MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية		
Module Title	**Analytical chemistry**	**Module Delivery**
Module Type	**Core**	⊠ Theory ☐ Lecture ⊠ Lab ⊠ Tutorial ☐ Practical ☐ Seminar
Module Code	MPH-112	
ECTS Credits	**6**	
SWL (hr/sem)	**150**	

Module Level	1	**Semester of Delivery**	1
Administering Department	MPH	**College**	Applied sciences-Heet
Module Leader	Rasim Farraj Muslim	**e-mail**	dr.rasim92hmts@uoanbar.edu.iq
Module Leader's Acad. Title	Assistant 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	/ /2023	**Version Number**	1.0

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

Module Aims, Learning Outcomes and Indicative Contents
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	1. The analytical chemistry course is determined according to the study plan prepared in the Medical Physics Department. 2. The course aims to introduce the student to the general concepts of the organic compounds and their importance and uses in various fields. 3. It also aims at a detailed study of the different structural compositions and naming principles for the compounds of organic chemistry, by focusing on the compounds. And help the student to know the composition of these substances, including drugs, and to know how interactions occur and the mechanism of interaction.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	- The student should know the general concepts of the compounds of the analytical chemistry curriculum. - That the student is acquainted with the basics and rules of naming, different structural structures and physical properties, and focuses on the same different rings for their vital activity, and recognizes their physical and chemical properties, and that the student distinguishes between the different structural structures. - That the student knows the basic principles of preparation methods - To familiarize the student with the different bases of their interactions. - That the student is aware of the importance of these compounds and their applications.
Indicative Contents المحتويات الإرشادية	a- Methods of teaching and learning 1- Giving lectures. 2- Using the method of recitation, discussion and solving questions. 3- Giving assignments to students to strengthen them and prepare them for the final and final exams. b- Evaluation methods 1- Daily and monthly exams 2- Duties 3- In-class exercises

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	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 types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	94	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6.3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

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

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to qualitative analytical chemistry
Week 2	Methods for the detection of elements and ions
Week 3	Sedimentation methods
Week 4	Methods of separation
Week 5	Macro and micro Qualitative analysis
Week 6	Chromatographic separation column
Week 7	Detection and estimation of items
Week 8	First month exam
Week 9	Introduction to Volumetric Analysis Chemistry

Week 10	Methods for expressing concentrations
Week 11	Solutions, ionic balance and chemical balance
Week 12	Equilibrium constants, inverse reactions and common ion
Week 13	Second month exam
Week 14	Titration
Week 15	Solubility product constant and slightly soluble salts
Week 16	Comprehensive review, applications and problem solving

Delivery Plan (Weekly Lab. Syllabus)	
المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Test Reducing Flame
Week 2	Flame test
Week 3	Detection of halogens, nitrogen and sulfur
Week 4	Extraction
Week 5	Solubility
Week 6	Titration methods
Week 7	Chromatography methods

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Fundamentals of analytical chemistry. 9th Edition by Douglas A. Skoog (Author), Donald M. West (Author), F. James Holler (Author), Stanley R. Crouch (Author). 10 EDITION. July 16, 2021	Yes
Recommended Texts	ANALYTICAL CHEMISTRY: A Fundamental Approach To Modern Separation Techniques. by Stanley Chris (Ph.D) (Author) August 15, 2022	No
Websites	https://www.amazon.com/Fundamentals-Analytical-Chemistry-Douglas-Skoog/dp/0357450396/ref=d_pd_sbs_vft_none_sccl_3_1/145-7711462-5419924?pd_rd_w=CSlfi&content-id=amzn1.sym.3676f086-9496-4fd7-8490-77cf7f43f846&pf_rd_p=3676f086-9496-4fd7-8490-77cf7f43f846&pf_rd_r=7EZR6MGHA0J9A87C0JF0&pd_rd_wg=KzlqI&pd_rd_r=6cd67e00-88f2-4c85-8c5e-a2822ac1d629&pd_rd_i=0357450396&psc=1	

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)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – 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.

Assist. Prof. Dr. Rasim Farraj Muslim

3 / 6 / 2023

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Computer 2	**Module Delivery**	
Module Type	Support	☐ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	SCI-102		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	1	**Semester of Delivery**	2
Administering Department		**College**	
Module Leader	Ibrahim Saud Khaleel	**e-mail**	ibrahem.abomusab@uoanbar.edu.iq
Module Leader's Acad. Title	Assist. Lect.	**Module Leader's Qualification**	M.Sc.
Module Tutor	Name (if available)	**e-mail**	E-mail
Name (if available)	Name	**e-mail**	E-mail
Scientific Committee Approval Date	/ /2023	**Version Number**	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	SCI-101	**Semester**	1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To develop problem solving skills and understanding of circuit theory through the application of techniques. 2. To understand voltage, current and power from a given circuit. 3. This course deals with the basic concept of electrical circuits. 4. This is the basic subject for all electrical and electronic circuits. 5. To understand Kirchhoff's current and voltage Laws problems. 6. To perform mesh and Nodal analysis.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Recognize how electricity works in electrical circuits. 2. List the various terms associated with electrical circuits. 3. Summarize what is meant by a basic electric circuit. 4. Discuss the reaction and involvement of atoms in electric circuits. 5. Describe electrical power, charge, and current. 6. Define Ohm's law. 7. Identify the basic circuit elements and their applications. 8. Discuss the operations of sinusoid and phasors in an electric circuit. 9. Discuss the various properties of resistors, capacitors, and inductors. 10. Explain the two Kirchoff's laws used in circuit analysis. 11. Identify the capacitor and inductor phasor relationship with respect to voltage and current.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A - Circuit Theory DC circuits – Current and voltage definitions, Passive sign convention and circuit elements, Combining resistive elements in series and parallel. Kirchhoff's laws and Ohm's law. Anatomy of a circuit, Network reduction, Introduction to mesh and nodal analysis. [15 hrs] AC circuits I – Time dependent signals, average and RMS values. Capacitance and inductance, energy storage elements, simple AC steady-state sinusoidal analysis. [15 hrs] AC Circuits II - Phasor diagrams, definition of complex impedance, AC circuit analysis with complex numbers. [10 hrs] RL, RC and RLC circuits - Frequency response of RLC circuits, simple filter and band-pass circuits, resonance and Q-factor, use of Bode plots, use of differential equations and their solutions. Time response (natural and step responses). Introduction to second order circuits. [15 hrs]

Revision problem classes [6 hrs]

Part B - Analogue Electronics

Fundamentals
Resistive networks, voltage and current sources, Thevenin and Norton equivalent circuits, current and voltage division, input resistance, output resistance, coupling and decoupling capacitors, maximum power transfer, RMS and power dissipation, current limiting and over voltage protection. [15 hrs]

Components and active devices – Components vs elements and circuit modeling, real and ideal elements. Introduction to sensors and actuators, self-generating vs modulating type sensors, simple circuit interfacing. [7 hrs]

Diodes and Diode circuits – Diode characteristics and equations, ideal vs real. Signal conditioning, clamping and clipping, rectification and peak detection, photodiodes, LEDs, Zener diodes, voltage stabilization, voltage reference, power supplies. [15 hrs]

| **Learning and Teaching Strategies** |
| استراتيجيات التعلم والتعليم |

| **Strategies** | 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 types of simple experiments involving some sampling activities that are interesting to the students. |

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	What is the Excel program? Then ways to open Excel
Week 2	Recognize tab commands? Then explain the home page
Week 3	Explanation of commands for the main page
Week 4	Explanation of the Insert tab
Week 5	Explanation of the Page Layout tab
Week 6	Explanation of the View tab
Week 7	What is the power point program? Then ways to open power point program
Week 8	Recognize tab commands? Then explain the home page
Week 9	Explanation of commands for the main page
Week 10	Explanation of the Insert tab
Week 11	Explanation of the Insert Pictures and Videos tab
Week 12	Explanation of the Page Layout tab
Week 13	Explanation of the View tab
Week 14	review
Week 15	Monthly test

| Delivery Plan (Weekly Lab. Syllabus) |
| المنهاج الاسبوعي للمختبر |

	Material Covered
Week 1	Lab 1: Apply ways to open Excel.
Week 2	Lab 2: Application of scheduling orders? Apply the Home commands for Font Size, Insert Row, Column, and Worksheet .
Week 3	Lab 3: Insert tab application such as insert picture, clip, table, and text box.
Week 4	Lab 4: Explanation and application of writing equations such as (sum, max, min, if).
Week 5	Lab 5: Explain and apply page layout commands such as margins, orientation, and paper orientation from right to left and vice versa.
Week 6	Lab 6: Insert table, enter data, delete and insert columns and rows.
Week 7	Lab 7: Explain and apply display commands, such as showing and hiding rulers, gridlines, and size.
Week 8	Lab 8: Application ways to open PowerPoint.
Week 9	Lab 9: application for home page such as color-darkness, font-size and underline .
Week 10	Lab 10 : Insert the Video, Audio, and Equalization app tab.
Week 11	Lab11: The application inserts a set of new slides.
Week 12	Lab12: Application to delete a group of slides.
Week 13	Lab13: PowerPoint save application.
Week 14	Lab14: review.

| Learning and Teaching Resources |
| مصادر التعلم والتدريس |

	Text	Available in the Library?
Required Texts	Computer basics represented by the difference between a computer and a human being, number, programs, memory size, and everything related to computer basics.	No
Recommended Texts	Apply to create the folder, change its name, show it, hide it, copy it, paste it, cut it, change the screen scroll, apply the right mouse commands, and everything related to basic computer basics in practice.	No
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	**التقدير**	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Computers 1		**Module Delivery**	
Module Type	Support		☐Theory ☐ Lecture ☒ Lab ☒Tutorial ☐ Practical ☐ Seminar	
Module Code	SCI-101		
ECTS Credits	3		
SWL (hr/sem)	75		
Module Level	1		**Semester of Delivery**	1
Administering Department		**College**		
Module Leader	Ibrahim Saud Khaleel	**e-mail**	ibrahem.abomusab@uoanbar.edu.iq	
Module Leader's Acad. Title	Assist. Lect.	**Module Leader's Qualification**	M.Sc.	
Module Tutor	Name (if available)	**e-mail**	E-mail	
Name (if available)	Name	**e-mail**	E-mail	
Scientific Committee Approval Date	/ /2023	**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	

Module Objectives أهداف المادة الدراسية	7. To develop problem solving skills and understanding of circuit theory through the application of techniques. 8. To understand voltage, current and power from a given circuit. 9. This course deals with the basic concept of electrical circuits. 10. This is the basic subject for all electrical and electronic circuits. 11. To understand Kirchhoff's current and voltage Laws problems. 12. To perform mesh and Nodal analysis.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 12. Recognize how electricity works in electrical circuits. 13. List the various terms associated with electrical circuits. 14. Summarize what is meant by a basic electric circuit. 15. Discuss the reaction and involvement of atoms in electric circuits. 16. Describe electrical power, charge, and current. 17. Define Ohm's law. 18. Identify the basic circuit elements and their applications. 19. Discuss the operations of sinusoid and phasors in an electric circuit. 20. Discuss the various properties of resistors, capacitors, and inductors. 21. Explain the two Kirchoff's laws used in circuit analysis. 22. Identify the capacitor and inductor phasor relationship with respect to voltage and current.
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	Revision problem classes [6 hrs] Part B - Analogue Electronics Fundamentals Resistive networks, voltage and current sources, Thevenin and Norton equivalent circuits, current and voltage division, input resistance, output resistance, coupling and decoupling capacitors, maximum power transfer, RMS and power dissipation, current limiting and over voltage protection. [15 hrs] Components and active devices – Components vs elements and circuit modeling, real and ideal elements. Introduction to sensors and actuators, self-generating vs modulating type sensors, simple circuit interfacing. [7 hrs] Diodes and Diode circuits – Diode characteristics and equations, ideal vs real. Signal conditioning, clamping and clipping, rectification and peak detection, photodiodes, LEDs, Zener diodes, voltage stabilization, voltage reference, power supplies. [15 hrs]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	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 types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	3.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	27	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**75**		

<table>
<tr><td colspan="6" align="center">**Module Evaluation**
تقييم المادة الدراسية</td></tr>
<tr><td></td><td></td><td>**Time/Number**</td><td>**Weight (Marks)**</td><td>**Week Due**</td><td>**Relevant Learning Outcome**</td></tr>
<tr><td rowspan="4">**Formative assessment**</td><td>**Quizzes**</td><td>1</td><td>10% (10)</td><td>5 and 10</td><td>LO #1, #2 and #10, #11</td></tr>
<tr><td>**Assignments**</td><td>-</td><td>10% (10)</td><td>2 and 12</td><td>LO #3, #4 and #6, #7</td></tr>
<tr><td>**Projects / Lab.**</td><td>2</td><td>10% (10)</td><td>Continuous</td><td>All</td></tr>
<tr><td>**Report**</td><td>-</td><td>10% (10)</td><td>13</td><td>LO #5, #8 and #10</td></tr>
<tr><td rowspan="2">**Summative assessment**</td><td>**Midterm Exam**</td><td>1hr</td><td>10% (10)</td><td>7</td><td>LO #1 - #7</td></tr>
<tr><td>**Final Exam**</td><td>2hr</td><td>50% (50)</td><td>16</td><td>All</td></tr>
<tr><td colspan="2">**Total assessment**</td><td></td><td>100% (100 Marks)</td><td></td><td></td></tr>
</table>

<table>
<tr><td colspan="2" align="center">**Delivery Plan (Weekly Syllabus)**
المنهاج الاسبوعي النظري</td></tr>
<tr><td></td><td>**Material Covered**</td></tr>
<tr><td>**Week 1**</td><td>What is a computer? Then find out the types of icons on the desktop.</td></tr>
<tr><td>**Week 2**</td><td>Execute by applying the right mouse command related to system icons, programs, and folders.</td></tr>
<tr><td>**Week 3**</td><td>Execute right mouse commands (copy, paste, cut, delete, and change folder name).</td></tr>
<tr><td>**Week 4**</td><td>Execute the right mouse button (the properties of the system icon, program icon, and folder icon)</td></tr>
<tr><td>**Week 5**</td><td>Create a new folder, then save it, change its name, shape, hide it, and show it)</td></tr>
<tr><td>**Week 6**</td><td>Show and hide the system icon (Control panel)</td></tr>
<tr><td>**Week 7**</td><td>Learn the Word program, then ways to open the program</td></tr>
<tr><td>**Week 8**</td><td>Home tab and execute its commands</td></tr>
<tr><td>**Week 9**</td><td>Insert and Execute tab Insert a table, clip art, picture, shapes, text box, and symbols</td></tr>
<tr><td>**Week 10**</td><td>Page layout tabs such as paper margins, orientation, and size</td></tr>
<tr><td>**Week 11**</td><td>The Page Layout tab performs watermark, page borders, and color commands</td></tr>
<tr><td>**Week 12**</td><td>Executing and opening a file command such as saving the document and options for choosing the language of numbers and printing</td></tr>
<tr><td>**Week 13**</td><td>Completing a file command for the rest of it, such as opening a new one, sending it, and previewing it before printing</td></tr>
<tr><td>**Week 14**</td><td>review</td></tr>
<tr><td>**Week 15**</td><td>Monthly test</td></tr>
</table>

	Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر
	Material Covered
Week 1	Lab 1: An application to create a folder, change its name, format and save it.
Week 2	Lab 2: Change wallpaper. Learn about system icons, hide them, and show them.
Week 3	Lab 3: Application of commands difference between delete and removal and the location of the use of each of them.
Week 4	Lab 4: Application right-click (system icon, program icon, folder icon properties)
Week 5	Lab 5: Use the (Control Panel) application to open and modify some programs such as time, date, deletion, and others
Week 6	Lab 6: The application opens the Home tab and performs its commands
Week 7	Lab 7: Insert and Execute tab application Insert a table, clip art, picture, shapes, text box, and symbols
Week 8	Lab 8: Apply page layout tabs such as paper margins, orientation, and size
Week 9	Lab 9: The Page Layout tab applies watermark, page border, and color commands
Week 10	Lab 10 : Executing and opening a file command such as saving the document and options for choosing the language of numbers and printing
Week 11	Lab: A file command completion application for the rest of the command, such as opening a new command, submitting it, and previewing it before printing
Week 12	Lab: The application of inserting a table and adding data inside it.
Week 13	Lab: Complete the insert table application and add new rows and columns
Week 14	Lab: Complete the insert table application and the method for deleting rows and columns from within the table

	Learning and Teaching Resources مصادر التعلم والتدريس	
	Text	**Available in the Library?**
Required Texts	Computer basics represented by the difference between a computer and a human being, number, programs, memory size, and everything related to computer basics.	No
Recommended Texts	Apply to create the folder, change its name, show it, hide it, copy it, paste it, cut it, change the screen scroll, apply the right mouse commands, and everything related to basic computer basics in practice.	No
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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	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
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

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

Module Information

Module Title	**Electricity & Magnetism**	Module Delivery
Module Type	**Core**	☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	MPH-111	
ECTS Credits	**6**	
SWL (hr/sem)	**150**	

Module Level	1	**Semester of Delivery**	1
Administering Department	MPH	**College**	Applied Sciences-Heet
Module Leader	Ghassan Adnan Naeem	**e-mail**	E-mail
Module Leader's Acad. Title	Professor	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	None	**e-mail**	E-mail
Scientific Committee Approval Date	/ /2023	**Version Number**	1.0

Relation with other Modules

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

Module Objectives	1) To develop problem solving skills and understanding of Electricity & Magnetism theory through the application of techniques. 2) To understand voltage, current and power from a given circuit. 3) This course deals with the basic concept of Electricity & Magnetism. 4) This is the basic subject for all electrical and electronic circuits.
Module Learning Outcomes	1) Recognize how electricity works in electrical circuits. 2) List the various terms associated with Electricity & Magnetism. 3) Summarize what is meant by a basic Electricity & Magnetism. 4) Discuss the Electron movement in electric circuits. 5) Describe electrical power, charge, and current.

