

## MODULE DESCRIPTION FORM

### نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	MEDICAL CHEMISTRY		Module Delivery	
Module Type	BASIC		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar	
Module Code	MIET1202			
ECTS Credits	6			
SWL (hr/sem)	180			
Module Level	1	Semester of Delivery		2
Administering Department	MIET	College	EETC	
Module Leader	Suhair Mohammed Hassan Yaseen		e-mail	<a href="mailto:Suhair.yaseen@mtu.edu.iq">Suhair.yaseen@mtu.edu.iq</a>
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D	
Module Tutor	None	e-mail		
Peer Reviewer Name	Ass.Prof.Dr. Ghaidaa Abdulrahman Khalid	e-mail	<a href="mailto:ghaidaakhalid@mtu.edu.iq">ghaidaakhalid@mtu.edu.iq</a>	
Scientific Committee Approval Date		Version Number		

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	-	Semester	-
Co-requisites module	-	Semester	-

## 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 write and balance chemical equation which many calculations depend on.</li> <li>2- To convert chemical formula to components composition percent or to conclude empirical formula depending upon composition percent.</li> <li>3-to predict about the economic pathway for specific reaction to happen depending upon stoichiometric calculations of balanced chemical equations.</li> <li>4-to Know how to prepare buffers with different ranges of pH using acids with suitable dissociation constant of acid.</li> <li>5- to understand effect of common ion on equilibrium of reversible reactions.</li> <li>6-to focus on theoretical working principles of spectrophotometric instrumentations.</li> <li>7- to discuss the importance of isotopes in diseases treatment and diagnosis.</li> </ol>
	<p>At ending of course, the student will:</p> <ol style="list-style-type: none"> <li>1- Able to give chemical compounds their systematic names and to write their chemical formulae.</li> <li>2- Know how to calculate concentrations of chemicals and to express them in various concentration terms. In addition to convert one term to another.</li> <li>3- Calculate the compound composition percent according to chemical formula, or know empirical formula depending on compounds composition percent.</li> <li>4- Write chemical equations of different reactions and balance them, and predict the limiting reactant in addition to the expected weight of products.</li> <li>5-Eestimate the reaction direction according to calculation of equilibrium constant of reversible reactions.</li> <li>6-Know how to prepare buffers and how buffer work?</li> <li>7- Understand importance and wide application of slightly soluble salts.</li> <li>8- Perform the statistical treatment of analytical results and source of errors.</li> <li>9- Recognize the importance of galvanic cells in current generation and role of electrolytic cells in metallic electroplating.</li> <li>9-Consider zero, 1<sup>st</sup> and 2<sup>nd</sup> laws of thermodynamic processes, and evaluate thermodynamic functions of work, enthalpy, heat, internal energy and giving judgment of spontaneous process or not by entropy and Gibbs free energy.</li> <li>10-List the components of photometric determination techniques, in addition to</li> </ol>

	<p>principals of their works.</p> <p>11- Identify the photometric instrumentations such as FIS, FT-IR spectrophotometer, and mass spectrophotometry.</p> <p>12- Emphasize the vital role of isotopes in diagnosis and diseases treatment.</p>
<p><b>Indicative Contents</b> المحتويات الإرشادية</p>	<p>Isotopes, Chemical formula, Units conversion</p> <p>Normality, Formality, Molarity, Molality, Mole fraction, Mill equivalent, ppm, ppb, mass percent, mass/vol percent.</p> <p>Stoichiometry</p> <p>Chemical equilibrium</p> <p>dissociation constant</p> <p>pH</p> <p>Buffers</p> <p>common ion</p> <p>Solubility product constant</p> <p>Statistical treatment, average, range, standard deviation, variance, Absolute error, relative error.</p> <p>Redox reactions, Electrochemistry, electrolytes, Nernst equation, cell potential.</p> <p>1<sup>st</sup> law of thermodynamic, Reversible and irreversible process, Heat capacities, adiabatic process, Isothermal processes.</p> <p>2nd law of thermodynamic, entropy, Gibbs free energy.</p> <p>Photochemistry, electromagnetic spectrum, Beer Lambert law.</p> <p>IR Spectrophotometer, mass spectroscopy, FIS, FES.</p> <p>Potentiometer, conductive meter, pH-meter.</p>

