple lipids reactions
<b>Week 11</b>	Phospholipids- types, functions and reactions.
<b>Week 12</b>	Problems about lipids.
<b>Week 13</b>	Amino acids- definition, classifications, and structures
<b>Week 14</b>	Reactions of amino acids
<b>Week 15</b>	Peptides and proteins – structures
<b>Week 16</b>	<b>Preparatory week before the final Exam</b>

## Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
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<b>Week 1</b>	Lab 1: Introduction to carbohydrates
<b>Week 2</b>	Lab 2: Molish test (general test of carbohydrates)
<b>Week 3</b>	Lab 3: Seliwanoff's test (distinguish an aldohexoses from a ketoses)
<b>Week 4</b>	Lab 4: Bial's test (determination of pentose sugars)
<b>Week 5</b>	Lab 5: Quiz + Fehling's test
<b>Week 6</b>	Lab 6: : Benedict's test (reduction under alkaline condition)
<b>Week 7</b>	Lab 7: Barfoed's test (reduction under acidic condition)
<b>Week 8</b>	Lab 8 Quiz + Osazone's test (confirm the identity of reducing sugar)
<b>Week 9</b>	Lab 9: Iodine test (distinguish between polysaccharides from other carbohydrates and starch from other polysaccharides)
<b>Week 10</b>	Lab 10: Exam
<b>Week 11</b>	Lab 11:
<b>Week 12</b>	Lab 12:
<b>Week 13</b>	Lab 13:
<b>Week 14</b>	Lab 14:
<b>Week 15</b>	Lab 15:

### Learning and Teaching Resources

#### مصادر التعلم والتدريس

	Text	Available in the Library?
<b>Required Texts</b>	PRINCIPLES OF BIOCHEMISTRY by David L. Nelson and Michael M. Cox	Yes
<b>Recommended Texts</b>	Biochemistry by Reginald H. Garrett   Charles M. Grisham University of Virginia	No
<b>Websites</b>	<a href="https://www.googleadservices.com/pagead/aclk?sa=L&amp;ai=DChcSEwiLw42j-M7_AhVCh2gJHcDjCDEYABAAGgJ3Zg&amp;ohost=www.google.com&amp;cid=CAESa-D2D-">https://www.googleadservices.com/pagead/aclk?sa=L&amp;ai=DChcSEwiLw42j-M7_AhVCh2gJHcDjCDEYABAAGgJ3Zg&amp;ohost=www.google.com&amp;cid=CAESa-D2D-</a>	

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lpxblAKCbQ87jsOIUrBr7Jnu1&sig=AOD64\\_1stsmSDejwPdTpVJQyfdJPH\\_8-  
g&q&adurl&ved=2ahUKEwig-Yaj-M7\\_AhVrZ\\_EDHbrMDHUQ0Qx6BAgIEAE](https://www.researchgate.net/publication/351111111)

### Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	F - Fail	راسب	(0-49)	Considerable amount of work required

## MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

### Module Information

معلومات المادة الدراسية

<b>Module Title</b>	<b>Biochemistry</b> (الكيمياء الحياتية/2 (المرحلة 3)			<b>Module Delivery</b>
<b>Module Type</b>				<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab
<b>Module Code</b>				
<b>ECTS Credits</b>				
<b>SWL (hr/sem)</b>				
<b>Administering Department</b>	Type Dept. Code	<b>College</b>	Type College Code	
<b>Module Leader</b>	Dr. Raid M. H. Al-Salih رائد معلق حنون		<b>e-mail</b>	E-mail
<b>Module Leader's Acad. Title</b>	Professor		<b>Module Leader's Qualification</b>	Ph.D.
<b>Module Tutor</b>	Name (if available)		<b>e-mail</b>	E-mail
<b>Peer Reviewer Name</b>	Name		<b>e-mail</b>	E-mail
<b>Scientific Committee Approval Date</b>	15/04/2024		<b>Version Number</b>	1.0

### Module Aims, Learning Outcomes and Indicative Contents

#### أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<b>Module Aims</b> أهداف المادة الدراسية	<p>16. To learn about the nucleic acids and protein synthesis.</p> <p>17. To know the functions of nucleotides.</p> <p>18. To realize the importance of nitrogen bases and their structures.</p> <p>19. To learn the chemical structures of the nucleic acids.</p> <p>20. To know the chemical structures of vitamins .</p> <p>21. To be able to recognize between water soluble vitamins and fat soluble vit.</p> <p>22. To know the functions of vitamins and their effects on health.</p> <p>23. To know the chemical composition of enzymes.</p> <p>24. To know the functions of enzymes.</p> <p>25. To learn the factors affecting on the enzymatic reaction rate.</p>
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	<p>26. To know the types of enzyme inhibitors.</p> <p>27. To know the concept of denaturation of enzymes.</p> <p>28. To be able to describe the classification of hormones.</p> <p>29. To know the mechanism of hormone secretion.</p> <p>30. To know the concept of negative feed back in regulation of hormone work.</p> <p>31. To be able to describe the bioenergetics.</p>
<p><b>Module Learning Outcomes</b></p> <p>مخرجات التعلم للمادة الدراسية</p>	<p>23. Have the ability to describe the chemical contents of nucleic acids.</p> <p>24. Have the ability to describe the functions of nucleotides</p> <p>25. Have the ability to draw the chemical structures of the codon.</p> <p>26. Have the ability to classify the vitamins.</p> <p>27. Have the knowledge about the functions of both classes of vitamins.</p> <p>28. Have the Knowledge about the health disorders of the deficiency of vitamins.</p> <p>29. Have the ability to write the chemical structures vitamins.</p> <p>30. Have the ability to describe the chemical composition of enzymes.</p> <p>31. Have the ability to describe the types of enzyme inhibitors.</p> <p>32. Have the knowledge about the classification of hormones.</p> <p>33. Have the ability to describe the mechanism of hormone secretion.</p> <p>34. Have the knowledge about bioenergetics.</p>
<p><b>Indicative Contents</b></p> <p>المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <ul style="list-style-type: none"> <li>- Nucleic acids/ definition/ types/ Functions. [2 hrs]</li> <li>- Nucleotides and nucleosides / functions and structures [4 hrs]</li> <li>- DNA structures/ types of RNA / protein synthesis. [2 hrs]</li> <li>- Vitamins definition, functions, classifications, and deficiency . [6 hrs]</li> <li>- Enzymes definition, functions, classifications, and composition. [10 hrs]</li> <li>- Hormones definition, functions, classifications, and disorders . [6 hrs]</li> <li>- Bioenergetics.</li> </ul>