	6) Define Coulomb's, Ohm's and Faraday's laws.
	7) Identify the electric and magnetic fields.
	8) Discuss the various properties of resistors, capacitors, and inductors.
	9) Explain the two Kirchoff's laws used in circuit analysis.
	10) Identify about Ampère's and Biot-Savart's laws of magnetism.
Indicative Contents	Indicative content includes the following. Part A - Electricity Theory Charge - properties of electric charge, charge conservation law, charge types, Coulomb's law, Newton's law of universal gravitation, electric field, electric field lines, electric field line density, drawing electric field lines, electric field strength , Directional flux, The Electric Flux, Causs's law, , the electric flux produced by an electric charge, the electric flux produced by an electric field. [15 hours] Electric Potential, The Relation between Voltage Difference and Field Intensity, Electrical Potential for Charge Point , Electrical Potential for Groups Charges Point , Electric potential of connected charges, Difference Potential, Electric Potential Energy, The energy principle, The work-energy relationship, Equipotential Surface, Characteristics of Equipotential surfaces . [15 hrs] Voltage, Current and Resistance, Electrical Current, The electric current density , Electrical Resistance, Kirchhoff's laws and Ohm's law, Connecting resistors in series, Connecting resistors in parallel. [15 hrs] Electrical Capacitors, The electrical capacitance , Types of electrical capacitors , The importance of using insulating material , Factors affecting the capacitance of a capacitor, connecting electrical capacitors , Series Connection , Parallel Connection. [10 hrs] AC circuits I – Time dependent signals, average and RMS values. Capacitance and inductance, energy storage elements, simple AC steady-state sinusoidal analysis. [15 hrs]. Revision problem classes [6 hrs] Part B – Magnetism Theory properties of magnets, Coulomb's law in magnetism , Magnetic field, Magnetic Flux , The magnetic field created by an electric current, Motion of Charged Particle in Organized Magnetic Field ,Motion of Charged Particle in-non-organized Magnetic Field, The Cyclotron ,The magnetic force acting on a current-carrying conductor, Magnetic Moment of Coil , Magnetic Field Generators . [15 hrs] Ampere's Law , Applications of Ampère's Law , Biot Savart Law , Difference between Biot–Savart Law and Ampère's Law . [15 hrs] Electromagnetic Induction, The basis of the theory of electromagnetic induction, Faraday's Law and Lenz's Law . [7 hrs]

Learning and Teaching Strategies

Strategies	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 types of simple experiments involving some sampling activities that are interesting to the students. Developing the student's practical abilities to do experiments and the possibility of presenting other experiments by the student and adopting scientific thinking and implementing experiments

Student Workload (SWL)

Structured SWL (h/sem)	94	**Structured SWL (h/w)**	6.3
Unstructured SWL (h/sem)	56	**Unstructured SWL (h/w)**	3.7
Total SWL (h/sem)		**150**	

Module Evaluation

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

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Electric charges and Coulomb's law
Week 2	Electric field and Gauss's law and lines Power
Week 3	Electric Potential Electrical Potential Energy

Week 4	Current, resistance and Ohm's law, Electromotive force and connecting resistors
Week 5	Electrical capacitance and capacitance connections
Week 6	AC circuits I – Time dependent signals, average and RMS values. Capacitance and inductance
Week 7	Mid-term Exam + Unit-Step Forcing, Forced Response, the RLC Circuit
Week 8	Magnetism ,properties of magnets, Coulomb's law in magnetism
Week 9	Magnetic field, Magnetic Flux , The magnetic field created by an electric current
Week 10	Motion of Charged Particle in Organized Magnetic Field ,Motion of Charged Particle in-non-organized Magnetic Field, The Cyclotron
Week 11	The magnetic force acting on a current-carrying conductor, Magnetic Moment of Coil , Magnetic Field Generators
Week 12	Ampere's Law , Applications of Ampère's Law
Week 13	Biot Savart Law , Difference between Biot–Savart Law and Ampère's Law
Week 14	Electromagnetic Induction ,The basis of the theory of electromagnetic induction,
Week 15	Faraday's Law and Lenz's Law
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered
Week 1	Lab 1: Introduction to ohmmeters, ammeters, voltmeters and galvanometers
Week 2	Lab 2: ohm 's Laws
Week 3	Lab 3: Kirchhoff's Laws
Week 4	Lab 4: connecting resistors
Week 5	Lab 5: capacitance connections
Week 6	Lab 6: Electric bridge
Week 7	Lab 7: AC circuits

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	Fundamentals of Electricity and Magnetism, authored by Yehia Abdel Hamid	Yes
Recommended Texts	Practical applications in electricity and magnetism, authored by Subhi Saeed.	No
Websites	https://www.hazemsakeek.net/	

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

		Module Information	
		معلومات المادة الدراسية	
Module Title		**Academic English 1**	Module Delivery
Module Type		**S**	☒Theory ☐Lecture ☐Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code		UNI-101	
ECTS Credits		2	
SWL (hr/sem)		**50**	
Module Level	1	Semester of Delivery	1
Administering Department	MPH	College	College of Applied Sciences-Hit
Module Leader	Yassir Sh. Hameed	e-mail	yassiralheety@gmail.com
Module Leader's Acad. Title	Asst. Instructor	Module Leader's Qualification	MA.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name		e-mail	E-mail
Scientific Committee Approval Date	/ /2023	Version Number	1.0

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

	Module Aims, Learning Outcomes and Indicative Contents
	أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	1. To learn the four English skills (reading, writing, listening and speaking). 2. To understand and distinguish between vocabulary that are similar in use. 3. To help students know the phonic symbols of English letters. 4. To help students read, understand and comprehend certain English texts. 5. To enable students to write in English language as well as to learn the basic rules of building up English sentences. 6. To have the ability to practice the language in real situations.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Engage the students in real communication to practice speaking skill. 2. Divide the students into groups to practice writing skill. 3. Ask the students to learn and grasp the words that describe family members. 4. Distinguish among the different rules used in texts. 5. Analyze the sentences depending on their grammatical structures. 6. Differentiate between the word-system in students' mother tongue and the target language. 7. Draw certain conclusions after understanding the given texts.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. In this course, students are directed to practice what they are taught throughout the semester. They are encouraged to work on collecting important notes during the session to be able to utilize the learned materials later on. It's important to use certain aids to help understand the lesson. Moreover, students should be directed to write certain meaningful and grammatical paragraphs. They should understand the texts to be able to answer questions given in the quizzes, mid-term and final examination.

	Learning and Teaching Strategies
	استراتيجيات التعلم والتعليم

Strategies	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 global thinking skills. This will be achieved through classes interactive communication, by performing and involving the four English skills, the receptive and productive ones, reading, listening, writing and speaking. some practical

	activities will be beneficial and interested to the students like engaging them in a communicative situation, asking them to practice a role-changing activity and so on.	

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	32	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2.1
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	18	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Hello! How are you? What's this in English? Good morning!
Week 2	Your world, What's his name? Contractions, Countries, Where are they from? Numbers
Week 3	All about you! What's his address? Personal information, Social expressions
Week 4	Family and friends! Possessive adjectives, Describing a friend, The alphabet

Week 5	The way I live! Present simple I/they/we/you, Sports/Food/Drinks, Language and nationalities, How much is it? Numbers
Week 6	Every day! Present simple he/she, Saying the time, Words go together, Days of the week, Prepositions of time on/at/in
Week 7	**Mid-term exam for the materials given above**
Week 8	My favorites! Make questions who, where, how, why… ect. Opposite adjectives, A holiday postcard
Week 9	Where I live? There's/'re, Directions, Go straight on, Turn right… ect.
Week 10	Time past! Was/were born, Saying years, When's your birthday?
Week 11	We had a great time! Regular v.s Irregular verbs, Time expressions, Making conversation
Week 12	I can do that! Show ability can/can't, Verb+noun, Adjective+noun
Week 13	Please and thank you! I'd like, Some v.s any, Making offers
Week 14	Here and now! Present continous v.s Present simple, Colours and clothes, What's the matter?
Week 15	It's time to go! Future plans, Means of transport, Social expressions
Week 16	**Preparation for the final examination**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	None
Week 2	None
Week 3	None
Week 4	None
Week 5	None
Week 6	None
Week 7	None

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Soars, L. (2009). New headway Plus: Beginner Student's Book.	No

Recommended Texts	Soars, L. (2009). New headway Plus: Beginner Working Book.	No
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)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – 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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية				
Module Title	Biology		**Module Delivery**	
Module Type	Basic		☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MPH-114			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	1		**Semester of Delivery**	1
Administering Department	Medical Physics		**College**	Applied Sciences-Heet
Module Leader	Ahmed Saadoun Jaloot Al-heety		**e-mail**	asjaloot@uoanbar.edu.iq
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.
Module Tutor	Ammar Abdul Razzaq Tawfiq		**e-mail**	ammarabta@uoanbar.edu.iq
Peer Reviewer Name	Marwan Mahmoud Saleh		**e-mail**	ah.marwan_bio@uoanbar.edu.iq
Scientific Committee Approval Date	/ / 2023		**Version Number**	1.0

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

	Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية
Module Objectives أهداف المادة الدراسية	1. Introducing the student to how to examine organisms and tissues using a microscope, in addition to 2. introducing him to the microorganisms that are pathogenic to humans (how to write their scientific names), and 3. the diseases resulting from them.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**1.** Recognize how does the cell form tissues and organs. **2.** List the various terms associated with cell. **3.** Define the Cell Theory. **4.** Define the basic parts of a cell. **5.** How do the parts of a cell work together? **6.** Describe each part of the cell separately. **7.** How does The Cytoskeleton Supports Eukaryotic Cells? **8.** Structures found in animal Cells but not in plant Cells. **9.** Structures found in plant Cells but not in animal Cells. **10.** Recognize how does Cell division & MITOSIS. **11.** Recognize how does a cell cycle and MEIOSISI. **12.** How can the student distinguish between MITOSIS and MEIOSISI? **13.** Define the basic parts of a Bacterial cell. **14.** Define the basic parts of a virus molecule. **15.** How can the student distinguish between bacteria and viruses.
Indicative Contents المحتويات الإرشادية	**Part A - General introduction to Biology** Branches of Biology General characteristics of prokaryotes, fungi ,Protista, Anamilia and Plantae CLASSIFICATION OF ORGANISMS. [**15 hrs**] Introduction to Cytology or Cell Biology. Cell membrane, Functions of the cell membrane [**15 hrs**] Nucleus, Nuclear envelope and Chromosomes. Nucleic acid as a Genetic Material, Gene, Genetic code. and Gene expression. [10 hrs] Proteins, essential functions of proteins and Proteins Has Four Levels of Organization. The Cytoskeleton Supports Eukaryotic Cells.. [**15 hrs**] Revision problem classes [**6 hrs**] **Part B - Cell division** Cell division & MITOSIS [**15 hrs**] A Cell cycle and MEIOSISI. [**7 hrs**] Bacteria, Shape & Size, Arrangement, Gram-staining characteristics, and Structure Of Bacterial Cell. Viruses, characteristics of Viruses and Viruses are said to have five specific properties that distinguish them from living cells. [**15 hrs**]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	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 types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	86	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.7
Total SWL (h/sem) 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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	1hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

	Delivery Plan (Weekly Syllabus)
	المنهاج الاسبوعي النظري
	Material Covered
Week 1	Introduction - General introduction to Biology
Week 2	Branches of Biology
Week 3	General characteristics of prokaryotes, fungi ,Protista, Anamilia and Plantae
Week 4	CLASSIFICATION OF ORGANISMS
Week 5	Introduction to Cytology or Cell Biology.
Week 6	Cell membrane, Functions of the cell membrane.
Week 7	Nucleus, Nuclear envelope and Chromosomes.
Week 8	Nucleic acid as a Genetic Material, Gene, Genetic code. and Gene expression.
Week 9	Proteins, essential functions of proteins and Proteins Has Four Levels of Organization.
Week 10	The Cytoskeleton Supports Eukaryotic Cells.
Week 11	SPECIALIZED PLANT ORGANELLES(Chloroplasts and Other Plastids and Central Vacuole)
Week 12	Cell division & MITOSIS
Week 13	A cell cycle and MEIOSISI
Week 14	Bacteria, Shape & Size, Arrangement, Gram-staining characteristics, and Structure Of Bacterial Cell.
Week 15	Viruses, characteristics of Viruses and Viruses are said to have five specific properties that distinguish them from living cells.
Week 16	**Preparatory week before the final Exam**

	Delivery Plan (Weekly Lab. Syllabus)
	المنهاج الاسبوعي للمختبر
	Material Covered
Week 1	Lab 1: Introduction to CELL
Week 2	Lab 2: Introduction to Parasitology
Week 3	Lab 3: Parasitology
Week 4	Lab 4: Parasitology
Week 5	Lab 5: Parasitology
Week 6	Lab 6: Parasitology
Week 7	Lab 7: Parasitology
Week 8	Lab 8: Introduction to Histology
Week 9	Lab 9: Histology
Week 10	Lab 10: Histology

Week 11	Lab 11: Histology
Week 12	Lab 12: Histology
Week 13	Lab 13: Histology
Week 14	Lab 14: Histology

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**Campbell**, N.A., Urry, L.A., Cain, M.L. and et al., (2021). **Biology**.12 ed.Pearson BenjaminCummings. SanFrancisco, USA.	Yes
Recommended Texts	**Mason**, K.A., Losos, J.B., and Singer.S.R, (2017). Biology.11 ed. McGraw-Hill Education, USA.	Yes
Websites	https://vetbooks.ir/?s=lippincott&fbclid=IwAR12okqcqBcCQorPjWFvbaOoLvqG5GjelDFl xNcB8jQyUnLk-ExQ0QgCr6I	

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)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – 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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title اسم المادة او الوحدة	**Mathematics 1**	**Module Delivery**
Module Type نوع الوحدة	**Base**	☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code كود الوحدة	**MPH-113**	
ECTS Credits	**7**	
SWL (hr/sem)	**175**	

Module Level	1	**Semester of Delivery**	1
Administering Department	MPH	**College**	College of Applied Sciences - Heat
Module Leader	م.م. ميثاق عبدالكريم عبدالواحد	**e-mail**	Methaq90alheety@uoanbar.edu.iq
Module Leader's Acad. Title	Assist. Lect.	**Module Leader's Qualification** مؤهلات مسؤول الوحدة	M.Sc.
Module Tutor	None	**e-mai**	None
Peer Reviewer Name		**e-mai**	
Scientific Committee Approval Date	/ / 2023	**Version Number**	1.0

Relation with other Modules
العلاقة مع المواد الدراسية الأخرى

Prerequisite module مادة اساسية تدرس قبلها	None	**Semester** الفصل الدراسي	
Co-requisites module مادة دراسية تدرس معها مشتركة	None	**Semester** الفصل الدراسي	

	Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. A student's acquisition of the concept of words and mathematical logic and ways of dealing with them algebraically. 2. Clarify the concept of sets, relationships, functions and links between them and theories related to them.	
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Upon completing this course, students will: 1. An ability to apply knowledge of mathematics, science and engineering. 2. Evaluate the indefinite and improper integrals by using different integration techniques. 3. Identify the definition and properties associated with definite integrals. 4. Evaluate integrals using the method of substitution. 5. Solve problems involving applications of integrals including finding volume of solids of revolution and area between curves. 6. Discover determinants and matrices and their properties. Learn Crammer rule for solving a set of matrix system.	
Indicative Contents المحتويات الإرشادية	1. Familiarity with basic mathematical concepts and principles required for all branches of mathematics. 2. Recognize the importance of integration and its applications. 3. Knowledge of the concept of specific values and related issues. 4. Studying methods of finding integration and identifying the most appropriate method.	

Learning and Teaching Strategies	
استراتيجيات التعلم والتعليم	
Strategies	1. Thinking creatively and critically. 2. Talk with a partner or in a small group. 3. Express ideas with linear activities. 4. Explore personal positions and values through debate, argument, and discussion. 5. Meditation in the educational process

Student Workload (SWL)			
الفصل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5.3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	96	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation				
تقييم المادة الدراسية				
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	
	Assignments	2	10% (10)	2 and 12	
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	
Summative assessment	Midterm Exam	2hr	10% (10)	7	
	Final Exam	3hr	50% (50)	16	
Total assessment			100% (100 Marks		

	Delivery Plan (Weekly+Lab Syllabus)
	المنهاج الاسبوعي النظري والعملي
	Material Covered
Week 1	The Real numbers, Slope, Equation of straight line, function
Week 2	Even and odd, Inequalities
Week 3	Domain , range and Sketch
Week 4	Limits
Week 5	Continuity
Week 6	The Derivative
Week 7	Second and higher derivatives , Derivative of natural logarithm
Week 8	Derivative of a^x , Chain Rule
Week 9	Exam
Week 10	Integration, Definite integration
Week 11	Integration by parts
Week 12	Integration by partial fractions
Week 13	Partial Fraction
Week 14	Area
Week 15	Area between two curves
Week 16	**Preparatory week before the final Exam**

	Learning and Teaching Resources مصادر التعلم والتدريس	
	Text	**Available in the Library?**
Required Texts	1. Calculus with analytic Geometry, Swokowski, Olinickand Pence, 1994. 2. Calculus, 8th edition (2007) by Howard Anton, (John Wiley & Sons, Inc, New York).	ـ الكتب المقررة المطلوبة Required textbooks
Recommended Texts مصادر للاطلاع	1. Professors lectures. 2. The internet.	الكتب والمراجع التي يوصى بها (المجلات العلمية ، التقارير Recommended books and references (scientific journals, reports
Websites مواقع الويب	المراجع الالكترونية، مواقع الانترنيت المكتبة الافتراضية مواقع المكتبات في بعض الجامعات العالمية Electronic references, websites Virtual library Library locations in some international universities	

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)	**FX – Fail**	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

مدرس المادة / م.م. ميثاق عبدالكريم عبدالواحد

methaq90alheety@uoanbar.edu.iq / البريد الالكتروني

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Atomic physics	**Module Delivery**	
Module Type	**Core**	☒ Theory	
Module Code	MPH-213	☐ Lecture ☒ Lab	
ECTS Credits	5	☒ Tutorial	
SWL (hr/sem)	**125**	☐ Practical ☐ Seminar	
Module Level	2	**Semester of Delivery**	3
Administering Department	MPH	**College**	Applied Sciences - Heet
Module Leader	Mawlood Maajal Ali	**e-mail**	mawloodmali@uoanbar.edu.iq
Module Leader's Acad. Title	Lect.	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name		**e-mail**	E-mail
Scientific Committee Approval Date	/ /2023	**Version Number**	1.0