### Learning and Teaching Strategies

#### استراتيجيات التعلم والتعليم

<p><b>Strategies</b></p>	<p>homework assignments, written exam, Quizzes, seminars, reports, practical tests and Online tests</p>
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Student Workload (SWL)			
الحمل الدراسي للطالب			
<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	60	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعيا	4
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	120	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعيا	8
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	180		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	15min/ 4 times	20%	3 <sup>rd</sup> , 5 <sup>th</sup> , 7 <sup>th</sup> , 12 <sup>th</sup>	LO# 1 <sup>st</sup> – 2 <sup>nd</sup> LO# 1 <sup>st</sup> – 5 <sup>th</sup> LO# 5 <sup>th</sup> – 7 <sup>th</sup> LO# 10 <sup>th</sup> – 12 <sup>th</sup>
	Assignments	5min/ 4 times	10%	2 <sup>nd</sup> , 6 <sup>th</sup> , 8 <sup>th</sup> , 13 <sup>th</sup>	LO# 1 <sup>st</sup> LO# 10 <sup>th</sup>
	Projects / Lab.	10min/ One time	5%	6 <sup>th</sup>	LO# 2 <sup>nd</sup> – 5 <sup>th</sup>
	Report	Each lab/ 5 times	5%	3 <sup>rd</sup> , 4 <sup>th</sup> , 5 <sup>th</sup> , 6 <sup>th</sup> , 7 <sup>th</sup>	LO# 1 <sup>st</sup> - 2 <sup>nd</sup> , LO# 3 <sup>rd</sup> LO# 4 <sup>th</sup> LO# 5 <sup>th</sup> LO# 6 <sup>th</sup> – 7 <sup>th</sup>
Summative assessment	Midterm Exam	60min/ one time	10%	10 <sup>th</sup>	LO# 1 <sup>st</sup> – 10 <sup>th</sup>
	Final Exam	180min/ one time	50%	16 <sup>th</sup>	
Total assessment			100%		

### Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction, Units conversion, Isotopes, Chemical formula and chemical equation
Week 2	Methods of expressing analytical concentrations: Normality, Formality, Molarity, Molality, Mole fraction, Mill equivalent, ppm, ppb, wt. and vol. percent ratio.
Week 3	Stoichiometry
Week 4	Chemical equilibrium
Week 5	Acid-Base dissociation constant
Week 6	pH-scale, buffer solution
Week 7	Solubility of precipitations, common ion effect
Week 8	Errors & statistical treatment of analytical data sources of errors, types of errors, average mode, range, average derivation, standard deviation, relative standard deviation, variance, method of expressing accuracy, Absolute error, relative error.
Week 9	Redox reactions, balancing of redox equation
Week 10	Electrochemistry: electrochemical cells, types of electrodes, electrolytes, Nernst equation, cell potential
Week 11	Thermodynamic, Zero and first law of thermodynamic, Reversible and irreversible expansion, Heat capacities, adiabatic expansion, Isothermal processes.
Week 12	Second law of thermodynamic: spontaneous processes, entropy and Gibbs free energy.
Week 13	Photochemistry (spectrophotometer analysis), Regions of electromagnetic spectrum, Absorption and emission of electromagnetic spectrum, Beer Lambert law, instrumentations components of spectrophotometer.
Week 14	IR Spectrophotometer, mass spectroscopy, flame ionization spectrophotometry.
Week 15	Potentiometer, conductive meter, pH-meter and some other applications of chemical sensors
Week 16	Exam

### Delivery Plan (Weekly Lab. Syllabus)

المنهاج الأسبوعي للمختبر

	Material Covered
<b>Week 1</b>	Principals of qualitative analysis.
<b>Week 2</b>	Qualitative analysis of cations of 1 <sup>st</sup> and 2 <sup>nd</sup> groups.
<b>Week 3</b>	Qualitative analysis of cations of 3 <sup>rd</sup> and fifth groups.
<b>Week 4</b>	Introduction to Quantitative (volumetric) analysis and types of standard substance in titration, principles and calculations of titration.
<b>Week 5</b>	How to prepare solution of primary standard materials and to standardize secondary standard substance of HCl, (acid-base titration)
<b>Week 6</b>	Standardization secondary standard substance of NaOH and its application by determination of vinegar acidity.
<b>Week 7</b>	Determination of residual chloride in tape water by titration against silver nitrate (precipitation titration).

### Learning and Teaching Resources

مصادر التعلم والتدريس

<b>Required Texts</b>		
<b>Recommended Texts</b>	<b>1- ESSENTIALS OF GENERAL CHEMISTRY</b> <b>By EBBING GABBON RAGSDALE</b> <b>2- CHEMICAL PRINCIPLES</b> <b>By Steven S Zumdahl - 4<sup>th</sup> edition</b>	<b>No</b>
<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
<p><b>Note:</b> 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.</p>				