### Learning and Teaching Strategies

#### استراتيجيات التعلم والتعليم

<p><b>Strategies</b></p>	<p>Foundational concepts are underlying concepts that students are expected to know prior to entering biochemistry and are essential for understanding big ideas in the discipline. These strategies include bond energy, free energy, pH/pKa, hydrogen bonding, alpha helix, and protein function with subsequent development of a</p>
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diagnostic instrument to assess student understanding of these concepts at the onset and close of a biochemistry course. Foundational concepts are integral to student success in biochemistry as they provide a scaffold onto which students build threshold concepts, a transformed way of understanding the discipline without which the learner cannot progress. A number of threshold concepts in biochemistry can be added including the physical basis of interactions, macromolecular structure and function, and steady state. Utilization of pre-existing mental structures to build new knowledge is the basis for the constructivist model of learning. Learners create new meaning using what they already know thus information retrieval is integral to making these connections.

### Delivery Plan (Weekly Syllabus)

#### المنهاج الاسبوعي النظري

	Material Covered
<b>Week 1</b>	Nucleic acids/ definition/ types/ general chemical composition.
<b>Week 2</b>	Nitrogen bases/ types and structures/ Nucleosides and nucleotide.
<b>Week 3</b>	DNA structures/ types of RNA/ Protein synthesis
<b>Week 4</b>	Vitamins/ classification/ general review.
<b>Week 5</b>	Water soluble vitamins. / structures/ RDA/ deficiency.
<b>Week 6</b>	Fat soluble vitamins. / structures/ RDA/ deficiency.
<b>Week 7</b>	Enzymes/ definition/ chemical composition/ the mechanism of enzyme activity.
<b>Week 8</b>	Classes of enzymes/ examples/ factors affecting on enzyme activity.

<b>Week 9</b>	Michaelis Menten and lineweaver burk equations.
<b>Week 10</b>	Inhibitors / types / examples / denaturation of enzymes.
<b>Week 11</b>	Problems
<b>Week 12</b>	Hormones/ definition/ chemical structures/ the mechanism of hormones secretions.
<b>Week 13</b>	Classification of hormones.
<b>Week 14</b>	Disorders related to hormones deficiency.
<b>Week 15</b>	Bioenergetics
<b>Week 16</b>	<b>Preparatory week before the final Exam</b>

### Delivery Plan (Weekly Lab. Syllabus)

#### المنهاج الاسبوعي للمختبر

	<b>Material Covered</b>
<b>Week 1</b>	Lab 1: Introduction to Lipids and fatty acids
<b>Week 2</b>	Lab 2: Separate the main types of fat
<b>Week 3</b>	Lab 3: Acrolein test (distinguish of glycerol)
<b>Week 4</b>	Lab 4: copper acetate test differentiate between TG, saturated and unsaturated fatty acids
<b>Week 5</b>	Lab 5: Iodine test (distinguish unsaturated fatty acids)
<b>Week 6</b>	Lab 6: Quiz + preparation of soap test
<b>Week 7</b>	Lab 7: reaction of soap (a) preparation of fatty acids from soap by using HCl
<b>Week 8</b>	Lab 8: reaction of soap (b) Salting out
<b>Week 9</b>	Lab 9: reaction of soap (c) Insoluble soap
<b>Week 10</b>	Lab 10: Quiz + Color test of proteins and amino acids (1) Ninhydrin test
<b>Week 11</b>	Lab 11: (2) Xanthoproteic test

<b>Week 12</b>	Lab 12: (3) Biuret test (general test for compounds having a peptide bond)
<b>Week 13</b>	Lab 13: Exam
<b>Week 14</b>	Lab 14:
<b>Week 15</b>	Lab 15:

### Learning and Teaching Resources

#### مصادر التعلم والتدريس

	Text	Available in the Library?
<b>Required Texts</b>	PRINCIPLES OF BIOCHEMISTRY by David L. Nelson and Michael M. Cox	Yes
<b>Recommended Texts</b>	Biochemistry by Reginald H. Garrett   Charles M. Grisham University of Virginia	No
<b>Websites</b>	<a href="https://www.googleadservices.com/pagead/aclk?sa=L&amp;ai=DChcSEwiLw42j-M7_AhVCh2gJHcDjCDEYABAAGgJ3Zg&amp;ohost=www.google.com&amp;cid=CAESa-D2D-4iWOcYb_8JOfJvpL-F7YIgrdGI13zh4J9I8Wsl1mutdns9hYUdktXadbisFS2R3at1g-00MoqOqNkt2fuhLTPPHJEwudZdpGuDCGXV47aX34hnx-&lt;br/&gt;lpxbIAKCbQ87jsOIUrBr7Jnu1&amp;sig=AOD64_1stsmSDejwPdTpVJQyfdJPH_8-&lt;br/&gt;g&amp;q&amp;adurl&amp;ved=2ahUKewjg-Yaj-M7_AhVrZ_EDHbrMDHUQ0Qx6BAglEAE">https://www.googleadservices.com/pagead/aclk?sa=L&amp;ai=DChcSEwiLw42j-M7_AhVCh2gJHcDjCDEYABAAGgJ3Zg&amp;ohost=www.google.com&amp;cid=CAESa-D2D-4iWOcYb_8JOfJvpL-F7YIgrdGI13zh4J9I8Wsl1mutdns9hYUdktXadbisFS2R3at1g-00MoqOqNkt2fuhLTPPHJEwudZdpGuDCGXV47aX34hnx-lpxbIAKCbQ87jsOIUrBr7Jnu1&amp;sig=AOD64_1stsmSDejwPdTpVJQyfdJPH_8-g&amp;q&amp;adurl&amp;ved=2ahUKewjg-Yaj-M7_AhVrZ_EDHbrMDHUQ0Qx6BAglEAE</a>	

### Grading Scheme

#### مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
<b>Success Group (50 - 100)</b>	<b>A - Excellent</b>	امتياز	90 - 100	Outstanding Performance
	<b>B - Very Good</b>	جيد جدا	80 - 89	Above average with some errors
	<b>C - Good</b>	جيد	70 - 79	Sound work with notable errors

	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
<b>Fail Group</b> <b>(0 – 49)</b>				
	F – Fail	راسب	(0-49)	Considerable amount of work required