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

	Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية
Module Objectives أهداف المادة الدراسية	1. Quantum Mechanics: Applying quantum mechanical principles to describe and analyze atomic phenomena. Exploring concepts such as wave-particle duality, the uncertainty principle, and quantum superposition in the context of atomic systems. 2. Atomic Structure: Understanding the structure of atoms, including the arrangement of electrons in different energy levels, the roles of protons and neutrons in the nucleus, and the overall size and shape of atoms. 3. Energy Levels and Spectroscopy: Exploring the energy levels of atoms and the transitions between these levels. Studying the emission and absorption of electromagnetic radiation by atoms, leading to the field of spectroscopy. 4. Atomic Interactions: Investigating the interactions between atoms, including collisions, scattering, and the formation of chemical bonds. Understanding the forces and potentials that govern these interactions. 5. Atomic Spectra and Laser Physics: Studying the properties of atomic spectra, including the emission and absorption of light by atoms. Understanding the principles and applications of lasers, which rely on atomic transitions and stimulated emission. 6. Atomic and Nuclear Physics: Exploring the connections between atomic and nuclear physics, including the study of radioactivity, nuclear decay, and nuclear reactions. Investigating atomic systems involving radioactive isotopes.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• **Knowledge and Understanding**: Acquire a comprehensive understanding of the fundamental principles and concepts of atomic physics, including atomic structure, energy levels, quantum mechanics, and atomic interactions. • **Mathematical and Analytical Skills**: Apply mathematical and analytical methods to solve problems and describe atomic systems. Develop proficiency in using mathematical tools such as quantum mechanics, differential equations, and statistical mechanics to model and analyze atomic phenomena. • **Critical Thinking**: Develop critical thinking skills to analyze and evaluate complex atomic physics problems. Apply logical reasoning and scientific principles to interpret experimental results and theoretical models. • **Problem Solving**: Develop problem-solving skills by applying atomic physics concepts to a variety of scenarios. Apply theoretical knowledge to explain and predict atomic phenomena and solve numerical problems related to atomic structure, energy levels, spectroscopy, and atomic interactions. • **Communication Skills**: Communicate scientific ideas effectively through written reports, presentations, and discussions. Clearly articulate concepts, experimental procedures, and results related to atomic physics to both technical and non-technical audiences. • **Research Skills**: Develop research skills by engaging with current literature and scientific publications in atomic physics. Gain the ability to critically evaluate research papers, understand ongoing developments in the field, and

	potentially contribute to research projects in atomic physics.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A - Atomic Structure: Rutherford model of the atom, Bohr model and energy levels, Quantum mechanical model of the atom, Electron configurations and orbital notation and Periodic table and periodic trends. [15 hrs] – Quantum Mechanics: Wave-particle duality, Schrödinger equation and its solutions, Operators and observables in quantum mechanics, Heisenberg uncertainty principle and Quantum numbers and their significance. [15 hrs] -Energy Levels and Spectroscopy: Atomic energy levels and transitions, Absorption and emission of electromagnetic radiation, Spectral lines and line spectra and Selection rules for atomic transitions. [10 hrs] Atomic Interactions: Coulomb's law and electric fields, Forces between charged particles Ionization and excitation of atoms, Elastic and inelastic scattering of particles and Chemical bonding and molecular structure. [15 hrs] Revision problem classes [6 hrs] Part B - Atomic Spectra and Laser Physics: Atomic emission and absorption spectra, Zeeman effect and Stark effect, Laser principles and operation, Population inversion and stimulated emission and Laser cooling and trapping techniques. [15 hrs] Atomic and Nuclear Physics: Radioactive decay and nuclear reactions, Nuclear structure and nuclear models, Nuclear fission and fusion, Isotopes and atomic mass spectroscopy and Applications of atomic physics in nuclear technology. [7 hrs] Applications of Atomic Physics: Atomic magnetometers and magnetic field sensing Atomic imaging techniques (electron microscopy, scanning probe microscopy), Atomic spectroscopy in astrophysics and Atomic physics in quantum computing and quantum information science. [15 hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	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 types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5.3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**125**		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction - Historical overview of atomic models and models of the atom

Week 2	Bohr model of the atom, Energy levels, quantum numbers and Atomic spectra and line emission
Week 3	Quantum mechanics fundamentals
Week 4	Schrödinger equation and wave functions
Week 5	Operators and observables in quantum mechanics
Week 6	Angular momentum and spin and Hydrogen atom and wave functions
Week 7	Mid exam
Week 8	Atomic interactions and forces and Ionization and excitation processes
Week 9	Absorption and emission of electromagnetic radiation
Week 10	Spectral lines and line spectra and Selection rules for atomic transitions
Week 11	Zeeman effect and Stark effect, Laser principles
Week 12	operation Population inversion and stimulated emission
Week 13	Nuclear physics and radioactive decay
Week 14	Nuclear reactions and fission/fusion processes
Week 15	Applications of atomic physics in technology
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)	
المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Lab safety guidelines and introduction to lab equipment
Week 2	Lab 2: Measurement of atomic spectra using a spectroscope and Analysis and interpretation of spectral lines
Week 3	Lab 3: Measurement of electron energy levels in a gas discharge tube
Week 4	Lab 4: Determination of energy gaps and excitation thresholds
Week 5	Lab 5: Experiment on the Zeeman effect
Week 6	Lab 6: Measurement of magnetic field-induced splitting of spectral lines
Week 7	Lab 7: atomic absorption spectroscopy
Week 8	Lab 8: Experiment on laser-induced fluorescence (LIF)
Week 9	Lab 9: Measurement of decay rates and half-lives of radioactive samples
Week 10	Lab 10: imaging techniques

| Learning and Teaching Resources |||
مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	D. Griffiths, Introduction to Quantum Mechanics Cambridge University Press, 2016.	No
Recommended Texts	Kenneth S. Krane, Introductory Nuclear Physics, John Wiley-1988	No
Websites		

| Grading Scheme |||||
مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
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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 of bioelectronics

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Bioelectronics		**Module Delivery**	
Module Type	**Core**		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ L Seminar	
Module Code	MPH-223			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	2	**Semester of Delivery**		4
Administering Department	Medical Physics, MPH	**College**	Applied sciences-Heet	
Module Leader	Manaf A Guma	**e-mail**	manafguma@uoanabr.edu.iq	
Module Leader's Acad. Title	Ass. Professor	**Module Leader's Qualification**	Ph.D.	
Module Tutor		**e-mail**	E-mail	
Peer Reviewer Name	Name	**e-mail**	E-mail	
Scientific Committee Approval Date	/ /2023	**Version Number**	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	MPH-213	**Semester**	3
Co-requisites module	None	**Semester**	
Module Aims, Learning Outcomes and Indicative Contents			

	أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية
Module Objectives أهداف المادة الدراسية	The main **Objectives of this modules are:** The main objectives of a module on bioelectronics typically focus on providing students with knowledge and skills related to the integration of electronics and biology. Here are some common objectives of bioelectronics modules: 1. Understanding the principles of bioelectronics: Students should gain a solid understanding of the fundamental concepts and principles of bioelectronics. This includes studying the interface between electronics and biological systems, as well as the underlying physics, chemistry, and biology involved. 2. Exploring bioelectronic devices and sensors: Students should learn about various bioelectronic devices and sensors, such as biosensors, biochips, implantable electronics, and wearable sensors. They should understand their working principles, fabrication techniques, and applications in healthcare, diagnostics, and biomedical research. 3. Investigating bioelectronic interfaces: Students should explore the interfaces between electronic devices and biological systems, including bioelectrodes, neural interfaces, and bioMEMS (BioMicroElectroMechanical Systems). They should understand the challenges and techniques involved in achieving biocompatibility, signal transduction, and data acquisition. 4. Understanding signal processing and data analysis: Students should develop skills in processing and analyzing biological signals acquired by bioelectronic devices. This includes understanding signal amplification, filtering, digitization, and computational methods for data analysis. 5. Exploring bioelectronic applications: Students should learn about the diverse applications of bioelectronics in healthcare, biomedical research, and therapeutics. This may include areas such as medical diagnostics, bioimaging, neuroprosthetics, bioelectrochemical systems, and bioelectronic medicine. 6. Integrating electronics and biology: Students should develop an interdisciplinary perspective by integrating knowledge from electronics, biology, and other relevant fields. They should understand the challenges, opportunities, and potential solutions that arise when combining electronic technologies with biological systems. 7. Practical skills in bioelectronics: Students should gain hands-on experience in designing, fabricating, and characterizing bioelectronic devices and systems. This may involve laboratory work, experiments, and projects that involve building and testing bioelectronic prototypes. 8. Ethical considerations and societal impact: Students should be aware of the ethical considerations and societal implications of bioelectronics. This includes understanding issues related to privacy, data security, informed consent, and responsible use of bioelectronic technologies. 9. Communication and collaboration: Students should develop effective communication skills to convey bioelectronics concepts and findings to both technical

	and non-technical audiences. They should also develop skills in interdisciplinary collaboration, working in teams, and presenting their work professionally.

By achieving these objectives, students will be well-prepared to contribute to the development and application of bioelectronic technologies, advancing fields such as healthcare, diagnostics, and biomedical research. |
| **Module Learning Outcomes**

مخرجات التعلم للمادة الدراسية | The module learning outcomes for a bioelectronics module typically focus on developing knowledge and skills related to the integration of electronics and biology. Here are some common learning outcomes for a bioelectronics module:

1. Understanding of bioelectronics principles: Students should develop a comprehensive understanding of the fundamental principles and concepts of bioelectronics. This includes knowledge of the interface between electronics and biological systems, bioelectrodes, and the electrical properties of biological materials.

2. Knowledge of biological signal acquisition and processing: Students should learn about techniques for acquiring and processing biological signals, such as electrocardiography (ECG), electroencephalography (EEG), and electromyography (EMG). They should understand signal amplification, noise reduction, filtering, and digitization.

3. Familiarity with bioelectronic devices and sensors: Students should gain knowledge about different bioelectronic devices and sensors used for biological signal acquisition and stimulation. This includes understanding the working principles and applications of devices such as biosensors, implantable electronics, neurostimulation devices, and wearable sensors.

4. Integration of electronics with biological systems: Students should understand how to integrate electronic devices with biological systems for monitoring, diagnosis, and therapeutic purposes. They should learn about techniques for interfacing electronics with cells, tissues, and organs.

5. Design and development of bioelectronic systems: Students should be able to design and develop bioelectronic systems, including hardware and software components. They should understand the selection and integration of electronic components, design of circuits, firmware or software development, and system integration.

6. Analysis and interpretation of biological data: Students should develop skills in analyzing and interpreting biological data obtained from bioelectronic systems. This includes understanding data visualization techniques, statistical analysis, and pattern recognition methods for extracting meaningful information from biological signals.

7. Bioelectronic applications in healthcare and research: Students should explore and understand the applications of bioelectronics in healthcare and biomedical research. This may include areas such as medical diagnostics, neural engineering, neuroprosthetics, bioelectrochemical systems, and bioelectronic interfaces.

8. Ethical considerations and regulatory aspects: Students should be aware of the ethical considerations and regulatory frameworks associated with the use of |

	bioelectronic devices and systems. They should understand the importance of patient safety, informed consent, and compliance with relevant regulations and standards.
	9. Practical skills in bioelectronics: Students should gain hands-on experience in designing, fabricating, and testing bioelectronic devices and systems. This may involve laboratory work, experiments, and projects that involve building and characterizing bioelectronic prototypes.
	10. Communication and collaboration: Students should develop effective communication skills to convey bioelectronics concepts and findings to both technical and non-technical audiences. They should also develop skills in interdisciplinary collaboration, working in teams, and presenting their work professionally.
	By achieving these learning outcomes, students will be equipped with the knowledge and skills necessary to contribute to the field of bioelectronics, advancing healthcare, diagnostics, and biomedical research.

Indicative Contents
 	
مضمون المحتويات
	Indicative content includes the following.
	
	The indicative contents of a bioelectronics course may vary depending on the specific curriculum and level of the course. However, here are some common topics and areas that can be covered in a bioelectronics course:
	
	1. Introduction to bioelectronics:
	  - Definition and scope of bioelectronics.
	  - Overview of the interface between electronics and biology.
	  - Applications of bioelectronics in healthcare and biomedical research.
	
	2. Electrical properties of biological systems:
	  - Introduction to the electrical properties of cells, tissues, and organs.
	  - Membrane potential and ion channels.
	  - Excitable cells and action potentials.
	
	3. Bioelectrodes and sensors:
	  - Principles of bioelectrodes and their fabrication.
	  - Electrode-skin interface and signal acquisition.
	  - Sensors for biomedical measurements (e.g., ECG, EEG, EMG).
	
	4. Bioamplifiers and signal conditioning:
	  - Amplification and filtering of biological signals.
	  - Noise reduction techniques.
	  - Signal conditioning for reliable data acquisition.
	
	5. Bioelectronic interfaces and implants:
	  - Design and integration of bioelectronic interfaces with biological systems.
	  - Implantable devices and neuroprosthetics.
	  - Wireless communication and power delivery.
	
	6. Biosensors and biochips:
	  - Principles of biosensors for biological detection.
	  - Transduction methods for biochemical measurements.

	- Lab-on-a-chip technologies and microfluidics.
	
	7. Neural engineering and neurostimulation:
	   - Neural interfaces for recording and stimulation.
	   - Brain-machine interfaces and neuroprosthetics.
	   - Deep brain stimulation and neuromodulation techniques.
	
	8. Bioelectrochemical systems:
	   - Biofuel cells and enzymatic reactions.
	   - Bioelectrochemical sensors and biosensors.
	   - Energy harvesting from biological systems.
	
	9. Bioelectronics in diagnostics and therapy:
	   - Medical diagnostics using bioelectronic devices.
	   - Wearable sensors and point-of-care testing.
	   - Bioelectronic therapeutic interventions.
	
	10. Ethical considerations and societal impact:
	   - Ethical implications of bioelectronics.
	   - Privacy and security considerations.
	   - Regulatory frameworks and standards for bioelectronic devices.
	
	11. Emerging trends and future directions:
	   - Advancements in bioelectronics research.
	   - Nanotechnology and bioelectronic integration.
	   - Bioelectronic medicine and personalized healthcare.
	
	These indicative contents provide a framework for structuring a bioelectronics course. The actual content and emphasis may vary depending on the specific requirements of the course and the expertise of the instructor..

Learning and Teaching Strategies	
استراتيجيات التعلم والتعليم	
Strategies	Learning and teaching strategies in Biochemistry aim to engage students in active learning, facilitate understanding of complex concepts, and develop critical thinking skills. Here are some common learning and teaching strategies employed in Basic Biochemistry courses: 1. Lectures: Lectures are often used to deliver foundational knowledge and concepts in biochemistry. They provide an overview of the topics, explain key principles, and highlight important details. Lectures may be supplemented with visual aids, such as slides or multimedia presentations, to enhance understanding. 2. Laboratory Work: Laboratory sessions allow students to apply theoretical knowledge to practical situations. They provide hands-on experience with biochemical techniques, data collection, analysis, and interpretation. Lab work may involve experiments related to biomolecule analysis, enzyme kinetics, or metabolic pathways.

3. Problem-solving Exercises: Problem-solving exercises and case studies help students apply their knowledge to real-life scenarios. They encourage critical thinking and problem-solving skills by presenting biochemical problems or experimental data for analysis and interpretation. Students may work individually or in groups to find solutions and explain their reasoning.

4. Interactive Discussions: Interactive discussions, such as small group discussions or classroom debates, promote active learning and peer-to-peer interaction. They allow students to ask questions, clarify doubts, and engage in meaningful discussions about biochemical concepts, experiments, or applications.

5. Concept Mapping: Concept mapping is a visual learning tool that helps students organize and connect different biochemical concepts. It involves creating diagrams or mind maps that illustrate the relationships between different biomolecules, metabolic pathways, or cellular processes. Concept maps can aid in understanding the "big picture" and identifying the interconnections within biochemistry.

6. Multimedia Resources: Incorporating multimedia resources, such as videos, animations, and interactive simulations, can enhance students' engagement and understanding of complex biochemical processes. These resources can visually illustrate molecular structures, enzyme kinetics, or cellular processes, making them more accessible and memorable.

7. Collaborative Learning: Collaborative learning activities, such as group projects or problem-solving tasks, encourage students to work together to solve biochemical problems or complete assignments. This fosters teamwork, communication, and the exchange of ideas, allowing students to learn from each other's perspectives and experiences.

8. Assessments: Assessments, such as quizzes, exams, and assignments, evaluate students' understanding and knowledge retention. They provide feedback on individual progress and help identify areas that require further review or clarification. Assessments may include multiple-choice questions, problem-solving tasks, or short essay questions.

9. Online Resources: Utilizing online resources, such as virtual labs, interactive tutorials, or online discussion forums, can provide additional learning opportunities outside of the classroom. These resources offer flexibility and accessibility, allowing students to review content at their own pace and seek additional support when needed.

10. Real-world Applications: Relating biochemistry concepts to real-world applications, such as medical advancements, biotechnology, or environmental issues, can enhance students' motivation and understanding. Exploring the practical relevance of biochemistry concepts helps students appreciate the significance of their learning and its impact in various fields.

	These strategies aim to create an active and engaging learning environment that promotes understanding, critical thinking, and application of biochemistry principles. The specific strategies employed may vary based on the teaching style, course format, and resources available to the instructor.		