## MODULE DESCRIPTION FORM

### نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	<b>Inorganic chemistry</b> الكيمياء الاعضوية/2 (المرحلة 3)		Module Delivery
Module Type	<b>Core</b>		<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	<b>CHE 24120</b>		
ECTS Credits	<b>6</b>		
SWL (hr/sem)	<b>150</b>		
Administering Department	Type Dept. Code	College	
Module Leader	Nuha Hussain Mzher & Haider Abbas Mahdi نهى حسين مزهر حيدر عباس مهدي		e-mail
			Nuh.hussain@sci.utq.edu.iq



<b>Module Leader's Acad. Title</b>	Professor	<b>Module Leader's Qualification</b>	Ph.D.
<b>Module Tutor</b>	Name (if available)	<b>e-mail</b>	E-mail
<b>Peer Reviewer Name</b>	Name	<b>e-mail</b>	E-mail
<b>Scientific Committee Approval Date</b>	15/04/2024		

### Module Aims, Learning Outcomes and Indicative Contents

#### أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<b>Module Aims</b> أهداف المادة الدراسية	<ol style="list-style-type: none"> <li>1. Coordination compounds are a major feature of the chemistry of over half the elements.</li> <li>2. Coordination compounds have important roles as industrial catalysts in controlling reactivity, and they are essential in biochemical processes</li> <li>3. Coordination Compounds Are Involved in the Treatment of Patients Poisoned with Heavy Metal Ions</li> <li>4. Coordination Complexes Are Used in X-Ray Crystallography and Nuclear Magnetic Resonance</li> </ol>
<b>Module Learning Outcomes</b> مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"> <li>1. Determine Molecule Structure</li> <li>2. Correlate Lewis Structure, Octet Rules, VSEPR Rules</li> <li>3. recognize Molecular Orbital Theory and The Combination Of Atomic Orbitals</li> <li>4. Explain to bonding in complexes using Molecular Orbital Theory and The Combination Of Atomic Orbitals</li> <li>5. Explain the spectroscopic properties of coordination compounds.</li> <li>6. Refer to the reaction mechanisms of coordination compounds.</li> </ol>
<b>Indicative Contents</b> المحتويات الإرشادية	

### Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

<b>Strategies</b>	
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**Delivery Plan (Weekly Syllabus)**

المنهاج الاسبوعي النظري

	Material Covered
<b>Week 1</b>	The introduction of bonding theory: Ionic and Covalent Bonding
<b>Week 2</b>	Electrostatic and Crystal Field Theory
<b>Week 3</b>	Crystal Field Theory to octahedral system
<b>Week 4</b>	Crystal Field Theory to tetrahedral system
<b>Week 5</b>	John Teller Event
<b>Week 6</b>	Ionic Bond and Metallic Bond; Crystal Structure, Lattice Energy
<b>Week 7</b>	Molecular Orbital Theory and The Combination Of Atomic Orbitals, Heteronuclear polyatomic molecules
<b>Week 8</b>	Molecular Orbital Theory and The Combination Of Atomic Orbitals, Homonuclear diatomic molecules
<b>Week 9</b>	Molecular Orbital Theory to complexes
<b>Week 10</b>	Magnetic Properties of Coordination Compounds
<b>Week 11</b>	Color in Coordination Compounds
<b>Week 12</b>	Thermodynamics and Kinetics of Complex Formation
<b>Week 13</b>	Reactions in Octahedral Complexes
<b>Week 14</b>	Reactions in Square Planar Complexes
<b>Week 15</b>	electronic transition

<b>Week 16</b>	<b>Final Exam</b>
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### Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	<b>Material Covered</b>
<b>Week 1</b>	Lab 1: cobalt ion reactions
<b>Week 2</b>	Lab 2: Preparation of the complex ethylenediaminetetrachloride barium cobaltate ( III ) tetrahydrate
<b>Week 3</b>	Lab 3: Preparation of the complex tricarbonate sodium cobaltate (III) trihydrate
<b>Week 4</b>	Lab 4: Preparation of the complex hexaamine cobalt ( III )
<b>Week 5</b>	Lab 5: Preparation of the complex triamine trinitro cobalt ( III )
<b>Week 6</b>	Lab 6: Preparation of the complex potassium cobalt( III ) tri-oxalate
<b>Week 7</b>	Lab 7: Preparation and spectroscopic study of some complexes of copper(II).
<b>Week 8</b>	Lab 8: Preparation of the complex bis-clasinito copper(II) dihydrate
<b>Week 9</b>	Lab 9: Preparation of the complex bis sulfate (ethylene diamine) copper(II) dihydrate
<b>Week 10</b>	Lab 10: Preparation of the complex dioxalato-copper (II) potassium dihydrate
<b>Week 11</b>	Lab 11: Spectroscopic study of the prepared copper complexes
<b>Week 12</b>	Lab 12: Nickel ion interactions
<b>Week 13</b>	Lab 13: Preparation of the complex hexaamine nickel(II) chloride
<b>Week 14</b>	Lab 14: Preparation of complex bis (dimethylglyoxime) nickel ( II )
<b>Week 15</b>	Lab 15: Examination
Week 16	Final Exam

### Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Text Book of Coordination Chemistry, R. K. Sharma, Discovery Publishing House, 2007	No Online only
Recommended Texts	Coordination Chemistry, George B. Kauffman, 1994	No Online only
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)				
	F - Fail	راسب	(0-49)	Considerable amount of work required

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	<b>Biochemistry</b>		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	CHE 36135		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	3	Semester of Delivery	6
Administering Department	Chemistry	College	College of Science
Module Leader	Dr. Raid M. H. Al-Salih	e-mail	E-mail

<b>Module Leader's Acad. Title</b>	Professor	<b>Module Leader's Qualification</b>	Ph.D.
<b>Module Tutor</b>		<b>e-mail</b>	E-mail
<b>Peer Reviewer Name</b>	Name	<b>e-mail</b>	E-mail
<b>Scientific Committee Approval Date</b>	01/06/2023	<b>Version Number</b>	1.0

### Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

<b>Prerequisite module</b>	CHE 35028	<b>Semester</b>	5
<b>Co-requisites module</b>	None	<b>Semester</b>	

### Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<b>Module Aims</b> أهداف المادة الدراسية	<p>32. To learn about the nucleic acids and protein synthesis.</p> <p>33. To know the functions of nucleotides.</p> <p>34. To realize the importance of nitrogen bases and their structures.</p> <p>35. To learn the chemical structures of the nucleic acids.</p> <p>36. To know the chemical structures of vitamins.</p> <p>37. To be able to recognize between water soluble vitamins and fat soluble vit.</p> <p>38. To know the functions of vitamins and their effects on health.</p> <p>39. To know the chemical composition of enzymes.</p> <p>40. To know the functions of enzymes.</p> <p>41. To learn the factors affecting on the enzymatic reaction rate.</p> <p>42. To know the types of enzyme inhibitors.</p> <p>43. To know the concept of denaturation of enzymes.</p> <p>44. To be able to describe the classification of hormones.</p> <p>45. To know the mechanism of hormone secretion.</p> <p>46. To know the concept of negative feedback in regulation of hormone work.</p>
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	47. To be able to describe the bioenergetics.
<b>Module Learning Outcomes</b>  مخرجات التعلم للمادة الدراسية	35. Have the ability to describe the chemical contents of nucleic acids. 36. Have the ability to describe the functions of nucleotides 37. Have the ability to draw the chemical structures of the codon. 38. Have the ability to classify the vitamins. 39. Have the knowledge about the functions of both classes of vitamins. 40. Have the Knowledge about the health disorders of the deficiency of vitamins. 41. Have the ability to write the chemical structures vitamins. 42. Have the ability to describe the chemical composition of enzymes. 43. Have the ability to describe the types of enzyme inhibitors. 44. Have the knowledge about the classification of hormones. 45. Have the ability to describe the mechanism of hormone secretion. 46. Have the knowledge about bioenergetics.
<b>Indicative Contents</b>  المحتويات الإرشادية	Indicative content includes the following: <ul style="list-style-type: none"> <li>• Nucleic acids/ definition/ types/ Functions. [2 hrs]</li> <li>• Nucleotides and nucleosides / functions and structures [4 hrs]</li> <li>• DNA structures/ types of RNA / protein synthesis. [2 hrs]</li> <li>• Vitamins definition, functions, classifications, and deficiency. [6 hrs]</li> <li>• Enzymes definition, functions, classifications, and composition. [10 hrs]</li> <li>• Hormones definition, functions, classifications, and disorders. [6 hrs]</li> <li>• Bioenergetics.</li> </ul>

<b>Learning and Teaching Strategies</b> استراتيجيات التعلم والتعليم	
<b>Strategies</b>	Foundational concepts are underlying concepts that students are expected to know prior to entering biochemistry and are essential for understanding big ideas in the discipline. These strategies include bond energy, free energy, pH/pKa, hydrogen bonding, alpha helix, and protein function with subsequent development of a diagnostic instrument to assess student understanding of these concepts at the onset and close of a biochemistry course. Foundational concepts are integral to student success in biochemistry as they provide a scaffold onto which students build threshold concepts, a transformed way of understanding the discipline without which the learner cannot progress. A number of threshold concepts in biochemistry can be added including the physical basis of interactions, macromolecular structure and function, and steady state. Utilization of pre-existing mental structures to build new knowledge is the basis for the constructivist model of learning. Learners create new meaning using what they already know thus information retrieval is integral to

making these connections.

### Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	92	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعيا	6
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	58	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	150		

### Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
<b>Total assessment</b>			100% (100 Marks)		

### Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	<b>Material Covered</b>
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<b>Week 1</b>	Nucleic acids/ definition/ types/ general chemical composition.
<b>Week 2</b>	Nitrogen bases/ types and structures/ Nucleosides and nucleotide.
<b>Week 3</b>	DNA structures/ types of RNA/ Protein synthesis
<b>Week 4</b>	Vitamins/ classification/ general review.
<b>Week 5</b>	Water soluble vitamins. / structures/ RDA/ deficiency.
<b>Week 6</b>	Fat soluble vitamins. / structures/ RDA/ deficiency.
<b>Week 7</b>	Enzymes/ definition/ chemical composition/ the mechanism of enzyme activity.
<b>Week 8</b>	Classes of enzymes/ examples/ factors affecting on enzyme activity.
<b>Week 9</b>	Michaelis Menten and lineweaver burk equations.
<b>Week 10</b>	Inhibitors / types / examples / denaturation of enzymes.
<b>Week 11</b>	Problems
<b>Week 12</b>	Hormones/ definition/ chemical structures/ the mechanism of hormones secretions.
<b>Week 13</b>	Classification of hormones.
<b>Week 14</b>	Disorders related to hormones deficiency.
<b>Week 15</b>	Bioenergetics
<b>Week 16</b>	<b>Final Exam</b>

### Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	<b>Material Covered</b>
<b>Week 1</b>	Lab 1: Introduction to Lipids and fatty acids
<b>Week 2</b>	Lab 2: Separate the main types of fat
<b>Week 3</b>	Lab 3: Acrolein test (distinguish of glycerol)

<b>Week 4</b>	Lab 4: copper acetate test differentiate between TG, saturated and unsaturated fatty acids
<b>Week 5</b>	Lab 5: Iodine test (distinguish unsaturated fatty acids)
<b>Week 6</b>	Lab 6: Quiz + preparation of soap test
<b>Week 7</b>	Lab 7: reaction of soap (a) preparation of fatty acids from soap by using HCl
<b>Week 8</b>	Lab 8: reaction of soap (b) Salting out
<b>Week 9</b>	Lab 9: reaction of soap (c) Insoluble soap
<b>Week 10</b>	Lab 10: Quiz + Color test of proteins and amino acids (1) Ninhydrin test
<b>Week 11</b>	Lab 11: (2) Xanthoproteic test
<b>Week 12</b>	Lab 12: (3) Biuret test (general test for compounds having a peptide bond)
<b>Week 13</b>	Lab 13: Final Exam