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5.3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.3
Total SWL (h/sem) 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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.		10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	1hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	1. Introduction to bioelectronics:
Week 2	2. Electrical properties of biological systems:
Week 3	3. Bioelectrodes and sensors:
Week 4	4. Bioamplifiers and signal conditioning:
Week 5	5. Bioelectronic interfaces and implants:
Week 6	6. Biosensors and biochips:
Week 7	Mid Exam
Week 8	7. Neural engineering and neurostimulation:
Week 9	8. Bioelectrochemical systems:
Week 10	9. Bioelectronics in diagnostics and therapy:
Week 11	10. Ethical considerations and societal impact:
Week 12	11. Emerging trends and future directions:
Week 13	Bio applications of bioelectronics
Week 14	Bio applications of bioelectronics
Week 15	Bio applications of bioelectronics
Week 16	Final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Here are some references and research papers related to bioelectronics: 1. "Bioelectronics: From Theory to Applications" by Giovanna De Luca, Fiorenzo Omenetto, and Mohamad Sawan. 2. "Bioelectronic Medicine: An Emerging Field in Biomedical Engineering" by Poonam Sharma, Pankaj Yadav, and Nitin Sharma.	Available Online

	3. "Bioelectronics: A Study of the Electronics of Living Systems" by Avinash Kumar Agarwal and Dilip Sharma. 4. "Bioelectronic Devices: Principles and Applications" edited by Paolo Facci. 5. "Bioelectronics Handbook: MOSFETs, Biosensors, and Neurons" edited by Wouter Serdijn, Rudy van der Toorn, and Leif Sörnmo. 6. "Bioelectronics: From Theory to Applications" edited by Krzysztof Iniewski. 7. "Bioelectronic Interfaces: Present Challenges and Future Prospects" by George G. Malliaras and Magnus Berggren. 8. "Bioelectronic Devices: Self-Assembled Systems and Semi-Living Technologies" by Tom F. Otero, Daniel J. Thomas, and Aleksandr Noy. 9. "Bioelectronic Medicine: An Overview of the Field and Its Potential" by Valentin A. Pavlov, Kevin J. Tracey, and Paul-Peter Tak. 10. "Bioelectronic Interfaces: Progress, Challenges, and Future Directions" by Sandeep K. Vashist.	
Recommended Texts	"Bioelectronics: From Theory to Applications" by Giovanna De Luca, Fiorenzo Omenetto, and Mohamad Sawan.	Yes
Websites	Any website	

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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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

<table>
<tr><td colspan="4" align="center">Module Information
معلومات المادة الدراسية</td></tr>
<tr>
<td>Module Title</td>
<td align="center">Biophysics</td>
<td colspan="2">Module Delivery</td>
</tr>
<tr>
<td>Module Type</td>
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☒ Theory
☐ Lecture
☒ Lab
☒ Tutorial
☐ Practical
☐ Seminar
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<tr>
<td>Module Code</td>
<td align="center">MPH-225</td>
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<tr>
<td>ECTS Credits</td>
<td align="center">5</td>
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<td>SWL (hr/sem)</td>
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<td>Module Level</td>
<td>2</td>
<td>Semester of Delivery</td>
<td>4</td>
</tr>
<tr>
<td>Administering Department</td>
<td>MPH</td>
<td>College</td>
<td>Applied Sciences-Heet</td>
</tr>
<tr>
<td>Module Leader</td>
<td>Dr.Nasrin Nadher Jamil</td>
<td>e-mail</td>
<td>nasrin32jamil@gmail.com</td>
</tr>
<tr>
<td>Module Leader's Acad. Title</td>
<td>Lect.</td>
<td>Module Leader's Qualification</td>
<td>Ph.D.</td>
</tr>
<tr>
<td>Module Tutor</td>
<td>Name (if available)</td>
<td>e-mail</td>
<td>E-mail</td>
</tr>
<tr>
<td>Peer Reviewer Name</td>
<td>Name</td>
<td>e-mail</td>
<td>E-mail</td>
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<tr>
<td>Scientific Committee Approval Date</td>
<td>/ /2023</td>
<td>Version Number</td>
<td>1.0</td>
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<table>
<tr><td colspan="4" align="center">Relation with other Modules
العلاقة مع المواد الدراسية الأخرى</td></tr>
<tr>
<td>Prerequisite module</td>
<td>None</td>
<td>Semester</td>
<td></td>
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<tr>
<td>Co-requisites module</td>
<td>None</td>
<td>Semester</td>
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	Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية
Module Objectives أهداف المادة الدراسية	1. This course deals with the basic concept of physics to understand the relation of physics with biology. 2. To develop problem solving skills that dealing with the work of medical devices. 3. To understand how the principles of physics are applied within the human body. 4. Develop a physical explanation of biological processes. 5. Clarifying the relationship between what happens outside and inside the human body.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Explain the meaning of biophysics and biophysicists. 2. Explain the atomic structure of human body. 3. Summarize what is meant by diffusion. 4. Discuss the four major biomolecules of nature. 5. Describe energy absorbance by molecules. 6. Define electromagnetic radiation and its types. 7. Discuss the effect of radiation on molecules inside body. 8. Discuss the relation between radiation and the work of some medical devices. 9. Discuss the examples of Energy interactions with human body. 10. Define Molecular motion. 11. Show mechanisms of passive and active transport through the membranes. 12. Discuss the electrical properties of biomembranes. 13. Explain the Waves and Sound.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Introduction of Biophysics What is BIOPHYSICS?- IMPORTANCE OF BIOPHYSICS.- What Do Biophysicists Do?- CONCEPT OF UNIT - Fundamental and derived units - SYSTEMS OF UNITS – Physical Quantities- Atomic Structure - Bonding between atoms - The hierarchy of living things [15 hrs] Proteins– Carbohydrates – Carbohydrates - Nucleic acids- Energy absorbance by molecules- Molecular transduction of energy. [15 hrs] Electromagnetic Radiation – Effect of EMR on human body- definition of ionizing and nonionizing radiation - free radicals - Examples of Energy interactions with human body. [10 hrs]

	Examples of Energy interactions with human body - ACTIVE TRANSPORT- Antiport, symport - Comparing Facilitated Diffusion and Active Transport – OSMOSIS - Basic principle of an osmometer - Electro-chemical potential - Extracellular Fluid – Waves and Sound . [15 hrs]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	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 types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5.3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation
تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction of Biophysics.
Week 2	Atomic Structure
Week 3	Energy Interactions with human body
Week 4	MECHANISMS OF PASIVE AND ACTIVE TRANSPORT THROUGH THE MEMBRANES
Week 5	ELECTRICAL PROPERTIES OF BIOMEMBRANES
Week 6	Waves and Sound – Part 1
Week 7	Waves and Sound – Part 2
Week 8	Equilibrium and Stability
Week 9	Friction
Week 10	Translational Motion
Week 11	Elasticity and Strength of Materials
Week 12	Fluids
Week 13	The Motion of Fluids
Week 14	Heat and Kinetic Theory
Week 15	Thermodynamics
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Measurements of Body Mass Index (BMI)
Week 2	Lab 2: Measure a blood pressure using mercury sphygmomanometer
Week 3	Lab 3: Measure of blood mass in the body
Week 4	Lab 4: Determination of the energy content of food by combustion
Week 5	Lab 5: Stress level and HRV stress
Week 6	Lab 6: investigation of Archimedes principle
Week 7	Lab 7: Measurement of liquid density
Week 8	Lab 8: Speed of sound.
Week 9	Lab 9: Determination of frequency of tuning fork.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Medical Physics, by J. R. Cameron	Yes
Recommended Texts		
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)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – 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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	**Biology II**	**Module Delivery**	
Module Type	**Basic**	☒ Theory	
Module Code	MPH-123	☐ Lecture	
ECTS Credits	6	☒ Lab	
		☒ Tutorial	
SWL (hr/sem)	**150**	☐ Practical	
		☐ Seminar	
Module Level	1	**Semester of Delivery**	2
Administering Department	MPH	**College**	Applied Sciences-Heet
Module Leader	Ahmed Saadoun Jaloot Al-heety	**e-mail**	asjaloot@uoanbar.edu.iq
Module Leader's Acad. Title	Assistant Professor	**Module Leader's Qualification**	Ph.D.
Module Tutor	Ammar Abdul Razzaq Tawfiq	**e-mail**	ammarabta@uoanbar.edu.iq
Peer Reviewer Name	Marwan Mahmoud Saleh	**e-mail**	ah.marwan_bio@uoanbar.edu.iq
Scientific Committee Approval Date	/ / 2023	**Version Number**	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	MPH-114	**Semester**	1
Co-requisites module	None	**Semester**	

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Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

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Module Objectives

أهداف المادة الدراسية

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4. Introducing the student to how to examine organisms and tissues using a microscope, in addition to
5. introducing him to the microorganisms that are pathogenic to humans (how to write their scientific names), and
6. the diseases resulting from them.

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Module Learning Outcomes

مخرجات التعلم للمادة الدراسية

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16. Recognize how does the cell form tissues and organs.
17. List the various terms associated with cell.
18. Define the Cell Theory.
19. Define the basic parts of a cell.
20. How do the parts of a cell work together?
21. Describe each part of the cell separately.
22. How does The Cytoskeleton Supports Eukaryotic Cells?
23. Structures found in animal Cells but not in plant Cells.
24. Structures found in plant Cells but not in animal Cells.
25. Recognize how does Cell division & MITOSIS.
26. Recognize how does a cell cycle and MEIOSISI.
27. How can the student distinguish between MITOSIS and MEIOSISI?
28. Define the basic parts of a Bacterial cell.
29. Define the basic parts of a virus molecule.
30. How can the student distinguish between bacteria and viruses.

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Indicative Contents

المحتويات الإرشادية

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<u>**Part A - General introduction to Biology**</u>
Branches of Biology
General characteristics of prokaryotes, fungi ,Protista, Anamilia and Plantae
CLASSIFICATION OF ORGANISMS. [**15 hrs**]

Introduction to Cytology or Cell Biology. Cell membrane, Functions of the cell membrane [**15 hrs**]

Nucleus, Nuclear envelope and Chromosomes.
Nucleic acid as a Genetic Material, Gene, Genetic code. and Gene expression. [10 hrs]

Proteins, essential functions of proteins and Proteins Has Four Levels of Organization. The Cytoskeleton Supports Eukaryotic Cells.. [**15 hrs**]

Revision problem classes [**6 hrs**]

<u>**Part B - Cell division**</u>

Cell division & MITOSIS [**15 hrs**]
A Cell cycle and MEIOSISI. [**7 hrs**]
Bacteria, Shape & Size, Arrangement, Gram-staining characteristics, and Structure Of Bacterial Cell. Viruses, characteristics of Viruses and Viruses are said to have five specific properties that distinguish them from living cells. [**15 hrs**]

</td>
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</table>

Learning and Teaching Strategies	
استراتيجيات التعلم والتعليم	
Strategies	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 types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.7
Total SWL (h/sem) 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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	1hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Histology
Week 2	Introduction to Epithelial Tissue
Week 3	Main characteristics of the four basic types of tissues.
Week 4	Basement Membranes
Week 5	Specializations of the apical cell surface
Week 6	Types of epithelia. Covering or Lining Epithelia and Common types of covering epithelia
Week 7	Secretory Epithelia & Glands. Exocrine glands, Endocrine glands.
Week 8	Connective Tissue.
Week 9	Cells of Connective tissue.
Week 10	Functions of cells in Connective tissue proper..
Week 11	Fibers in Connective tissue.
Week 12	Types of Connective Tissue, Connective Tissue Proper, Classification of connective or supporting tissues
Week 13	Specialized connective tissue, Adipose Tissue, Cartilage and Bone.
Week 14	Muscle Tissue
Week 15	Nervous System
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)	
المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to CELL
Week 2	Lab 2: Introduction to Histology
Week 3	Lab 3: Epithelia and adjacent connective
Week 4	Lab 4: Histology
Week 5	Lab 5: Histology
Week 6	Lab 6: Histology
Week 7	Lab 7: Histology
Week 8	Lab 8: Histology
Week 9	Lab 9: Histology
Week 10	Lab 10: Histology

Week 11	Lab 11: Histology
Week 12	Lab 12: Histology
Week 13	Lab 13: Histology
Week 14	Lab 14: Histology

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Campbell**, N.A., Urry, L.A., Cain, M.L. and et al., (2021). **Biology**.12 ed.Pearson BenjaminCummings. SanFrancisco, USA.	Yes
Recommended Texts	**Mescher**, A.L. (2021). unqueira's Basic Histology.6th ed. McGraw-Hill Education, USA.	Yes
Websites	https://vetbooks.ir/?s=lippincott&fbclid=IwAR12okqcqBcCQorPjWFvbaOoLvqG5GjelDFl xNcB8jQyUnLk-ExQ0QgCr6I	

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)	**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

Module Information		
معلومات المادة الدراسية		

Module Title	**Thermodynamics**	Module Delivery
Module Type	**Core**	☒ Theory
Module Code	MPH-211	☐ Lecture ☒ Lab
ECTS Credits	5	☒ Tutorial
SWL (hr/sem)	125	☐ Practical ☐ Seminar

Module Level	2	Semester of Delivery	3
Administering Department	MPH	**College**	Applied Sciences-Heet
Module Leader	Ahmed A. Sarhan	**e-mail**	Aas_alhity@uoanbar.edu.iq
Module Leader's Acad. Title	Lect.	**Module Leader's Qualification**	Ph.D.
Module Tutor	N/A	**e-mail**	E-mail
Peer Reviewer Name		**e-mail**	E-mail
Scientific Committee Approval Date	/ /2023	**Version Number**	1.0

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

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	This class is an introduction to thermodynamics and statistical physics. The material is taught from the point of view of quantum mechanics from the very beginning, but the knowledge of quantum mechanics required of the student is in fact very slight. We will cover the fundamental topics of equilibrium thermodynamics -- entropy, temperature, energy, heat, reversible and irreversible processes -- and see applications to some simple systems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Statistical mechanics and thermodynamics are central to many applications of physics in the real world, and their use crosses many conceptual boundaries in physics and engineering. Students proficient in the concepts covered in this course will excel in their study of complex systems. The course provides three

	credits of physics. This course teaches students to: Identify, formulate and solve engineering and physics problems.
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	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 types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**125**		

Module Evaluation
تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Thermodynamics and statistical mechanics.
Week 2	Basic concepts of temperature, heat, entropy, equilibrium, reversible and irreversible processes.
Week 3	Applications to solids, liquids, and gases.

Week 4	Project 1 discussion
Week 5	Thermal equilibrium, zeroth law, thermometer, statistical definition of temperature
Week 6	Boltzmann distribution, applied to two-state systems.
Week 7	Midterm Exam
Week 8	Probability distribution, random variables, standard deviation, binormal and Gaussian distribution
Week 9	Kinetic theory of gases, Maxwell distribution, Gaussian integrals, effusion, transport.
Week 10	Thermodynamics
Week 11	Internal energy, the first law, heat and heat capacity, isothermal and adiabatic processes
Week 12	Project 2 discussion
Week 13	Ideal gas revisited. Thermal de Broglie wave length. Density of states.
Week 14	Classical stat mech. Harmonic oscillator. Equipartition theorem
Week 15	**Preparatory week before the final Exam**
Week 16	**Final Exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	*Concepts in Thermal Physics, 2nd Ed, by S. J. Blundell and K. M. Blundell (Oxford).* This is the text used at Oxford.	No
Recommended Texts	*An Introduction to Thermal Physics,* by D. Schroeder (Addison-Wesley), and *Fundamentals of Statistical and Thermal Physics,* by F. Reif (McGraw-Hill).	No
Websites	A class webpage with the syllabus and other information maintained at http://physics.nmsu.edu/~pate/teaching/phys480

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Mathematics 2	**Module Delivery**	
Module Type	Basic	☒ Theory	
Module Code	MPH-122	☐ Lecture ☐ Lab	
ECTS Credits	8	☒ Tutorial	
SWL (hr/sem)	200	☐ Practical ☐ Seminar	
Module Level	1	**Semester of Delivery**	2
Administering Department	MPH	**College**	Applied sciences- Heet
Module Leader	Ahmed T	**e-mail**	E-mail
Module Leader's Acad. Title	Lect.	**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	/ /2023	**Version Number**	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	MPH-113	**Semester**	1
Co-requisites module	None	**Semester**	

	Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية
Module Objectives أهداف المادة الدراسية	1. To develop problem solving skills and understanding of Ordinary differential Equations. 2. To understand Initial Conditions and Boundary Conditions, Homogeneous Equation and Exact Differential Equations. 3. This course deals with the basic concept of differential Equations with the methods for solving in different types. 4. This is the basic subject for all differential Equations. 5. To understand Initial Conditions and Boundary Conditions, Homogeneous Equation and Exact Differential Equations problems. 6. To perform and Solve the differential equation (D.E) by using the separating variables method and First-Order Differential Equations.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. understand differential Equations and how to connect with other application. 2. To be educated differential Equations. 3. General Solution: A general solution represents a family of functions that satisfy the differential equation. It contains one or more arbitrary constants, which can be determined by applying appropriate initial or boundary conditions. 4. Particular Solution: A particular solution is a specific function that satisfies the differential equation along with given initial or boundary conditions. It can be obtained by applying specific values to the arbitrary constants in the general solution. 5. For certain types of differential equations, it is important to determine if a solution exists and whether it is unique. The theory of differential equations provides conditions under which solutions exist and are unique within a given domain. Define Ohm's law. 6. Differential equations can be visualized using phase portraits, which plot the behavior of solutions in a multidimensional space. Phase portraits provide insights into the long-term behavior of a system and can help identify stable and unstable equilibria, limit cycles, and other dynamic phenomena.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. When studying differential equations (D.E.), the indicative contents typically include the following topics: Part A 1-Introduction to Differential Equations: Definition of a differential equation, order and degree of a differential equation, classification of differential equations (ordinary vs. partial), and examples illustrating the need for differential equations in various fields. First-Order Differential Equations: Solution techniques for first-order differential equations, including separable variables, exact equations, integrating factors, and

linear equations. Applications of first-order differential equations in growth and decay problems, population dynamics, and mixing problems. [15 hrs]

Second-Order Linear Differential Equations: Homogeneous and non-homogeneous linear differential equations of second order. Solution techniques, such as finding the complementary solution and particular solution, using the method of undetermined coefficients and variation of parameters. [15 hrs]

Higher-Order Linear Differential Equations: Extension of solution techniques to higher-order linear differential equations. Characteristic equation, roots, and general solutions. Applications in physics and engineering. [15 hrs]

Systems of Differential Equations: Introduction to systems of first-order differential equations. Solution techniques such as matrix methods, eigenvalues, and eigenvectors.

Revision problem classes [6 hrs]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	The primary tactic that will be used in the instruction of this module is going to be to emphasize the need of active engagement from the students in the exercises, while simultaneously honing and extending their capacity for critical thinking. This will be accomplished via the use of lectures, interactive tutorials, and discussion of various sorts of straightforward experiments that include certain sampling tasks that the students find fascinating.

Student Workload (SWL)
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5.3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	121	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	8.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**200**		

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

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	Mid-term Exam + Unit-Step Forcing, Forced Response, the RLC Circuit
Week 8	
Week 9	
Week 10	
Week 11	
Week 12	
Week 13	
Week 14	
Week 15	
Week 16	Preparatory week before the final Exam

	Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered	
Week 1		
Week 2		
Week 3		
Week 4		
Week 5		
Week 6		
Week 7		

	Learning and Teaching Resources مصادر التعلم والتدريس	
	Text	**Available in the Library?**
Required Texts		Yes
Recommended Texts		No
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)	**FX – Fail**	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – 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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Medical imaging	**Module Delivery**	
Module Type	**Core**	☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	MPH-221		
ECTS Credits	**6**		
SWL (hr/sem)	**150**		
Module Level	2	**Semester of Delivery**	4
Administering Department	MPH	**College**	Applied sciences – Heet
Module Leader	Yasser Yousef Ali	**e-mail**	yasirdr2003@gmail.com
Module Leader's Acad. Title	Lecturer	**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	/ /2023	**Version Number**	1.0

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

Module Aims, Learning Outcomes and Indicative Contents
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	1. The medical imaging course is determined according to the study plan prepared in the Department of Medical Physics. 2. The course aims to introduce the student to the general concepts of medical imaging and its importance and uses in various fields. 3. It also aims at a detailed study of the different types of medical imaging and its foundations. The course also aims to introduce the student to everything related to the subject.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. The student should know the general concepts of medical imaging. 2. To familiarize the student with the basics and rules of medical imaging. 3. That the student knows the basic principles and the importance of medical imaging.
Indicative Contents المحتويات الإرشادية	a- Methods of teaching and learning 1- Giving lectures. 2- Using the method of recitation, discussion and solving questions. 3- Giving assignments to students to strengthen them and prepare them for the final and final exams. b- Evaluation methods 1- Daily and monthly exams 2- Duties 3- In-class exercises

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	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 types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.7

Total SWL (h/sem) 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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	1hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction and principles in Radiology
Week 2	Radiology & Medical Imaging
Week 3	x-rays
Week 4	Properties of x-rays
Week 5	Fluoroscopy
Week 6	CT - computed tomography
Week 7	Magnetic resonance imaging 1
Week 8	First month exam
Week 9	Magnetic resonance imaging 2
Week 10	Peta scan
Week 11	Dexascan
Week 12	Ultrasound
Week 13	Second month exam
Week 14	Mamogram
Week 15	Doppler study

Week 16	Comprehensive review, applications and problem solving

Delivery Plan (Weekly Lab. Syllabus)	
المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	-----
Week 2	-----
Week 3	-----
Week 4	-----
Week 5	-----
Week 6	-----
Week 7	-----

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Textbook of Radiology and Imaging Vol. 1. Seven edition, David Sutton. 1-554. Churchill Livingstone. November 21, 2002**	No
Recommended Texts	**A Textbook of Radiology and Imaging,Vol. 2. Churchill Livingstone, Chicago University, 1980. 1-439. 2011**	No
Websites	https://www.amazon.com/Textbook-Radiology-Imaging-2-Set/dp/0443071098	

Grading Scheme				
مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
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	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
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Dr. Yasser Yousef Ali

11 / 6 / 2023

Module Description Form of Molecular Biophysics

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	**Molecular biophysics**		**Module Delivery**	
Module Type	**Core**		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ L Seminar	
Module Code	MPH-222			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	2	**Semester of Delivery**		4
Administering Department	MPH	**College**	Applied sciences-Heet	
Module Leader	Manaf A Guma	**e-mail**	manafguma@uoanabr.edu.iq	
Module Leader's Acad. Title	Ass. 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	/ /2023	**Version Number**	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	MPH-123	**Semester**	2
Co-requisites module	None	**Semester**	

	Module Aims, Learning Outcomes and Indicative Contents
	أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية
Module Objectives أهداف المادة الدراسية	The main **Objectives of this modules are:** The objectives of molecular biophysics involve studying the physical principles and mechanisms underlying biological processes at the molecular level. Some of the main module objectives of molecular biophysics include: 1. Understanding biomolecular structure: Molecular biophysics aims to investigate the three-dimensional structures of biological macromolecules such as proteins, nucleic acids, and lipids. This involves studying their conformation, folding, and interactions, and determining how these structures relate to their function. 2. Examining molecular interactions: Molecular biophysics explores the interactions between biomolecules, including protein-protein interactions, protein-ligand interactions, and nucleic acid interactions. It aims to understand the thermodynamics and kinetics of these interactions and their implications for cellular processes. 3. Investigating molecular dynamics: Molecular biophysics focuses on studying the dynamics and movements of biomolecules. This involves understanding how molecules change their conformations over time, how they interact with other molecules, and how these dynamics influence biological function. 4. Exploring energy transfer and conversion: Molecular biophysics aims to elucidate the processes by which energy is transferred and converted in biological systems. This includes understanding energy transfer in light-harvesting complexes, electron transfer in photosynthesis and respiration, and ATP synthesis in cellular respiration. 5. Investigating membrane biophysics: Molecular biophysics examines the properties and behavior of biological membranes. This includes studying the organization of lipids and proteins within membranes, understanding membrane transport mechanisms, and exploring how membrane properties influence cellular processes. 6. Applying biophysical techniques: Molecular biophysics involves the application of various experimental and computational techniques to investigate biological systems. These techniques include X-ray crystallography, nuclear magnetic resonance (NMR) spectroscopy, electron microscopy, fluorescence spectroscopy, molecular dynamics simulations, and computational modeling. 7. Bridging biology and physics: Molecular biophysics aims to integrate principles from physics, chemistry, and biology to understand the fundamental processes underlying life. It seeks to provide a quantitative and mechanistic understanding of biological phenomena, applying physical and mathematical models to explain experimental observations. By achieving these objectives, molecular biophysics contributes to our understanding of biological systems at a molecular level, enabling the development of new insights, technologies, and applications in areas such as drug discovery, bioengineering, and molecular medicine.
Module Learning Outcomes	The outcomes of this modules are to have ability to understand the following subject:

| مخرجات التعلم للمادة الدراسية | The learning outcomes of a module in molecular biophysics typically include acquiring knowledge and developing skills related to the field. Here are some common learning outcomes:

1. Understanding biomolecular structure: Students should be able to comprehend the principles and techniques used to determine the three-dimensional structures of biomolecules. They should be able to analyze and interpret structural data, including protein folding and nucleic acid conformation.

2. Analyzing molecular interactions: Students should gain knowledge of the different types of molecular interactions and their significance in biological systems. They should be able to analyze experimental data and explain the thermodynamics and kinetics of molecular interactions.

3. Exploring molecular dynamics: Students should develop an understanding of molecular dynamics simulations and their application in studying the movements and conformational changes of biomolecules. They should be able to interpret simulation results and relate them to biological function.

4. Investigating energy transfer and conversion: Students should comprehend the principles and mechanisms of energy transfer and conversion in biological systems. They should be able to explain how energy is harvested and utilized in processes such as photosynthesis and cellular respiration.

5. Analyzing membrane biophysics: Students should gain knowledge of the properties and behavior of biological membranes. They should be able to analyze and interpret experimental data related to membrane structure, dynamics, and transport.

6. Applying biophysical techniques: Students should acquire practical skills in using biophysical techniques such as X-ray crystallography, NMR spectroscopy, and fluorescence spectroscopy. They should be able to design experiments, collect and analyze data, and interpret the results.

7. Integrating biology and physics: Students should be able to bridge the gap between biology and physics by applying physical and mathematical principles to explain biological phenomena. They should develop critical thinking and problem-solving skills to analyze complex biological systems.

8. Communication and scientific literacy: Students should be able to effectively communicate scientific concepts and findings related to molecular biophysics. They should develop skills in scientific writing, data presentation, and oral communication.

9. Ethical considerations: Students should be aware of the ethical implications and societal impacts of molecular biophysics research. They should understand the responsible conduct of research and the ethical considerations associated with the use of biological materials and techniques.

Overall, the learning outcomes of a molecular biophysics module aim to provide students with a strong foundation in the principles, techniques, and applications |

	of molecular biophysics, enabling them to contribute to advancements in the field and pursue further research or careers in related areas.

Indicative Contents
مضمون المحتويات
	Indicative content includes the following.
	
	The indicative contents of a molecular biophysics module may vary depending on the specific curriculum and level of the course. However, here are some common topics and areas that are often covered in molecular biophysics:
	
	1. Biomolecular structure:
	  - Protein structure: primary, secondary, tertiary, and quaternary structures; protein folding and stability.
	  - Nucleic acid structure: DNA and RNA structure, base pairing, and secondary structures.
	  - Lipid structure and membrane organization.
	
	2. Molecular interactions:
	  - Non-covalent interactions: hydrogen bonding, electrostatic interactions, hydrophobic interactions, and van der Waals forces.
	  - Protein-protein interactions: binding kinetics, protein complexes, and protein aggregation.
	  - Protein-ligand interactions: enzyme-substrate interactions, drug-protein interactions, and receptor-ligand binding.
	
	3. Molecular dynamics:
	  - Molecular dynamics simulations: principles, force fields, and simulation techniques.
	  - Protein dynamics: conformational changes, molecular flexibility, and allosteric regulation.
	  - Nucleic acid dynamics: DNA and RNA dynamics, molecular recognition, and helix-coil transitions.
	
	4. Energy transfer and conversion:
	  - Photosynthesis: light-harvesting complexes, energy transfer, and electron transport.
	  - Respiration: electron transport chain, ATP synthesis, and proton gradients.
	  - Molecular motors: molecular machines, motor proteins, and ATP-dependent movement.
	
	5. Membrane biophysics:
	  - Lipid bilayers: fluidity, permeability, and lipid-protein interactions.
	  - Membrane transport: ion channels, transporters, and facilitated diffusion.
	  - Membrane signaling: receptor-ligand interactions, signal transduction, and membrane receptors.
	
	6. Biophysical techniques:
	  - X-ray crystallography: principles, data collection, and structure determination.
	  - Nuclear magnetic resonance (NMR) spectroscopy: principles, multidimensional NMR, and structural analysis.
	  - Fluorescence spectroscopy: principles, fluorescence probes, and protein-ligand binding studies.

	- Electron microscopy: principles, sample preparation, and imaging of biomolecules.
	
	7. Integration of biology and physics:
	  - Statistical mechanics: principles and application to biological systems.
	  - Molecular modeling: computational methods, molecular docking, and molecular dynamics simulations.
	  - Biophysical principles in biological processes: enzyme kinetics, thermodynamics, and transport phenomena.
	
	8. Case studies and applications:
	  - Protein structure-function relationships.
	  - Drug discovery and design.
	  - Biomolecular engineering and nanotechnology.
	  - Biophysical techniques in medical diagnostics and imaging.
	
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Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	Learning and teaching strategies in Biochemistry aim to engage students in active learning, facilitate understanding of complex concepts, and develop critical thinking skills. Here are some common learning and teaching strategies employed in Basic Biochemistry courses: 1. Lectures: Lectures are often used to deliver foundational knowledge and concepts in biochemistry. They provide an overview of the topics, explain key principles, and highlight important details. Lectures may be supplemented with visual aids, such as slides or multimedia presentations, to enhance understanding. 2. Laboratory Work: Laboratory sessions allow students to apply theoretical knowledge to practical situations. They provide hands-on experience with biochemical techniques, data collection, analysis, and interpretation. Lab work may involve experiments related to biomolecule analysis, enzyme kinetics, or metabolic pathways. 3. Problem-solving Exercises: Problem-solving exercises and case studies help students apply their knowledge to real-life scenarios. They encourage critical thinking and problem-solving skills by presenting biochemical problems or experimental data for analysis and interpretation. Students may work individually or in groups to find solutions and explain their reasoning. 4. Interactive Discussions: Interactive discussions, such as small group discussions or classroom debates, promote active learning and peer-to-peer interaction. They allow students to ask questions, clarify doubts, and engage in meaningful discussions about biochemical concepts, experiments, or applications.

5. Concept Mapping: Concept mapping is a visual learning tool that helps students organize and connect different biochemical concepts. It involves creating diagrams or mind maps that illustrate the relationships between different biomolecules, metabolic pathways, or cellular processes. Concept maps can aid in understanding the "big picture" and identifying the interconnections within biochemistry.

6. Multimedia Resources: Incorporating multimedia resources, such as videos, animations, and interactive simulations, can enhance students' engagement and understanding of complex biochemical processes. These resources can visually illustrate molecular structures, enzyme kinetics, or cellular processes, making them more accessible and memorable.

7. Collaborative Learning: Collaborative learning activities, such as group projects or problem-solving tasks, encourage students to work together to solve biochemical problems or complete assignments. This fosters teamwork, communication, and the exchange of ideas, allowing students to learn from each other's perspectives and experiences.

8. Assessments: Assessments, such as quizzes, exams, and assignments, evaluate students' understanding and knowledge retention. They provide feedback on individual progress and help identify areas that require further review or clarification. Assessments may include multiple-choice questions, problem-solving tasks, or short essay questions.

9. Online Resources: Utilizing online resources, such as virtual labs, interactive tutorials, or online discussion forums, can provide additional learning opportunities outside of the classroom. These resources offer flexibility and accessibility, allowing students to review content at their own pace and seek additional support when needed.

10. Real-world Applications: Relating biochemistry concepts to real-world applications, such as medical advancements, biotechnology, or environmental issues, can enhance students' motivation and understanding. Exploring the practical relevance of biochemistry concepts helps students appreciate the significance of their learning and its impact in various fields.

These strategies aim to create an active and engaging learning environment that promotes understanding, critical thinking, and application of biochemistry principles. The specific strategies employed may vary based on the teaching style, course format, and resources available to the instructor.

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

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

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	مدخل الى الفيزياء الحيوية والجزيء الحيوي introduction to Biophysics& Biomolecules
Week 2	تعبير الجينات Expression of Genes
Week 3	تنقية البروتين Protein purification
Week 4	تحليل نقاوة البروتين purification analysis
Week 5	بلورة البروتين Protein Crystallization
Week 6	الرنين النووي المغناطيسي للبروتين Protein NMR
Week 7	Mid exam

Week 8	البصريات: الامتصاص Optical spectroscopic: Absorbance
Week 9	التألق Fluorescence
Week 10	الحركيات kinetics
Week 11	حركيات البروتين Proteins kinetics
Week 12	تشخيص البروتينات الثانوية Circular dichroism
Week 13	المجهر الإلكتروني Electronic microscopic
Week 14	الثرمودايميك في النظام البيولوجي Thermodynamic of the biological system
Week 15	طيف الكتلة Mass spectroscopy
Week 16	Final exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Biochemistry books: Color atlas of biochemistry Biophysical chemistry Physical chemistry Biomolecules	**Available** Online
Recommended Texts	Color atlas of biochemistry and biophysics Protein structure and function	Yes
Websites	Any website	

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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	F – Fail	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	Optics	**Module Delivery**	
Module Type	**Core**	☒ Theory ☐ Lecture ☒ L lab ☒ Tutorial ☐ L Practical ☐ Seminar	
Module Code	MPH-212		
ECTS Credits	**5**		
SWL (hr/sem)	**125**		
Module Level	2	**Semester of Delivery**	3
Administering Department	MPH	**College**	Applied sciences - Heet
Module Leader	Dr.Nasrin Nadher Jamil	**e-mail**	nasrin32jamil@gmail.com
Module Leader's Acad. Title	Lect.	**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	/ /2023	**Version Number**	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	MPH-121	**Semester**	2
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	6. This course deals with the basic concept of optics physics to understand the applications of optics in medcine. 7. To develop problem solving skills that dealing with the work of optical medical devices. 8. To understand how the principles of optics physics are applied within the human body. 9. Develop a physical explanation of optics. 10. Clarifying the relationship between the optics and its applications and different fields of medicine
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 14. Explain the meaning of EM and light. 15. Explain the atomic structure of matter. 16. Summarize what is meant by optics. 17. Discuss the major principles of light and optics. 18. Describe light absorbance by molecules. 19. Define optics and its types. 20. Discuss the effect of light on molecules inside body. 21. Discuss the relation between optics and the work of some medical devices. 22. Discuss the laws of optics. 23. Define some of optics applications in medicine.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Introduction of LASER What is LASER?- IMPORTANCE OF LASER.- What Do LASER Do?- CONCEPT OF UNIT - Fundamental and derived units in laser - SYSTEMS OF UNITS – Physical Quantities- Atomic Structure - Bonding between atoms .[15 hrs] Laser tissues Interaction– Laser Eye surgery (Part 1) - Laser Eye surgery (Part 2) - Molecular transduction of energy. [15 hrs] Laser Lithotripsy – Laser in Cancer treatment- Laser in Dentistry1 - Laser in Dermatology- Laser in Dentistry 2. [10 hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	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 types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5.3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Nature and propagation of light.
Week 2	The Electromagnetic Spectrum
Week 3	Refractive Index

Week 4	Fermat's Principle.
Week 5	Critical Angle and Total Internal Reflection
Week 6	Refraction by prism
Week 7	Dispersion
Week 8	Reflection and refraction at spherical surfaces
Week 9	GRAPHICAL CONSTRUCTIONS. THE PARALLEL-RAY METHOD
Week 10	The magnification
Week 11	Lenses
Week 12	Image Formation.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	INTERFERENCE FROM A DOUBLE SLIT AND RESOLVING POWER OF THE HUMAN EYE
Week 2	NEWTON'S RINGS
Week 3	DIFFRACTION
Week 4	SPECTROMETER
Week 5	Diffraction grating and spectroscopy
Week 6	Abbe refractometer

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1- Fundamental of optics by [Jenkins and white] 2- Introduction to modern optics by [Grant R. Fowles]	Yes
Recommended Texts		
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)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – 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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	**Organic chemistry**	**Module Delivery**	
Module Type	**Basic**	☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	MPH-126		
ECTS Credits	5		
SWL (hr/sem)	**125**		
Module Level	2	**Semester of Delivery**	3
Administering Department	MPH	**College**	Applied sciences -Heet
Module Leader	Rasim Farraj Muslim	**e-mail**	Dr.rasim92hmts@uoanbar.edu.iq
Module Leader's Acad. Title	Assistant 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	/ /2023	**Version Number**	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	MPH-112	**Semester**	1
Co-requisites module	None	**Semester**	

	Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	

Module Objectives أهداف المادة الدراسية	4. The chemistry of organic compounds course is determined according to the study plan prepared in the Medical Physics Department. 5. The course aims to introduce the student to the general concepts of the organic compounds and their importance and uses in various fields. 6. It also aims at a detailed study of the different structural compositions and naming principles for the compounds of organic chemistry, by focusing on the compounds. And help the student to know the composition of these substances, including drugs, and to know how interactions occur and the mechanism of interaction.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	- The student should know the general concepts of the compounds of the organic chemistry curriculum. - That the student is acquainted with the basics and rules of naming, different structural structures and physical properties, and focuses on the same different rings for their vital activity, and recognizes their physical and chemical properties, and that the student distinguishes between the different structural structures. - That the student knows the basic principles of preparation methods - To familiarize the student with the different bases of their interactions. - That the student is aware of the importance of these compounds and their applications.
Indicative Contents المحتويات الإرشادية	a- Methods of teaching and learning 1- Giving lectures. 2- Using the method of recitation, discussion and solving questions. 3- Giving assignments to students to strengthen them and prepare them for the final and final exams. b- Evaluation methods 1- Daily and monthly exams 2- Duties 3- In-class exercises

	Learning and Teaching Strategies استراتيجيات التعلم والتعليم	

Strategies	**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 types of simple experiments involving some sampling activities that are interesting to the students.**

Student Workload (SWL)

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**200**		

Module Evaluation
تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction and principles in organic techniques
Week 2	Chemistry of carbon and hydrogen compounds
Week 3	Concept of energy
Week 4	Organic formulations
Week 5	Reaction relationship and physical properties of organic compounds
Week 6	Alkanes
Week 7	Alkenes
Week 8	First month exam
Week 9	Alkynes

Week 10	Alcohols and phenols
Week 11	Ethers
Week 12	Carbonyl compounds
Week 13	Second month exam
Week 14	Amine derivatives
Week 15	Basic principles in the techniques of organic preparations
Week 16	Comprehensive review, applications and problem solving

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Melting point
Week 2	Boiling point
Week 3	Distillation
Week 4	Extraction
Week 5	Detection of organic compounds
Week 6	Detection of alcoholic compounds
Week 7	Chromatography methods

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**Organic Chemistry**, 6th Edition. Robert T. **Morrison**. 4.3 out of 5 stars 70 ; **Organic Chemistry**, 7th Edition ; **Organic Chemistry** Fundamentals (Quick Study Academic).	Yes
Recommended Texts	**Introductory Organic Chemistry and Hydrocarbons A Physical Chemistry Approach.** 1st Edition. By Caio Lima Firme. Copyright 2020.	No
Websites	https://www.amazon.com/Organic-Chemistry-Morrison-Boyd/dp/8131704815	