### Learning and Teaching Resources

#### مصادر التعلم والتدريس

	Text	Available in the Library?
<b>Required Texts</b>	PRINCIPLES OF BIOCHEMISTRY by David L. Nelson and Michael M. Cox	Yes
<b>Recommended Texts</b>	Biochemistry by Reginald H. Garrett   Charles M. Grisham University of Virginia	No
<b>Websites</b>	<a href="https://www.googleadservices.com/pagead/aclk?sa=L&amp;ai=DChcSEwiLw42j-M7_AhVCh2gJHcDjCDEYABAAGgJ3Zg&amp;ohost=www.google.com&amp;cid=CAESa-D2D-4iWOcYb_8JOfJvpL-F7YIgrdGI13zh4J9I8Wsl1mutdns9hYUdktXadbisFS2R3at1g-00MoqOqNkt2fuhLTPPHJEwudZdpGuDCGXV47aX34hnx-lpxblAKCbQ87jsOIUrBr7Jnu1&amp;sig=AOD64_1stsmSDejwtpdTpVJQyfdJPH_8-g&amp;q&amp;adurl&amp;ved=2ahUKewjg-Yaj-M7_AhVrZ_EDHbrMDHUQ0Qx6BAgIEAE">https://www.googleadservices.com/pagead/aclk?sa=L&amp;ai=DChcSEwiLw42j-M7_AhVCh2gJHcDjCDEYABAAGgJ3Zg&amp;ohost=www.google.com&amp;cid=CAESa-D2D-4iWOcYb_8JOfJvpL-F7YIgrdGI13zh4J9I8Wsl1mutdns9hYUdktXadbisFS2R3at1g-00MoqOqNkt2fuhLTPPHJEwudZdpGuDCGXV47aX34hnx-lpxblAKCbQ87jsOIUrBr7Jnu1&amp;sig=AOD64_1stsmSDejwtpdTpVJQyfdJPH_8-g&amp;q&amp;adurl&amp;ved=2ahUKewjg-Yaj-M7_AhVrZ_EDHbrMDHUQ0Qx6BAgIEAE</a>	

### Grading Scheme

#### مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
<b>Success Group (50 - 100)</b>	<b>A - Excellent</b>	امتياز	90 - 100	Outstanding Performance
	<b>B - Very Good</b>	جيد جدا	80 - 89	Above average with some errors
	<b>C - Good</b>	جيد	70 - 79	Sound work with notable errors
	<b>D - Satisfactory</b>	متوسط	60 - 69	Fair but with major shortcomings
	<b>E - Sufficient</b>	مقبول	50 - 59	Work meets minimum criteria
<b>Fail Group (0 - 49)</b>	<b>FX – Fail</b>	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	<b>F – Fail</b>	راسب	(0-44)	Considerable amount of work required

**Note:** Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.



# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	kinetic chemistry		Chemical Kinetics	
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar	
Module Code	CHE 35127			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	3	Semester of Delivery		5
Administering Department	Type Dept. Code	College	Type College Code	
Module Leader	Samah Hussein Kadhim		e-mail	<a href="mailto:samah.h_chem_chem@sci.utq.edu.iq">samah.h_chem_chem@sci.utq.edu.iq</a>
Module Leader's Acad. Title	Professor		Module Leader's Qualification	Ph.D.
Module Tutor			e-mail	E-mail
Peer Reviewer Name			e-mail	E-mail
Scientific Committee Approval Date	01/06/2023		Version Number	1.0

Relation with other Modules				
العلاقة مع المواد الدراسية الأخرى				
Prerequisite module	CHE 24122		Semester	4
Co-requisites module	None		Semester	

## Module Aims, Learning Outcomes and Indicative Contents

### أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p><b>Module Aims</b> أهداف المادة الدراسية</p>	<p>1-To derive and use integrated rate expressions for first and second order reactions.</p> <p>2- To understand how rates and reaction order can be determined from experimental data.</p> <p>3- To describe the temperature dependence of rate in terms of the Arrhenius equation and simple collision theory (SCT) and activated complex theory (ACT).</p> <p>4-To discuss elementary, complex non-chain and chain reactions.</p> <p>5- To introduce the use of the steady state treatment in the disentangling of rate data.</p> <p>6-To consider the kinetics of chain reactions, e.g. ozone depletion, radical polymerisation.</p> <p>7- To consider the kinetics catalysis, using of enzyme-catalyzed reactions as an example.</p>
<p><b>Module Learning Outcomes</b> مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> <li>1. Chemical Kinetics: rate equations and reaction rate constant; activation energy, its determination and interpretation.</li> <li>2. List the various terms associated with chemical kinetics.</li> <li>3. Summarize what is meant by a rate law, order and molecularity.</li> <li>4. Discuss the Arrhenius law; reaction kinetics of complex heterogeneous reactions; consecutive and competing reactions and rate determining steps; catalysis.</li> <li>5. Describe Polymerization kinetics- Enzymes- The Michaelis-Menten mechanism of enzyme catalysis</li> <li>6. Define the steady – state approximation.</li> <li>7. Apply mass and energy balances to chemical reactions. Use chemical thermodynamics to define problems. Acquire kinetic data from literature and laboratory. Interpret such data.</li> <li>8. Discuss the kinetic model of gases-the kinetic theory of gases viscosity</li> <li>9. Discuss the Maxwell-Boltzmann distribution of molecules.</li> <li>10. Discuss thermal conductivity.</li> </ol>
<p><b>Indicative Contents</b></p>	<p>Indicative content includes the following.</p>

Part A – Chemical kinetics

Introduction - Chemical kinetics- The rate of chemical reaction -factors influencing reaction rate- The rate law and rate constant- Order of reaction-Properties of reaction orders- Molecularity of a reaction-Derivation of differential and integral velocity equations-determination the reaction order- half-life time-first order reactions [ hrs]

Zero order reactions- Pseudo first order reactions- Determination of the reaction order-Temperature and Reaction Rate- Arrhenius equation-determination the activation energy- Collision theory. Transition state theory. [ hrs]

Catalysts and Reaction Rates -Reaction mechanisms – the rate determination step and reaction mechanism- The steady – state approximation-Kinetics of complex reactions - Types of complex reactions - The parallel reactions- consecutive or sequential reactions. [ hrs]

Reversible reactions- Chain reactions- explosions-Polymerization kinetics- Enzymes- The Michaelis-Menten mechanism of enzyme catalysis. [ hrs]

Revision problem classes [hrs]

Part B - Molecular motion in gases

Fundamentals

Introduction – molecular motion in gases-the kinetic model of gases-the kinetic theory of gases viscosity. [ hrs]

The molecular velocity distribution of gases- The Maxwell-Boltzmann distribution of molecules-The mean free path, collision diameter-Thermal conductivity-Degrees of freedom of gaseous molecules. [ hrs]

The principle of equal power distribution- some numerical values of molecular kinetic energy for ideal gases only. [ hrs]