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
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	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
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Assist. Prof. Dr. Rasim Farraj Muslim

3 / 6 / 2023

MODULE DESCRIPTION FORM of Physiology

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	**Physiology**	**Module Delivery**	
Module Type	**Basic**	☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	MPH-214		
ECTS Credits	5		
SWL (hr/sem)	**125**		
Module Level	2	**Semester of Delivery**	3
Administering Department		**College**	
Module Leader	Marwan Mahmood Saleh	**e-mail**	ah.marwan_bio@uoanabr.edu.iq
Module Leader's Acad. Title	Ass. 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	/ /2023	**Version Number**	1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	MPH-123	**Semester**	2
Co-requisites module		**Semester**	

	Module Aims, Learning Outcomes and Indicative Contents
	أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية
Module Objectives أهداف المادة الدراسية	1. Basic concept and knowledge of structure and functioning of different systems in body. 2. To understand integrated aspect of functioning of the individual and all the systems in totality in body. 3. To understand the integration of the combined knowledge of Physiology and Anatomy. 4. To know all the common clinical conditions of deranged normal physiology in body - clinical usefulness for knowing Physiology. 5. To be able to solve simple clinical problems with the help of their knowledge in Physiology. 6. To promote and inculcate curiosity and skill for elective learning in the field of research. 7. Basic exposure to some necessary clinical departments and Clinical tests laboratories for horizontal and vertical integration for early clinical exposure and to witness theoretical knowledge. These objectives provide a broad overview of the topics typically covered in a Basic physiology 1 module, but the specific content and emphasis may vary from course to course.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	At the end of the module, learners will be expected to: A1. Define the organisation of the body A2. Outline the main anatomical systems within the body, their structures, physiology and function to include, the muscular, skeletal, cardiovascular, lymphatic, nervous, urinary, digestive, reproductive, endocrine, respiratory and Integumentary system A3. Analyse the effects of postural deviations on human function A4. Describe pathology for each system of the human body. A5. Explain the physiological and psychological effects of complementary therapies
Indicative Contents مضمون المحتويات	Indicative content includes the following. The indicative contents of physiology may vary depending on the specific course or educational institution. However, here are some common topics and areas of study that are typically covered in physiology course: 1. Describe the anatomical regions and planes of the body 2. Describe the chemical organisation of the body 3. Describe the structure, function and types of cell 4. Explain the structure, function, growth and repair of the integumentary system 5. Explain the structure, function and growth of the skeletal system and associated parts 6. Explain the structure, function, growth and repair of the muscular system

	7. Explain the location and action of muscle groups within the muscular system
	8. Describe the structure and function of each component of the nervous system
	9. Explain the structure and function of the endocrine system to include each endocrine gland
	10. Explain the structure, function and processes of the respiratory system
	11. Explain the structure and function of the cardiovascular system and its associated parts
	12. Define blood pressure and Explain the factors that affect blood pressure
	13. Explain the structure and function of the lymphatic system and its associated parts
	14. Explain the principles of immunity
	15. Explain the structure, function and processes of the digestive system
	16. Explain the structure, function and processes of the urinary system

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	Learning and teaching strategies in physiology aim to engage students in active learning, facilitate understanding of complex concepts, and develop critical thinking skills. Here are some common learning and teaching strategies employed in physiology courses:

1. Lectures: Lectures are often used to deliver foundational knowledge and concepts in physiology. They provide an overview of the topics, explain key principles, and highlight important details. Lectures may be supplemented with visual aids, such as slides or multimedia presentations, to enhance understanding.

2. Laboratory Work: Laboratory sessions allow students to apply theoretical knowledge to practical situations. They provide hands-on experience with lab. techniques, data collection, analysis, and interpretation. Lab work may involve experiments related to pathological analysis.

3. Problem-solving Exercises: Problem-solving exercises and case studies help students apply their knowledge to real-life scenarios. They encourage critical thinking and problem-solving skills by presenting physiological problems or experimental data for analysis and interpretation. Students may work individually or in groups to find solutions and explain their reasoning.

4. Interactive Discussions: Interactive discussions, such as small group discussions or classroom debates, promote active learning and peer-to-peer interaction. They allow students to ask questions, clarify doubts, and engage in meaningful discussions about physiological concepts, experiments, or applications. |

6. Multimedia Resources: Incorporating multimedia resources, such as videos, animations, and interactive simulations, can enhance students' engagement and understanding of complex physiological processes. These resources can visually illustrate molecular structures, enzyme kinetics, or cellular processes, making them more accessible and memorable.

7. Collaborative Learning: Collaborative learning activities, such as group projects or problem-solving tasks, encourage students to work together to solve physiological problems or complete assignments. This fosters teamwork, communication, and the exchange of ideas, allowing students to learn from each other's perspectives and experiences.

8. Assessments: Assessments, such as quizzes, exams, and assignments, evaluate students' understanding and knowledge retention. They provide feedback on individual progress and help identify areas that require further review or clarification. Assessments may include multiple-choice questions, problem-solving tasks, or short essay questions.

9. Online Resources: Utilizing online resources, such as virtual labs, interactive tutorials, or online discussion forums, can provide additional learning opportunities outside of the classroom. These resources offer flexibility and accessibility, allowing students to review content at their own pace and seek additional support when needed.

10. Real-world Applications: Relating physiology concepts to real-world applications, such as medical advancements, biotechnology, or environmental issues, can enhance students' motivation and understanding. Exploring the practical relevance of physiology concepts helps students appreciate the significance of their learning and its impact in various fields.

These strategies aim to create an active and engaging learning environment that promotes understanding, critical thinking, and application of physiology principles. The specific strategies employed may vary based on the teaching style, course format, and resources available to the instructor.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	anatomical regions and planes of the body
Week 2	chemical organisation of the body
Week 3	structure, function and types of cell
Week 4	the integumentary system
Week 5	skeletal system and associated parts
Week 6	muscular system
Week 7	the location and action of muscle
Week 8	nervous system
Week 9	endocrine gland
Week 10	respiratory system

Week 11	cardiovascular system
Week 12	blood pressure
Week 13	lymphatic system
Week 14	principles of immunity
Week 15	digestive system
Week 16	urinary system

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to the physiology lab (Rules for laboratory experiments, laboratory Safety Signs/Labels and laboratory reports).
Week 2	Sample collection and preservation
Week 3	anthropometric measurements
Week 4	Osmosis Across Plasma Membrane
Week 5	Bleeding time and clotting time
Week 6	Blood Pressure
Week 7	Cardiovascular effects of exercise
Week 8	Electrocardiogram and heart sounds
Week 9	Midterm Exam
Week 10	Clinical examination of vision
Week 11	Pancreas function and insulin shock
Week 12	Body fluids
Week 13	Urinalysis (Physical characteristics)
Week 14	Urinalysis (chemical characteristics)
Week 15	Revision

<table>
<tr><th colspan="3">Learning and Teaching Resources
مصادر التعلم والتدريس</th></tr>
<tr><td></td><td>Text</td><td>Available in the Library?</td></tr>
<tr><td>Required Texts</td><td>Guyton and Hall Textbook of Medical Physiology
Principles of Anatomy and Physiology 15th edition</td><td>Available Online</td></tr>
<tr><td>Recommended Texts</td><td>Color atlas of physiology</td><td>No</td></tr>
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<tr><th colspan="5">Grading Scheme
مخطط الدرجات</th></tr>
<tr><td>Group</td><td>Grade</td><td>التقدير</td><td>Marks %</td><td>Definition</td></tr>
<tr><td rowspan="5">Success Group (50 - 100)</td><td>A - Excellent</td><td>امتياز</td><td>90 - 100</td><td>Outstanding Performance</td></tr>
<tr><td>B - Very Good</td><td>جيد جدا</td><td>80 - 89</td><td>Above average with some errors</td></tr>
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<tr><td rowspan="2">Fail Group (0 – 49)</td><td>FX – Fail</td><td>راسب (قيد المعالجة)</td><td>(45-49)</td><td>More work required but credit awarded</td></tr>
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</table>

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MODULE DESCRIPTION FORM of Biochemistry

نموذج وصف المادة الدراسية

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<tr><td colspan="4" align="center">Module Information
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<td>Applied sciences-Heet</td>
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<tr>
<td>Module Leader</td>
<td>Manaf A Guma</td>
<td>e-mail</td>
<td>manafguma@uoanabr.edu.iq</td>
</tr>
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<td>Module Leader's Qualification</td>
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<tr>
<td>Module Tutor</td>
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<tr>
<td>Peer Reviewer Name</td>
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العلاقة مع المواد الدراسية الأخرى</td></tr>
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<td>Semester</td>
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</table>

	Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية
Module Objectives أهداف المادة الدراسية	The module objectives of Basic Biochemistry 1 may vary depending on the specific course or educational institution. However, here are some common objectives that are typically covered in a Basic Biochemistry 1 module: 1. Introduction to Biochemistry: Understand the scope, importance, and basic principles of biochemistry as a scientific discipline. 2. Structure and Function of Biomolecules: Explore the structure, properties, and functions of biomolecules, including proteins, carbohydrates, lipids, and nucleic acids. 3. Protein Structure and Function: Learn about the primary, secondary, tertiary, and quaternary structure of proteins and the relationship between structure and function. Understand protein folding, enzymes, and enzyme kinetics. 4. Enzymes. 5. Hormones. 6. Vitamins and Minerals. These objectives provide a broad overview of the topics typically covered in a Basic Biochemistry 1 module, but the specific content and emphasis may vary from course to course.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The outcomes of this modules are to have ability to understand the following subject: 1. Protein Structure and Function: Learn about the primary, secondary, tertiary, and quaternary structure of proteins and the relationship between structure and function. Understand protein folding, enzymes, and enzyme kinetics. 2. Carbohydrate Metabolism: Study the metabolism of carbohydrates, including glycolysis, gluconeogenesis, glycogen metabolism, and the regulation of blood sugar levels. 3. Lipid Metabolism: Explore the metabolism of lipids, including fatty acid oxidation, lipogenesis, cholesterol metabolism, and the role of lipids in cellular membranes. 4. Nucleic Acids and DNA Replication: Understand the structure and function of nucleic acids, including DNA and RNA. Learn about DNA replication, transcription, and translation.

	5. Bioenergetics and Metabolism: Gain an understanding of the principles of bioenergetics and the metabolism of major biomolecules. Learn about ATP production, oxidative phosphorylation, and the regulation of metabolism. 5. Integration of Metabolic Pathways: Study the integration and coordination of different metabolic pathways in the cell. Understand how cells regulate metabolic processes to maintain homeostasis. 6. Techniques in Biochemistry: Familiarize yourself with common laboratory techniques used in biochemistry, such as chromatography, electrophoresis, spectrophotometry, and molecular biology techniques. 7. Biochemical Techniques and Applications: Learn about the applications of biochemistry in various fields, including medicine, biotechnology, pharmacology, and environmental science.
Indicative Contents مضمون المحتويات	Indicative content includes the following. The indicative contents of Basic Biochemistry may vary depending on the specific course or educational institution. However, here are some common topics and areas of study that are typically covered in a Basic Biochemistry course: 1. Introduction to Biochemistry: - Definition and scope of biochemistry - Historical overview of biochemistry - Importance and applications of biochemistry 2. Biomolecules: - Structure, properties, and functions of proteins - Structure, properties, and functions of carbohydrates - Structure, properties, and functions of lipids - Structure, properties, and functions of nucleic acids 3. Protein Structure and Function: - Primary, secondary, tertiary, and quaternary structure of proteins - Protein folding and stability - Enzymes and enzyme kinetics - Regulation of enzyme activity 4. Carbohydrate classifications and reactions: 5.Enzymes 6.Hormones: 7.Vitamins and Minerals

	Learning and Teaching Strategies استراتيجيات التعلم والتعليم
Strategies	Learning and teaching strategies in Basic Biochemistry aim to engage students in active learning, facilitate understanding of complex concepts, and develop critical thinking skills. Here are some common learning and teaching strategies employed in Basic Biochemistry courses: 1. Lectures: Lectures are often used to deliver foundational knowledge and concepts in biochemistry. They provide an overview of the topics, explain key principles, and highlight important details. Lectures may be supplemented with visual aids, such as slides or multimedia presentations, to enhance understanding. 2. Laboratory Work: Laboratory sessions allow students to apply theoretical knowledge to practical situations. They provide hands-on experience with biochemical techniques, data collection, analysis, and interpretation. Lab work may involve experiments related to biomolecule analysis, enzyme kinetics, or metabolic pathways. 3. Problem-solving Exercises: Problem-solving exercises and case studies help students apply their knowledge to real-life scenarios. They encourage critical thinking and problem-solving skills by presenting biochemical problems or experimental data for analysis and interpretation. Students may work individually or in groups to find solutions and explain their reasoning. 4. Interactive Discussions: Interactive discussions, such as small group discussions or classroom debates, promote active learning and peer-to-peer interaction. They allow students to ask questions, clarify doubts, and engage in meaningful discussions about biochemical concepts, experiments, or applications. 5. Concept Mapping: Concept mapping is a visual learning tool that helps students organize and connect different biochemical concepts. It involves creating diagrams or mind maps that illustrate the relationships between different biomolecules, metabolic pathways, or cellular processes. Concept maps can aid in understanding the "big picture" and identifying the interconnections within biochemistry. 6. Multimedia Resources: Incorporating multimedia resources, such as videos, animations, and interactive simulations, can enhance students' engagement and understanding of complex biochemical processes. These resources can visually illustrate molecular structures, enzyme kinetics, or cellular processes, making them more accessible and memorable. 7. Collaborative Learning: Collaborative learning activities, such as group projects or problem-solving tasks, encourage students to work together to solve biochemical problems or complete assignments. This fosters teamwork, communication, and the

exchange of ideas, allowing students to learn from each other's perspectives and experiences.

8. Assessments: Assessments, such as quizzes, exams, and assignments, evaluate students' understanding and knowledge retention. They provide feedback on individual progress and help identify areas that require further review or clarification. Assessments may include multiple-choice questions, problem-solving tasks, or short essay questions.

9. Online Resources: Utilizing online resources, such as virtual labs, interactive tutorials, or online discussion forums, can provide additional learning opportunities outside of the classroom. These resources offer flexibility and accessibility, allowing students to review content at their own pace and seek additional support when needed.

10. Real-world Applications: Relating biochemistry concepts to real-world applications, such as medical advancements, biotechnology, or environmental issues, can enhance students' motivation and understanding. Exploring the practical relevance of biochemistry concepts helps students appreciate the significance of their learning and its impact in various fields.

These strategies aim to create an active and engaging learning environment that promotes understanding, critical thinking, and application of biochemistry principles. The specific strategies employed may vary based on the teaching style, course format, and resources available to the instructor.

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation				
تقييم المادة الدراسية				
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7

	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	1hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to biochemistry and living cells
Week 2	Carbohydrates classification and reactions
Week 3	Mono-Carbohydrates
Week 4	di- Carbohydrates
Week 5	Poly- Carbohydrates
Week 6	Amino acids
Week 7	Proteins and peptides
Week 8	1st exam
Week 9	Enzymes
Week 10	Lipids
Week 11	Fatty acids
Week 12	Nucleic acids DNA and RNA
Week 13	Hormones
Week 14	Vitamins
Week 15	Minerals and trace elements
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Buffer and solutions preparations
Week 2	Molish test
Week 3	Fehling test
Week 4	Benedict test

Week 5	Ozasone formation
Week 6	Iodine test and Unknown test
Week 7	Ninhydrin test and Xanthoproteic test
Week 8	Sakaguchi test
Week 9	Milon test
Week 10	Protein test
Week 11	Solubility test of lipids
Week 12	Saponification test
Week 13	Acrolein test
Week 14	Enzymes test
Week 15	Vitamin C test

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Biochemistry books: Harper. Lippincott Color atlas of biochemistry	**Available** Online
Recommended Texts	Color atlas of biochemistry	No
Websites	Any website	

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)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – 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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Biostatics		**Module Delivery**	
Module Type	Basic		☒ Theory	
Module Code	MPH-321		☐ Lecture ☒ Lab	
ECTS Credits	4		☒ Tutorial	
SWL (hr/sem)	100		☐ Practical ☐ Seminar	
Module Level	3	**Semester of Delivery**		6
Administering Department	Medical Physics	**College**	Applied Sciences-Heet	
Module Leader	Rabah Salim Shareef	**e-mail**	eq.rabah.s.shareef@uoanbar.edu.iq	
Module Leader's Acad. Title	Asset. Professor	**Module Leader's Qualification**	Ph.D.	
Module Tutor	None	**e-mail**	E-mail	
Peer Reviewer Name		**e-mail**	E-mail	
Scientific Committee Approval Date	/ /2023	**Version Number**	1.0	

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

	Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Upon completion of the course the learner is expected to do the following: 1. design research questions; 2. distinguish qualitative and quantitative data; 3. Evaluate strength of different biological experimental designs; and 4. Evaluate different data analysis methods;	
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Upon successful completion of the course the learner will be able to: 1. Knowledge of the basics of biological tests 2. Know the importance of health and vital data 3. Know how to collect data and samples 4. analyze different experimental designs for generation of qualitative and quantitative data; 5. design research hypotheses and generate appropriate data; and 6. generated data to appropriate statistical analysis and give relevant interpretation to the output	
Indicative Contents المحتويات الإرشادية	This course explores the meaning of statistics. It introduces students to some basic terms like variable, continuous variable, discrete or discontinuous variables population, sample, histogram, frequency, classes, class interval and frequency distribution; a distribution in statistical terms: mode, median, mean; measuring the spread of a distribution: range, semi interquartile range, mean deviation, variance, standard deviation; samples and populations: probability and the normal distribution curve, distribution of t, calculating the limits of a mean; and comparing the means of two samples: null hypothesis, alternate hypothesis, differences between standard deviations, limits for standard deviation and variance. The course also examines a comparison of three or more samples: simple analysis of variance; correlation of two variables: scatter diagram, correlation coefficient, regression lines, mean center; and chi-square test: the 2x2 contingency table. Learners are taken through planning experiments: layout of experiments, controls, precision of measurements, number of replicates, randomization, Latin squares, and interaction.	

	Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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 types of simple experiments involving some sampling activities that are interesting to the students.	