## Learning and Teaching Strategies

### استراتيجيات التعلم والتعليم

<b>Strategies</b>	The module is delivered through a series of lectures, supported by appropriate case study material as necessary. Lectures are supported with tutorial sessions, which promote teamwork, development of oral presentation and ICT skills, e-learning, peer feedback and self-learning. Learning outcomes are assessed by formal examination and coursework.
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## Delivery Plan (Weekly Syllabus)

### المنهاج الاسبوعي النظري

	Material Covered
<b>Week 1</b>	Introduction – Chemical kinetics- The rate of chemical reaction -factors influencing reaction rate
<b>Week 2</b>	The rate law and rate constant- Order of reaction-Properties of reaction orders- Molecularity of a reaction
<b>Week 3</b>	Derivation of differential and integral velocity equations-determination the reaction order- half-life time-first order reactions
<b>Week 4</b>	Second order reactions- Third order reactions
<b>Week 5</b>	Zero order reactions- Pseudo first order reactions- Determination of the reaction order
<b>Week 6</b>	Temperature and Reaction Rate- Arrhenius equation-determination the activation energy-
<b>Week 7</b>	Collision theory. Transition state theory



<b>Week 8</b>	Catalysts and Reaction Rates -Reaction mechanisms – the rate determination step and reaction mechanism- The steady – state approximation
<b>Week 9</b>	Kinetics of complex reactions - Types of complex reactions - The parallel reactions- consecutive or sequential reactions
<b>Week 10</b>	Reversible reactions- Chain reactions- explosions
<b>Week 11</b>	Polymerization kinetics- Enzymes- The Michaelis-Menten mechanism of enzyme catalysis
<b>Week 12</b>	Introduction – molecular motion in gases-the kinetic model of gases-the kinetic theory of gases viscosity
<b>Week 13</b>	The molecular velocity distribution of gases- The Maxwell-Boltzmann distribution of molecules-The mean free path, collision diameter
<b>Week 14</b>	Thermal conductivity-Degrees of freedom of gaseous molecules
<b>Week 15</b>	The principle of equal power distribution- some numerical values of molecular kinetic energy for ideal gases only
<b>Week 16</b>	<b>Final Exam</b>

### Delivery Plan (Weekly Lab. Syllabus)

#### المنهاج الاسبوعي للمختبر

	<b>Material Covered</b>
<b>Week 1</b>	Lab 1: Hydrolysis of an ester catalyzed by acid.
<b>Week 2</b>	Lab 2: Determination the rate constant of base catalyzed hydrolysis of an ester by titration.
<b>Week 3</b>	Lab 3: Determination the rate constant of base catalyzed hydrolysis of an ester by electrical conductivity measurements.
<b>Week 4</b>	Lab 4: Determination of rate constant of reaction between iodide and persulfate ions by titration.
<b>Week 5</b>	Lab 5: A Study of Reaction Kinetics the Iodination of Acetone.
<b>Week 6</b>	Lab 6: The mechanism study of hydrogen peroxide and hydrogen iodide.
<b>Week 7</b>	Lab 7: Hydrolysis of an Ester in the Presence of Base Using Different Concentration

<b>Week 8</b>	Lab 8: Determination the rate constant of a second order reaction using equal initial concentration
<b>Week 9</b>	Lab 9: The effect of change of temperature on the rate of reaction between H <sub>2</sub> O <sub>2</sub> and HI.
<b>Week 10</b>	Lab 10: Study the effect of change of solvent on the reaction between iodide and persulfate ions.
<b>Week 11</b>	Lab 11: Study the effect of change of temperature on the reaction between iodide and persulfate ions.
<b>Week 12</b>	Lab 12: Determination of rate constant for the hydrolysis of benzilidene spectrophotometry.
<b>Week 13</b>	Lab 13: Study the autocatalytic reaction between potassium permanganate and oxalic acid.
<b>Week 14</b>	Lab 14: A kinetic study of potassium iodide with potassium persulfate using iodide clock reaction.
<b>Week 15</b>	Lab 15: The effect of concentration and temperature on the rate of reaction between sodium thiosulphate and hydrochloric acid.
<b>Week 16</b>	<b>Final exam</b>

### Learning and Teaching Resources

#### مصادر التعلم والتدريس

	Text	Available in the Library?
<b>Required Texts</b>	Essentials of physical chemistry A Run Bahl B.S. Bahl G.D. Tull S. Chan company LTD. 2000	No
<b>Recommended Texts</b>	P.W. Atkins Physical chemistry 8th edition	No
<b>Websites</b>		

### Grading Scheme

#### مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
<b>Success Group</b>	<b>A - Excellent</b>	امتياز	90 - 100	Outstanding Performance

<b>(50 - 100)</b>	<b>B - Very Good</b>	جيد جدا	80 - 89	Above average with some errors
	<b>C - Good</b>	جيد	70 - 79	Sound work with notable errors
	<b>D - Satisfactory</b>	متوسط	60 - 69	Fair but with major shortcomings
	<b>E - Sufficient</b>	مقبول	50 - 59	Work meets minimum criteria
<b>Fail Group (0 - 49)</b>	<b>FX – Fail</b>	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	<b>F – Fail</b>	راسب	(0-44)	Considerable amount of work required

**Note:** Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

### Module Information

معلومات المادة الدراسية

<b>Module Title</b>	<b>Electrochemistry &amp; Photochemistry</b>		<b>Electrical and photochemistry</b>	
<b>Module Type</b>	<b>Core</b>		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar	
<b>Module Code</b>	<b>CHE 36134</b>			
<b>ECTS Credits</b>	<b>6</b>			
<b>SWL (hr/sem)</b>	<b>150</b>			
<b>Module Level</b>	3	<b>Semester of Delivery</b>		
<b>Administering Department</b>	Type Dept. Code	<b>College</b>	Type College Code	
<b>Module Leader</b>	Samah Hussein Kadhim		<b>e-mail</b>	<a href="mailto:samah.h_chem_chem@sci.utq.edu.iq">samah.h_chem_chem@sci.utq.edu.iq</a>
<b>Module Leader's Acad. Title</b>	Professor		<b>Module Leader's Qualification</b>	Ph.D.
<b>Module Tutor</b>			<b>e-mail</b>	E-mail
<b>Peer Reviewer Name</b>			<b>e-mail</b>	E-mail
<b>Scientific Committee Approval Date</b>	01/06/2023		<b>Version Number</b>	1.0

### Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

<b>Prerequisite module</b>	CHE 35127	<b>Semester</b>	5
<b>Co-requisites module</b>	None	<b>Semester</b>	

**Module Aims, Learning Outcomes and Indicative Contents**

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p><b>Module Aims</b> أهداف المادة الدراسية</p>	<ol style="list-style-type: none"> <li>1. The aim of this module is to provide students with fundamental concepts of Electrical and photochemistry and their applications and importance in industry, energy and nature.</li> <li>2-To understanding of Theories of electrolytic conductance</li> <li>3-To understand voltage, current, Ohm's, and Faraday's laws of electrolysis.</li> <li>4-This course deals with the basic concept of electrochemical cell.</li> <li>5-To understand the light induced excitation and photochemical reaction</li> <li>6-To understand Beer Lambert law and Einstein's law of photoequivalence.</li> <li>7-To understand molecular electronic structure and electronic spectrum.</li> </ol>
<p><b>Module Learning Outcomes</b> مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> <li>1. Recognize how electrolysis and electrochemical cells works</li> <li>2. List the various terms associated with Electrical and photochemistry.</li> <li>3. Summarize what is meant by a basic Galvanic Cells.</li> <li>4. Discuss the Variation of conductance with concentration.</li> <li>5. Describe Types of electrodes.</li> <li>6. Define Ohm's law.</li> <li>7. Identify the laws of photochemistry-Beer Lambert law</li> <li>8. Discuss the electronic spectrum-photosensitization</li> <li>9. Discuss the photochemical processes and quantum yield</li> </ol>

<p><b>Indicative Contents</b></p> <p>المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><u>Part A - Electrical</u></p> <p>Introduction-Electrochemistry-Important laws and Units-Electrolysis and Faraday's laws of electrolysis- Electrolytic conductivity- equivalent conductance-molar conductance- Variation of conductance with concentration. [ hrs]</p> <p>Determination of <math>\Lambda^\circ</math>- Conductance Measurements Applications-Theory of electrolytic conductance -Electrical migration and transport numbers-Conductometric titrations- Mobilities of hydrogen and hydroxyl ions. [ hrs]</p> <p>Electrochemical Cell- Galvanic Cells, Daniel cell- Electromotive force- galvanic series Types of electrodes. [ hrs]</p> <p>Reversible Galvanic Cell Operation- Changes in Free Energy for Cell Reaction- Nernst Equation -Concentration cells- Types of concentration cells- Potentiometric titrations Batteries- types of batteries. [hrs]</p> <p>Revision problem classes [hrs]</p> <p><u>Part B - Photochemistry</u></p> <p>Fundamentals</p> <p>Photochemistry- regions of the electromagnetic spectrum-the laws of photochemistry-Beer Lambert law-Einstein's law of photoequivalence-quantum yield- photochemical processes. [ hrs]</p> <p>Selective chemical reactions-molecular orbitals and types of electronic transfers- Molecular electronic structure-multiplicity, singlet and triplet states-selection rules- Types of transfers forbidden and allowed- potential energy curves for diatomic molecules. [ hrs]</p>

	electronic spectrum-photosensitization-half-life of excited state –quantum yield for fluorescence and phosphorescence. [ hrs]
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### Learning and Teaching Strategies

#### استراتيجيات التعلم والتعليم

<b>Strategies</b>	The module is delivered through a series of lectures, supported by appropriate case study material as necessary. Lectures are supported with tutorial sessions, which promote teamwork, development of oral presentation and ICT skills, e-learning, peer feedback and self-learning. Learning outcomes are assessed by formal examination and coursework.
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### Delivery Plan (Weekly Syllabus)

#### المنهاج الاسبوعي النظري

	Material Covered
<b>Week 1</b>	Introduction-Electrochemistry-Important laws and units-Electrolysis and Faraday's laws of electrolysis
<b>Week 2</b>	Electrolytic conductivity- equivalent conductance-molar conductance- Variation of conductance with concentration
<b>Week 3</b>	Determination of $\Lambda^\circ$ - Conductance Measurements Applications
<b>Week 4</b>	Theory of electrolytic conductance -Electrical migration and transport numbers

<b>Week 5</b>	Conductometric titrations- Mobilities of hydrogen and hydroxyl ions
<b>Week 6</b>	Electrochemical Cell- Galvanic Cells, Daniel cell- Electromotive force- galvanic series
<b>Week 7</b>	Types of electrodes
<b>Week 8</b>	Reversible Galvanic Cell Operation- Changes in Free Energy for Cell Reaction- Nernst Equation
<b>Week 9</b>	Concentration cells- Types of concentration cells- Potentiometric titrations
<b>Week 10</b>	Batteries- types of batteries
<b>Week 11</b>	Photochemistry- regions of the electromagnetic spectrum-the laws of photochemistry-Beer Lambert law
<b>Week 12</b>	Einstein's law of photoequivalence-quantum yield- photochemical processes
<b>Week 13</b>	Selective chemical reactions-molecular orbitals and types of electronic transfers- Molecular electronic structure
<b>Week 14</b>	multiplicity, singlet and triplet states-selection rules- Types of transfers forbidden and allowed-potential energy curves for diatomic molecules
<b>Week 15</b>	electronic spectrum-photosensitization-half-life of excited state –quantum yield for fluorescence and phosphorescence
<b>Week 16</b>	<b>Preparatory week before the final Exam</b>

### Delivery Plan (Weekly Lab. Syllabus)

#### المنهاج الاسبوعي للمختبر

	<b>Material Covered</b>
<b>Week 1</b>	Lab 1: Introduction - Determination of cell constant.
<b>Week 2</b>	Lab 2: Conductometric titration of strong acid with strong base.
<b>Week 3</b>	Lab 3: Conductometric titration of an acid mixture (HCl+HAC) with strong base.
<b>Week 4</b>	Lab 4: Variation of conductance with concentration strong and weak electrolytes.
<b>Week 5</b>	Lab 5: Determination of equivalent conductance at infinite dilution ( $\Lambda^\infty$ ) and dissociation constant of weak acid (acetic and benzoic acid).

<b>Week 6</b>	Lab 6: Quantitatin analysis of aspirin bills by electrical conductivity measurements.
<b>Week 7</b>	Lab 7: Determination of solubility of sparingly soluble salts from conductivity measurements.
<b>Week 8</b>	Lab 8: Determination of hydrolysis constant of aniline hydrochloride by conductivity.
<b>Week 9</b>	Lab 9: Titration of KCl vs AgNO <sub>3</sub> (Precipitation Titration)
<b>Week 10</b>	Lab 10: Determination the hydrolysis constant by conductimetric measurements.
<b>Week 11</b>	Lab 11: Determination the dissociation constant of a weak acid (approximate E.M.F.) PH method.
<b>Week 12</b>	Lab 12: The standard electrode potentials zinc and copper.

### Learning and Teaching Resources

#### مصادر التعلم والتدريس

	Text	Available in the Library?
<b>Required Texts</b>	Physical chemistry Gordon . m. barrow	NO
<b>Recommended Texts</b>	P.W. Atkins Physical chemistry 8th edition	No
<b>Websites</b>		

### Grading Scheme

#### مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
<b>Success Group (50 - 100)</b>	<b>A - Excellent</b>	امتياز	90 - 100	Outstanding Performance
	<b>B - Very Good</b>	جيد جدا	80 - 89	Above average with some errors
	<b>C - Good</b>	جيد	70 - 79	Sound work with notable errors
	<b>D - Satisfactory</b>	متوسط	60 - 69	Fair but with major shortcomings
	<b>E - Sufficient</b>	مقبول	50 - 59	Work meets minimum criteria



<b>Fail Group</b>	<b>FX – Fail</b>	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
<b>(0 – 49)</b>	<b>F – Fail</b>	راسب	(0-44)	Considerable amount of work required

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# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	<b>Inorganic chemistry</b>		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	CHE 36132		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	3	Semester of Delivery	
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Nuha Hussain Mzher & Haider Abbas Mahdi		e-mail Nuh.hussain@sci.utq.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor		e-mail	E-mail
Peer Reviewer Name		e-mail	E-mail
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

## Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

<b>Prerequisite module</b>	CHE 35125	<b>Semester</b>	5
<b>Co-requisites module</b>	None	<b>Semester</b>	

## Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<b>Module Aims</b> أهداف المادة الدراسية	<p>48. Coordination compounds are a major feature of the chemistry of over half the elements.</p> <p>49. Coordination compounds have important roles as industrial catalysts in controlling reactivity, and they are essential in biochemical processes</p> <p>50. Coordination Compounds Are Involved in the Treatment of Patients Poisoned with Heavy Metal Ions</p> <p>51. Coordination Complexes Are Used in X-Ray Crystallography and Nuclear Magnetic Resonance</p>
<b>Module Learning Outcomes</b> مخرجات التعلم للمادة الدراسية	<p>47. Determine Molecule Structure</p> <p>48. Correlate Lewis Structure, Octet Rules, VSEPR Rules</p> <p>49. recognize Molecular Orbital Theory and The Combination Of Atomic Orbitals</p> <p>50. Explain to bonding in complexes using Molecular Orbital Theory and The Combination Of Atomic Orbitals</p> <p>51. Explain the spectroscopic properties of coordination compounds.</p> <p>52. Refer to the reaction mechanisms of coordination compounds.</p>
<b>Indicative Contents</b> المحتويات الإرشادية	

## Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

<b>Strategies</b>	
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### Delivery Plan (Weekly Syllabus)

#### المنهاج الاسبوعي النظري

	<b>Material Covered</b>
<b>Week 1</b>	The introduction of bonding theory: Ionic and Covalent Bonding
<b>Week 2</b>	Electrostatic and Crystal Field Theory
<b>Week 3</b>	Crystal Field Theory to octahedral system
<b>Week 4</b>	Crystal Field Theory to tetrahedral system
<b>Week 5</b>	John Teller Event
<b>Week 6</b>	Ionic Bond and Metallic Bond; Crystal Structure, Lattice Energy
<b>Week 7</b>	Molecular Orbital Theory and The Combination Of Atomic Orbitals, Heteronuclear polyatomic molecules
<b>Week 8</b>	Molecular Orbital Theory and The Combination Of Atomic Orbitals, Homonuclear diatomic molecules
<b>Week 9</b>	Molecular Orbital Theory to complexes
<b>Week 10</b>	Magnetic Properties of Coordination Compounds
<b>Week 11</b>	Color in Coordination Compounds
<b>Week 12</b>	Thermodynamics and Kinetics of Complex Formation

<b>Week 13</b>	Reactions in Octahedral Complexes
<b>Week 14</b>	Reactions in Square Planar Complexes
<b>Week 15</b>	electronic transition
<b>Week 16</b>	<b>Final Exam</b>

### Delivery Plan (Weekly Lab. Syllabus)

#### المنهاج الاسبوعي للمختبر

	<b>Material Covered</b>
<b>Week 1</b>	Lab 1: cobalt ion reactions
<b>Week 2</b>	Lab 2: Preparation of the complex ethylenediaminetetrachloride barium cobaltate ( III ) tetrahydrate
<b>Week 3</b>	Lab 3: Preparation of the complex tricarbonate sodium cobaltate (III) trihydrate
<b>Week 4</b>	Lab 4: Preparation of the complex hexaamine cobalt ( III )
<b>Week 5</b>	Lab 5: Preparation of the complex triamine trinitro cobalt ( III )
<b>Week 6</b>	Lab 6: Preparation of the complex potassium cobalt( III ) tri-oxalate
<b>Week 7</b>	Lab 7: Preparation and spectroscopic study of some complexes of copper(II).
<b>Week 8</b>	Lab 8: Preparation of the complex bis-clasinito copper(II) dihydrate
<b>Week 9</b>	Lab 9: Preparation of the complex bis sulfate (ethylene diamine) copper(II) dihydrate
<b>Week 10</b>	Lab 10: Preparation of the complex dioxalato-copper (II) potassium dihydrate
<b>Week 11</b>	Lab 11: Spectroscopic study of the prepared copper complexes
<b>Week 12</b>	Lab 12: Nickel ion interactions
<b>Week 13</b>	Lab 13: Preparation of the complex hexaamine nickel(II) chloride
<b>Week 14</b>	Lab 14: Preparation of complex bis (dimethylglyoxime) nickel ( II )
<b>Week 15</b>	Lab 15: Examination

Week 16	Final Exam
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## Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Text Book of Coordination Chemistry, R. K. Sharma, Discovery Publishing House, 2007	No Online only
Recommended Texts	Coordination Chemistry, George B. Kauffman, 1994	No Online only
Websites		

## Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
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Fail Group (0 - 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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## MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية