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5.3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	21	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

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

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	INTRODUCTON TO BIOSTATISTICS: Meaning of biostatistics - Types of variables - Population and samples (Populations, Samples from populations, Random sampling, Parameters and statistics)
Week 2	Data Collection: (Sources of statistical data, The sources of medical data , Methods of data collection , Sampling Method , Methods of ensuring sample representation of the original population)
Week 3	PRESENTATION OF BIOLOGICAL DATA: (Frequency distribution)
Week 4	Graphical presentation: (Bar Charts, Histogram, Frequency polygon, Cumulative Frequency Polygon, The Pie Chart)
Week 5	PROBABILITY AND STATISTICS: 1- Probability (Laws of probability: Counting possible outcomes, Probability of an event, adding probabilities, Multiplying probabilities) – 2- Permutation and combinations: (Permutations, Combinations)
Week 6	NORMAL DISTRIBUTION: (Symmetry and Kurtosis • Proportions of normal distribution • The distribution of means • Statistical hypothesis testing • Assessing departures from normality)

Week 7	BIONOMIAL AND POISSON DISTRIBUTION: (• Binomial distribution • Poisson distribution)
Week 8	STANDRAD ERROR AND CONFIDENCE INTERVAL: (• Standard error • Confidence interval)
Week 9	HYPOTHESIS TESTING: (• Null hypothesis and alternative hypotheses • The standard format for hypothesis testing)
Week 10	THE t- DISTRIBUTION: One group of observations (or one sample test) • Two independent group of observation (Variances not known; Variances known)
Week 11	THE CHI-SQUARE DISTRIBUTION: Ch-Square X^2
Week 12	Correlation Analysis: (Types of correlation , Measuring Correlation , Simple correlation coefficient , Multiple correlation coefficient , Partial Correlation)
Week 13	Regression Analysis: (The importance of regression analysis , The importance of , regression analysis , Simple linear Regression Analysis , Simple Regression Model , Multiple liner regression)
Week 14	ANALYSIS OF VARIANCE: One-way (Single factor) ANOVA
Week 15	ANALYSIS OF VARIANCE: Two-way (factor) ANOVA
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Introductory Biostatistics for the Health Sciences	No
Recommended Texts	Techniques of Medical and Biological Statistics, 2021	No
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

<table>
<tr><td colspan="4" align="center">Module Information</td></tr>
<tr><td colspan="4" align="center">معلومات المادة الدراسية</td></tr>
<tr><td>Module Title</td><td>Laser Basics</td><td colspan="2">Module Delivery</td></tr>
<tr><td>Module Type</td><td>Core</td><td colspan="2" rowspan="4">☒ Theory
☐Lecture
☒ lab
☒ Tutorial
☐ Practical
☐ Seminar</td></tr>
<tr><td>Module Code</td><td>MPH-315</td></tr>
<tr><td>ECTS Credits</td><td>6</td></tr>
<tr><td>SWL (hr/sem)</td><td>150</td></tr>
<tr><td>Module Level</td><td>3</td><td>Semester of Delivery</td><td>5</td></tr>
<tr><td>Administering Department</td><td>MPH</td><td>College</td><td>Applied sciences – Heet</td></tr>
<tr><td>Module Leader</td><td>Dr.Nasrin Nadher Jamil</td><td>e-mail</td><td>nasrin32jamil@gmail.com</td></tr>
<tr><td>Module Leader's Acad. Title</td><td>Lect.</td><td>Module Leader's Qualification</td><td>Ph.D.</td></tr>
<tr><td>Module Tutor</td><td>Name (if available)</td><td>e-mail</td><td>E-mail</td></tr>
<tr><td>Peer Reviewer Name</td><td>Name</td><td>e-mail</td><td>E-mail</td></tr>
<tr><td>Scientific Committee Approval Date</td><td>/   /2023</td><td>Version Number</td><td>1.0</td></tr>
</table>

<table>
<tr><td colspan="4" align="center">Relation with other Modules</td></tr>
<tr><td colspan="4" align="center">العلاقة مع المواد الدراسية الأخرى</td></tr>
<tr><td>Prerequisite module</td><td>MPH-215</td><td>Semester</td><td>1</td></tr>
<tr><td>Co-requisites module</td><td>None</td><td>Semester</td><td></td></tr>
</table>

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	11. This course deals with the basic concept of laser physics. 12. To develop problem solving skills that dealing with the work of laser. 13. To understand how the principles of physics are applied within the laser 14. Develop a physical explanation of laser. 15. Clarifying the relationship between the laser and its applications and different fields of medicine.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 24. Explain the meaning of laser. 25. Explain the atomic structure of human body. 26. Discuss the major principles of laser. 27. Describe the laser types. 28. Define the fundamentals of laser. 29. Discuss the effect of laser on molecules inside body. 30. Discuss the relation between laser and the work of some medical devices. 31. Discuss the examples of laser interactions with human body. 32. Define some of laser applications in medicine.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Introduction of LASER Properties of Light - What is LASER?- IMPORTANCE OF LASER.- What Do LASER Do?- CONCEPT OF UNIT - Fundamental and derived units in laser - SYSTEMS OF UNITS – Physical Quantities- Atomic Structure - Bonding between atoms .[15 hrs] Laser tissues Interaction– Laser Properties - Population of the atoms –Boltizman Equation. [15 hrs] Laser Resonator (Cavity) – Laser Gain - Laser Operation (Part 1) - Laser Operation (Part 2)- Laser Types – Laser Modes . [10 hrs]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	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 types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	94	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6.3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	56	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.7
Total SWL (h/sem) 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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	1hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to EM .
Week 2	Atomic Structure
Week 3	Laser Interactions with human body

Week 4	Laser tissues Interaction.
Week 5	Laser Properties
Week 6	Population of the atoms and Boltizman Equation.
Week 7	Laser Resonator (Cavity)
Week 8	Laser Gain
Week 9	Laser Operation (Part 1)
Week 10	Laser Operation (Part 2)
Week 11	Laser Modes.
Week 12	Laser Types .

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Diffraction from a single slit
Week 2	Determine the wavelength of laser light using a diffraction grating
Week 3	Laser beam divergence
Week 4	Determine the laser spot size.
Week 5	Measure the absorption coefficient of a substance using laser light.

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Medical Physics, by J. R. Cameron	Yes
Recommended Texts	Any book concern with laser.	
Websites		

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

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<tr><td colspan="4" align="center">Module Information
معلومات المادة الدراسية</td></tr>
<tr><td>Module Title</td><td>Medical laser applications</td><td colspan="2">Module Delivery</td></tr>
<tr><td>Module Type</td><td>Core</td><td colspan="2" rowspan="4">☒ Theory
☐ Lecture
☒ lab
☒ Tutorial
☐ Practical
☐ Seminar</td></tr>
<tr><td>Module Code</td><td>MPH-324</td></tr>
<tr><td>ECTS Credits</td><td>6</td></tr>
<tr><td>SWL (hr/sem)</td><td>150</td></tr>
<tr><td>Module Level</td><td>3</td><td>Semester of Delivery</td><td>6</td></tr>
<tr><td>Administering Department</td><td>MPH</td><td>College</td><td>Applied Sciences – Heet</td></tr>
<tr><td>Module Leader</td><td>Dr.Nasrin Nadher Jamil</td><td>e-mail</td><td>nasrin32jamil@gmail.com</td></tr>
<tr><td>Module Leader's Acad. Title</td><td>Lect.</td><td>Module Leader's Qualification</td><td>Ph.D.</td></tr>
<tr><td>Module Tutor</td><td>Name (if available)</td><td>e-mail</td><td>E-mail</td></tr>
<tr><td>Peer Reviewer Name</td><td>Name</td><td>e-mail</td><td>E-mail</td></tr>
<tr><td>Scientific Committee Approval Date</td><td>/ /2023</td><td>Version Number</td><td>1.0</td></tr>
</table>

<table>
<tr><td colspan="4" align="center">Relation with other Modules
العلاقة مع المواد الدراسية الأخرى</td></tr>
<tr><td>Prerequisite module</td><td>MPH-315</td><td>Semester</td><td>5</td></tr>
<tr><td>Co-requisites module</td><td>None</td><td>Semester</td><td></td></tr>
</table>

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	16. This course deals with the basic concept of laser physics to understand the applications of laser in medcine. 17. To develop problem solving skills that dealing with the work of medical devices. 18. To understand how the principles of physics are applied within the human body. 19. Develop a physical explanation of laser. 20. Clarifying the relationship between the laser and its applications and different fields of medicine
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 33. Explain the meaning of laser. 34. Explain the atomic structure of human body. 35. Summarize what is meant by laser. 36. Discuss the major principles of laser. 37. Describe energy absorbance by molecules. 38. Define electromagnetic radiation and its types. 39. Discuss the effect of radiation on molecules inside body. 40. Discuss the relation between radiation and the work of some medical devices. 41. Discuss the examples of laser interactions with human body. 42. Define some of laser applications in medicine.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Introduction of LASER What is LASER?- IMPORTANCE OF LASER.- What Do LASER Do?- CONCEPT OF UNIT - Fundamental and derived units in laser - SYSTEMS OF UNITS – Physical Quantities- Atomic Structure - Bonding between atoms .[15 hrs] Laser tissues Interaction– Laser Eye surgery (Part 1) - Laser Eye surgery (Part 2) - Molecular transduction of energy. [15 hrs] Laser Lithotripsy – Laser in Cancer treatment- Laser in Dentistry1 - Laser in Dermatology- Laser in Dentistry 2. [10 hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	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 types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5.3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.7
Total SWL (h/sem) 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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	1hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Laser.
Week 2	Atomic Structure
Week 3	Laser Interactions with human body

Week 4	Laser tissues Interaction.
Week 5	Laser Eye surgery (Part 1)
Week 6	Laser Eye surgery (Part 2)
Week 7	Laser Lithotripsy (Part 1)
Week 8	Laser Lithotripsy (Part 2)
Week 9	Laser in Cancer treatment
Week 10	Laser in Dentistry
Week 11	Laser in Dermatology
Week 12	Laser in Dentistry.

Delivery Plan (Weekly Lab. Syllabus)	
المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	
Week 8	
Week 9	

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Medical Physics, by J. R. Cameron	Yes
Recommended Texts		
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)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – 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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	**Medical Physics -1**	**Module Delivery**	
Module Type	**Core**	☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	MPH-311		
ECTS Credits	**5**		
SWL (hr/sem)	125		
Module Level	3	**Semester of Delivery**	5
Administering Department	MPH	**College**	Applied Sciences – Heet
Module Leader	Ahmed A. Sarhan	**e-mail**	Aas_alhity@uoanbar.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.
Module Tutor	N/A	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	/ /2023	**Version Number**	1.0

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

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Develop basic understanding of medical physics concepts, 2. Develop problem-solving and critical-thinking skills, 3. Learn to integrate and apply various physics concepts to a single problem, 4. Develop scientific communication skills
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of the course, students will be expected to be able to… 1– Describe an imaging system and break it down into its components and physical principles for each of the imaging modalities covered (x-ray, CT, NM, US, MRI). 2– Identify the key factors that affect image quality and address these factors for the different imaging modalities. 3– Learn to communicate the physical principles behind medical technology, radiation safety, and relevant applications
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies	
استراتيجيات التعلم والتعليم	
Strategies	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 types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**125**		

Module Evaluation

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Radiation Types
Week 2	Ionizing Radiation and Attenuation of Radiation
Week 3	X ray and physical effect of RAD
Week 4	Project 1 discussion
Week 5	Biological effect of RAD
Week 6	Chemical effect of RAD
Week 7	Midterm Exam
Week 8	Xray imaging
Week 9	Nuclear imaging
Week 10	Introduction to MRI and applications
Week 11	Introduction to Radiation Types
Week 12	Project 2 discussion
Week 13	Ionizing Radiation and Attenuation of Radiation
Week 14	X ray and physical effect of RAD
Week 15	Preparatory week before the final Exam
Week 16	Final Exam

	Learning and Teaching Resources مصادر التعلم والتدريس	
	Text	**Available in the Library?**
Required Texts	Medical Imaging Physics, by W.R. Hendee and E.R. Ritenour, Fourth Edition, Wiley-Liss, Inc., New York, 2002.	No
Recommended Texts	• Medical Physics and Biomedical Engineering, B H Brown, R H Smallwood, D C Barber and D R Hose, IOP Publishing Ltd, 1999. • M. Maqbool (ed.), An Introduction to Medical Physics, Biological and Medical Physics, Biomedical Engineering, DOI 10.1007/978-3-319-61540-0_11	No
Websites	https://onlinelibrary.wiley.com/doi/book/10.1002/0471221155	

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)	**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 of Medical terminology

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	**Medical terminology**	**Module Delivery**	
Module Type	**Basic**	☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	MPH-313		
ECTS Credits	4		
SWL (hr/sem)	**100**		
Module Level	3	**Semester of Delivery**	5
Administering Department	MPH	**College**	Applied Sciences-Heet
Module Leader	Marwan Mahmood Saleh	**e-mail**	ah.marwan_bio@uoanabr.edu.iq
Module Leader's Acad. Title	Ass. 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	/ /2023	**Version Number**	1.0

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

Module Objectives أهداف المادة الدراسية	The primary class objective is to read and understand the language of medicine. Upon the completion of this course the student will be able to: • Form medical terms by combining prefixes, suffixes and root words. • Associate medical terms with specific body systems. • Identify and interpret diagnostic and symptomatic terms related to the pathophysiology specific to each body system. • Describe designated diagnostic testing procedures (laboratory, x-ray, surgical, pharmacy, etc.). • Distinguish common medical abbreviations and acronyms. • Choose and define medical terms from appropriate sources. • Summarize and correctly interpret medical/clinical related materials. • Evaluate the quality of medical literature available in print and internet format. • Develop an active vocabulary of selected medical terms.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	At the end of the course students will be able to: 1. Identify the basic structure of medical words, including prefixes, suffixes, roots, combining forms, and plurals. 2. Identify medical terminology as it relates to the anatomy and physiology of the human body. 3. Identify the rules of building medical terms and a connection between the term and its relationship to anatomy and physiology.
Indicative Contents مضمون المحتويات	The study of medical terminology introduces students to the language of medicine. Students will gain an understanding of basic elements, rules of building and analyzing medical words, and medical terms associated with the body as a whole. Utilizing a systems-approach, the student will define, interpret, and pronounce medical terms relating to structure and function, pathology, diagnosis, clinical procedures, oncology, and pharmacology. In addition to medical terms, common abbreviations applicable to each system will be interpreted.

	Learning and Teaching Strategies
	استراتيجيات التعلم والتعليم

Strategies	Learning and teaching strategies in medical terminology aim to engage students in active learning, facilitate understanding of complex concepts, and develop critical thinking skills. Here are some common learning and teaching strategies employed in medical terminology courses: 1. Lectures: Lectures are often used to deliver foundational knowledge and concepts in physiology. They provide an overview of the topics, explain key principles, and highlight

important details. Lectures may be supplemented with visual aids, such as slides or multimedia presentations, to enhance understanding.

4. Interactive Discussions: Interactive discussions, such as small group discussions or classroom debates, promote active learning and peer-to-peer interaction. They allow students to ask questions, clarify doubts, and engage in meaningful discussions about medical concepts.

6. Multimedia Resources: Incorporating multimedia resources, such as videos, animations, and interactive simulations, can enhance students' engagement and understanding medical terms.

7. Collaborative Learning: Collaborative learning activities, such as group projects or problem-solving tasks, encourage students to work together to solve terms problems or complete assignments. This fosters teamwork, communication, and the exchange of ideas, allowing students to learn from each other's perspectives and experiences.

8. Assessments: Assessments, such as quizzes, exams, and assignments, evaluate students' understanding and knowledge retention. They provide feedback on individual progress and help identify areas that require further review or clarification. Assessments may include multiple-choice questions, problem-solving tasks, or short essay questions.

9. Online Resources: Utilizing online resources, such as interactive tutorials, or online discussion forums, can provide additional learning opportunities outside of the classroom. These resources offer flexibility and accessibility, allowing students to review content at their own pace and seek additional support when needed.

10. Real-world Applications: Relating medical concepts to real-world applications, such as medical advancements, biotechnology, or environmental issues, can enhance students' motivation and understanding. Exploring the practical relevance of medical concepts helps students appreciate the significance of their learning and its impact in various fields.

These strategies aim to create an active and engaging learning environment that promotes understanding, critical thinking, and medical principles. The specific strategies employed may vary based on the teaching style, course format, and resources available to the instructor.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	67	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	1. Introduction – Basic Elements of a Medical Word
Week 2	2. Suffixes: Surgical, Diagnostic, Pathological, Grammatical and Plural
Week 3	3. Prefixes
Week 4	4. Body Structure
Week 5	5. Integumentary System
Week 6	6. Gastrointestinal (Digestive) System
Week 7	7. Respiratory System
Week 8	8. Cardiovascular System
Week 9	9. Blood and Lymphatic System

Week 10	10. Musculoskeletal System
Week 11	11. Urinary System
Week 12	12. Female Reproductive System
Week 13	13. Male Reproductive System
Week 14	14. Endocrine System
Week 15	15. Nervous System
Week 16	16. Special Senses

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Medical Terminology: A Living Language, 5th edition with Med Term Interactive Access Card by Bonnie F. Fremgen and Suzanne S. Frucht	**Available** Online
Recommended Texts		No
Websites	Any website	

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
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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

Module Information		
معلومات المادة الدراسية		
Module Title	**Physics of nuclear medicine**	**Module Delivery**
Module Type	**Core**	☒ Theory
Module Code	**MPH-323**	☐ Lecture ☒ Lab
ECTS Credits	**6**	☒ Tutorial ☐ Practical
SWL (hr/sem)	**501**	☐ Seminar

Module Level	3	**Semester of Delivery**	6
Administering Department	MPH	**College**	Applied Sciences - Heet
Module Leader	Mawlood Maajal Ali	**e-mail**	mawloodmali@uoanbar.edu.iq
Module Leader's Acad. Title	Lect.	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name		**e-mail**	E-mail
Scientific Committee Approval Date	/ /2023	**Version Number**	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	7. Fundamentals of Nuclear Physics: Understand the basic principles and concepts of nuclear physics, including atomic structure, nuclear reactions, radioactivity, and radioactive decay. 8. Interaction of Radiation with Matter: Learn about the interactions of various types of radiation (gamma rays, beta particles, alpha particles) with matter, including attenuation, scattering, and absorption. 9. Radiation Detectors and Instrumentation: Study the principles and operation of radiation detectors used in nuclear medicine, such as scintillation detectors, gamma cameras, positron emission tomography (PET) scanners, and single-photon emission computed tomography (SPECT) systems. 10. Radiopharmaceuticals: Gain knowledge about the production, characteristics, and properties of radiopharmaceuticals used in nuclear medicine, including the selection criteria and labeling techniques. 11. Radiation Dosimetry: Understand the principles of radiation dosimetry and its application in nuclear medicine, including the calculation of absorbed doses, effective doses, and organ doses to assess radiation risks to patients and medical personnel. 12. Radiation Safety: Understand the principles of radiation safety in nuclear medicine, including radiation protection measures, regulatory guidelines, radiation safety practices, and personnel monitoring. 13. Emerging Technologies: Stay updated on the latest advancements and emerging technologies in nuclear medicine physics, such as hybrid imaging modalities (e.g., PET/CT, SPECT/CT), molecular imaging, and theranostics. 14. Clinical Applications: Gain an understanding of the clinical applications of nuclear medicine physics, including the use of nuclear imaging techniques in diagnosis, staging, therapy planning, and monitoring of various diseases, such as cancer, cardiovascular disorders, and neurological conditions.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• **Knowledge of Nuclear Physics**: Demonstrate a solid understanding of the fundamental principles and concepts of nuclear physics, including atomic structure, nuclear reactions, radioactivity, and radioactive decay. • **Understanding Radiation-Matter Interactions**: Explain the interactions of various types of radiation with matter, including attenuation, scattering, and absorption, and their implications for nuclear medicine imaging and therapy. • **Proficiency in Radiation Detectors and Instrumentation**: Develop proficiency

	in the principles and operation of radiation detectors used in nuclear medicine, including scintillation detectors, gamma cameras, PET scanners, and SPECT systems. • **Familiarity with Radiopharmaceuticals**: Acquire knowledge of the production, characteristics, and properties of radiopharmaceuticals used in nuclear medicine, including their selection criteria and labeling techniques. • **Competence in Radiation Dosimetry**: Apply the principles of radiation dosimetry to calculate absorbed doses, effective doses, and organ doses, and understand their significance in assessing radiation risks in nuclear medicine. • **Ability to Generate and Interpret Images**: Demonstrate the ability to acquire and interpret nuclear medicine images using techniques such as planar imaging, SPECT, and PET, and understand the principles of image formation and reconstruction. • **Understanding Quality Control and Safety Procedures**: Comprehend the quality control procedures, calibration techniques, and quality assurance programs necessary for maintaining and ensuring the accuracy and safety of nuclear medicine instrumentation and imaging systems. • **Radiation Safety Awareness:** Demonstrate an understanding of the principles of radiation safety in nuclear medicine, including the implementation of radiation protection measures, adherence to regulatory guidelines, and awareness of radiation safety practices for patients and medical personnel. • **Awareness of Emerging Technologies**: Stay updated on the latest advancements and emerging technologies in nuclear medicine physics, such as hybrid imaging modalities, molecular imaging, and theranostics, and their potential applications in clinical practice. • **Application of Physics Principles to Clinical Practice**: Apply the knowledge of nuclear medicine physics to clinical scenarios, including the use of nuclear imaging techniques in diagnosis, staging, therapy planning, and monitoring of various diseases, and understand the role of physics in optimizing patient care.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A - Atomic Structure: Rutherford model of the atom, Bohr model and energy levels, Quantum mechanical model of the atom, Electron configurations and orbital notation and Periodic table and periodic trends. [15 hrs] – Quantum Mechanics: Wave-particle duality, Schrödinger equation and its solutions, Operators and observables in quantum mechanics, Heisenberg uncertainty principle and Quantum numbers and their significance. [15 hrs] -Energy Levels and Spectroscopy:

	Atomic energy levels and transitions, Absorption and emission of electromagnetic radiation, Spectral lines and line spectra and Selection rules for atomic transitions. [10 hrs]
	Atomic Interactions: Coulomb's law and electric fields, Forces between charged particles Ionization and excitation of atoms, Elastic and inelastic scattering of particles and Chemical bonding and molecular structure. [15 hrs]
	Revision problem classes [6 hrs]
	Part B -
	Atomic Spectra and Laser Physics: Atomic emission and absorption spectra, Zeeman effect and Stark effect, Laser principles and operation, Population inversion and stimulated emission and Laser cooling and trapping techniques. [15 hrs]
	Atomic and Nuclear Physics: Radioactive decay and nuclear reactions, Nuclear structure and nuclear models, Nuclear fission and fusion, Isotopes and atomic mass spectroscopy and Applications of atomic physics in nuclear technology. [7 hrs]
	Applications of Atomic Physics: Atomic magnetometers and magnetic field sensing Atomic imaging techniques (electron microscopy, scanning probe microscopy), Atomic spectroscopy in astrophysics and Atomic physics in quantum computing and quantum information science. [15 hrs]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	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 types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**125**		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Nuclear Physics and Atomic Structure and Radioactive Decay
Week 2	Types of Radiation and Radioactive Decay Modes
Week 3	Interactions of Radiation with Matter, Attenuation, Scattering, and Absorption, Cross-Section and Stopping Power
Week 4	Radiation Detectors in Nuclear Medicine, Scintillation Detectors
Week 5	Gamma Cameras and Imaging Principles
Week 6	Positron Emission Tomography (PET) Principles, PET Detectors and Coincidence Detection and Image Reconstruction Techniques in PET
Week 7	Mid exam
Week 8	Single-Photon Emission Computed Tomography (SPECT) Principles
Week 9	SPECT Detectors and Collimators and Image Reconstruction Techniques in SPECT

Week 10	Radiation Dosimetry in Nuclear Medicine, Absorbed Dose Calculation and Effective Dose and Organ Doses
Week 11	Radiation Safety in Nuclear Medicine, Radiation Protection Principles and Regulations and Personnel Monitoring and Radiation Safety Practices
Week 12	Advanced Imaging Technologies in Nuclear Medicine, Hybrid Imaging Modalities (PET/CT, SPECT/CT) and Molecular Imaging and Theranostics
Week 13	Clinical Applications of Nuclear MedicineDiagnostic Imaging
Week 14	**Review and Recapitulation**
Week 15	**Case Studies and Problem Solving**
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1- week 15	Hospital training

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	"Physics in Nuclear Medicine" by Simon R. Cherry, James A. Sorenson, and Michael E. Phelps	No
Recommended Texts	"Nuclear Medicine Physics: The Basics" by Ramesh Chandra	No
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)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – 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.

Module Description Form of Biomaterials

نموذج وصف المادة الدراسية

<table>
<tr><td colspan="4" align="center">Module Information
معلومات المادة الدراسية</td></tr>
<tr><td>Module Title</td><td colspan="2" align="center">Biomaterials</td><td>Module Delivery</td></tr>
<tr><td>Module Type</td><td colspan="2" align="center">Core</td><td rowspan="4">☒ Theory
☐ Lecture
☒ Lab
☒ Tutorial
☐ Practical
☐ L Seminar</td></tr>
<tr><td>Module Code</td><td colspan="2" align="center">MPH-424</td></tr>
<tr><td>ECTS Credits</td><td colspan="2" align="center">5</td></tr>
<tr><td>SWL (hr/sem)</td><td colspan="2" align="center">125</td></tr>
<tr><td>Module Level</td><td>4</td><td>Semester of Delivery</td><td>8</td></tr>
<tr><td>Administering Department</td><td>MPH</td><td>College</td><td>Applied sciences-Heet</td></tr>
<tr><td>Module Leader</td><td>Manaf A Guma</td><td>e-mail</td><td>manafguma@uoanabr.edu.iq</td></tr>
<tr><td>Module Leader's Acad. Title</td><td>Ass. Professor</td><td>Module Leader's Qualification</td><td>Ph.D.</td></tr>
<tr><td>Module Tutor</td><td>Name (if available)</td><td>e-mail</td><td>E-mail</td></tr>
<tr><td>Peer Reviewer Name</td><td>Name</td><td>e-mail</td><td>E-mail</td></tr>
<tr><td>Scientific Committee Approval Date</td><td>/ /2023</td><td>Version Number</td><td>1.0</td></tr>
</table>

<table>
<tr><td colspan="4" align="center">Relation with other Modules
العلاقة مع المواد الدراسية الأخرى</td></tr>
<tr><td>Prerequisite module</td><td>Basic of biochemistry</td><td>Semester</td><td></td></tr>
<tr><td>Co-requisites module</td><td>Cell and Molecular Biology Biochemistry</td><td>Semester</td><td></td></tr>
</table>

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	**The main Objectives of this modules are:** This course is designed to provide a comprehensive understanding of the multidisciplinary field of biomaterials, focusing on the biological responses to materials and the clinical context of their use. Through lectures, paper reviews, in class discussions and invited lectures, students will be introduced to the Biomaterials Science and the physiological interactions between body environment and biomaterials. Students will be required to acquire understanding and expertise from analysis of primary literature and will complete group presentations on the status of state-of-the-art biomaterial applications, including medical implants, artificial organs, and scaffolds for tissue engineering. (from Spanish)
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The learning outcomes of a module in biomaterials typically include acquiring knowledge and developing skills related to the field. Here are some common learning outcomes: 1. Understanding biomaterials: Students should develop a comprehensive understanding of the fundamental concepts and principles of biomaterials, including their composition, properties, and applications in various biomedical fields. 2. Analyzing biomaterial properties: Students should be able to evaluate the physical, chemical, mechanical, and biological properties of biomaterials. They should be able to analyze and interpret data related to biomaterial characterization techniques, such as spectroscopy, microscopy, and mechanical testing. 3. Examining biocompatibility: Students should gain knowledge about biocompatibility assessment methods and factors that influence the interaction between biomaterials and living tissues. They should be able to evaluate and predict the biocompatibility of different biomaterials. 4. Exploring biomaterial synthesis and processing: Students should understand the techniques and processes used for biomaterial synthesis, including the fabrication, modification, and surface functionalization of biomaterials. They should develop skills in selecting appropriate fabrication techniques for specific applications. 5. Investigating tissue-material interactions: Students should comprehend the interactions between biomaterials and biological tissues at the cellular and molecular levels. They should be able to analyze the cellular response to biomaterials and understand the mechanisms of tissue-material integration and regeneration. 6. Analyzing biomaterial degradation and biodegradation: Students should understand the degradation mechanisms of biomaterials in different physiological environments. They should be able to evaluate the biodegradation kinetics and design biomaterials with controlled degradation properties. 7. Exploring biomedical applications: Students should gain knowledge of the diverse applications of biomaterials in areas such as tissue engineering, regenerative medicine, drug delivery, medical devices, and implants. They should

	understand the design considerations and requirements for specific biomedical applications.
	8. Assessing biomaterial performance: Students should be able to assess the performance and functionality of biomaterials in real-world applications. They should develop skills in evaluating the long-term stability, efficacy, and safety of biomaterials through in vitro and in vivo testing.
	9. Considering ethical and regulatory aspects: Students should be aware of the ethical considerations and regulatory frameworks associated with the development, testing, and use of biomaterials. They should understand the importance of responsible research practices, patient safety, and compliance with relevant regulations and standards.
	10. Communication and scientific literacy: Students should be able to effectively communicate scientific concepts and findings related to biomaterials. They should develop skills in scientific writing, data presentation, and oral communication, and be able to critically analyze and interpret scientific literature in the field of biomaterials.
	By achieving these learning outcomes, students will be equipped with the knowledge and skills necessary to contribute to the development, evaluation, and application of biomaterials in various biomedical and healthcare contexts.

Indicative Contents
مضمون المحتويات
	Indicative content includes the following.
	The indicative contents of a short assay on biomaterials may vary depending on the specific focus of the assignment or course. However, here are some key topics and areas that can be covered in a short assay on biomaterials:
	
	1. Introduction to biomaterials:
	  - Definition and importance of biomaterials in various biomedical applications.
	  - Types of biomaterials: polymers, metals, ceramics, and composites.
	  - Role of biomaterials in tissue engineering, regenerative medicine, and medical devices.
	
	2. Properties of biomaterials:
	  - Physical properties: density, porosity, surface roughness, and mechanical properties.
	  - Chemical properties: composition, surface chemistry, and functionalization.
	  - Biological properties: biocompatibility, cell adhesion, and tissue integration.
	
	3. Biocompatibility and tissue response:
	  - Definition and assessment of biocompatibility.
	  - Cellular response to biomaterials: adhesion, proliferation, and differentiation.
	  - Host response to biomaterials: inflammation, immune response, and foreign body reaction.
	
	4. Biomaterial characterization techniques:
	  - Spectroscopic techniques: Fourier-transform infrared spectroscopy (FTIR), Raman spectroscopy.

	- Microscopy techniques: scanning electron microscopy (SEM), transmission electron microscopy (TEM). - Mechanical testing techniques: tensile testing, compression testing, and nanoindentation. 5. Biomaterial synthesis and processing: - Fabrication techniques: casting, electrospinning, 3D printing, and self-assembly. - Surface modification techniques: plasma treatment, chemical functionalization, and surface coatings. - Sterilization and packaging of biomaterials. 6. Applications of biomaterials: - Tissue engineering and regenerative medicine: scaffolds, hydrogels, and cell encapsulation. - Medical devices: implants, prosthetics, orthopedic devices, and cardiovascular devices. - Drug delivery systems: nanoparticles, microparticles, and controlled-release systems. 7. Current challenges and future directions: - Biomaterial-associated infections and strategies for infection control. - Integration of biomaterials with host tissues: enhancing tissue integration and minimizing immune response. - Advancements in biomaterials for personalized medicine and targeted therapies. 8. Ethical considerations and regulatory aspects: - Ethical implications of biomaterial research and development. - Regulatory frameworks and standards for biomaterials in medical applications. - Importance of safety, efficacy, and long-term performance evaluation of biomaterials. 9. Conclusion: - Summary of the key points discussed in the essay. - Significance of biomaterials in advancing healthcare and improving patient outcomes. - Future prospects and potential impact of biomaterial research. These indicative contents provide a framework for structuring a short assay on biomaterials. The actual content and emphasis may vary depending on the specific requirements of the assignment or course. .

Learning and Teaching Strategies	
استراتيجيات التعلم والتعليم	
Strategies	Learning and teaching strategies in Biochemistry aim to engage students in active learning, facilitate understanding of complex concepts, and develop critical

thinking skills. Here are some common learning and teaching strategies employed in Basic Biochemistry courses:

1. Lectures: Lectures are often used to deliver foundational knowledge and concepts in biochemistry. They provide an overview of the topics, explain key principles, and highlight important details. Lectures may be supplemented with visual aids, such as slides or multimedia presentations, to enhance understanding.

2. Laboratory Work: Laboratory sessions allow students to apply theoretical knowledge to practical situations. They provide hands-on experience with biochemical techniques, data collection, analysis, and interpretation. Lab work may involve experiments related to biomolecule analysis, enzyme kinetics, or metabolic pathways.

3. Problem-solving Exercises: Problem-solving exercises and case studies help students apply their knowledge to real-life scenarios. They encourage critical thinking and problem-solving skills by presenting biochemical problems or experimental data for analysis and interpretation. Students may work individually or in groups to find solutions and explain their reasoning.

4. Interactive Discussions: Interactive discussions, such as small group discussions or classroom debates, promote active learning and peer-to-peer interaction. They allow students to ask questions, clarify doubts, and engage in meaningful discussions about biochemical concepts, experiments, or applications.

5. Concept Mapping: Concept mapping is a visual learning tool that helps students organize and connect different biochemical concepts. It involves creating diagrams or mind maps that illustrate the relationships between different biomolecules, metabolic pathways, or cellular processes. Concept maps can aid in understanding the "big picture" and identifying the interconnections within biochemistry.

6. Multimedia Resources: Incorporating multimedia resources, such as videos, animations, and interactive simulations, can enhance students' engagement and understanding of complex biochemical processes. These resources can visually illustrate molecular structures, enzyme kinetics, or cellular processes, making them more accessible and memorable.

7. Collaborative Learning: Collaborative learning activities, such as group projects or problem-solving tasks, encourage students to work together to solve biochemical problems or complete assignments. This fosters teamwork, communication, and the exchange of ideas, allowing students to learn from each other's perspectives and experiences.

8. Assessments: Assessments, such as quizzes, exams, and assignments, evaluate students' understanding and knowledge retention. They provide feedback on individual progress and help identify areas that require further review or clarification. Assessments may include multiple-choice questions, problem-solving tasks, or short essay questions.

9. Online Resources: Utilizing online resources, such as virtual labs, interactive tutorials, or online discussion forums, can provide additional learning opportunities outside of the classroom. These resources offer flexibility and accessibility, allowing students to review content at their own pace and seek additional support when needed.

10. Real-world Applications: Relating biochemistry concepts to real-world applications, such as medical advancements, biotechnology, or environmental issues, can enhance students' motivation and understanding. Exploring the practical relevance of biochemistry concepts helps students appreciate the significance of their learning and its impact in various fields.

These strategies aim to create an active and engaging learning environment that promotes understanding, critical thinking, and application of biochemistry principles. The specific strategies employed may vary based on the teaching style, course format, and resources available to the instructor.

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	49	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3.3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	76	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**125**		

Module Evaluation				
تقييم المادة الدراسية				
	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7

	Projects / Lab.		10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	1hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Biomaterials. Basic concepts
Week 2	Polymers and hydrogels for biomedical applications
Week 3	Ceramics for biomedical applications
Week 4	Biomaterial degradation
Week 5	Designing biomaterials for 3D printing
Week 6	Surface modification of biomaterials
Week 7	Mid exam
Week 8	Extracellular matrix-based biomaterials
Week 9	Biomaterial implantation: acute inflammation and wound healing
Week 10	Immune response to biomaterials
Week 11	Infection, tumorigenesis and calcification of biomaterials
Week 12	Blood-biomaterial interactions
Week 13	Biomaterial characterization techniques:
Week 14	Applications of biomaterial: Tissue engineering and regenerative medicine: scaffolds, hydrogels, and cell encapsulation.
Week 15	Applications of biomaterial: Medical devices: implants, prosthetics, orthopedic devices, and cardiovascular devices.
Week 16	Applications of biomaterial: delivery systems: nanoparticles, microparticles, and controlled-release systems.

	Learning and Teaching Resources مصادر التعلم والتدريس	
	Text	**Available in the Library?**
Required Texts	Here are some reference books on biomaterials that you can explore: 1. "Biomaterials Science: An Introduction to Materials in Medicine" by Buddy D. Ratner, Allan S. Hoffman, Frederick J. Schoen, and Jack E. Lemons. 2. "Principles of Tissue Engineering" by Robert Lanza, Robert Langer, Joseph P. Vacanti, and Antonios G. Mikos. 3. "Biomaterials: The Intersection of Biology and Materials Science" by Johnna S. Temenoff and Antonios G. Mikos. 4. "Introduction to Biomaterials: Basic Theory with Engineering Applications" by C. Mauli Agrawal, Jack E. Lemons, and John D. Bumgardner. 5. "Biomaterials: A Basic Introduction" by Qizhi Chen. 6. "Fundamentals of Biomaterials" by David W. Grainger and Charles L. Allen. 7. "Biomaterials Science: Processing, Properties, and Applications" by Roger Narayan. 8. "Biomaterials: Principles and Practices" by Joyce Y. Wong, Joseph D. Bronzino, and Donald R. Peterson. 9. "Biomaterials: An Introduction" by Joon B. Park and R. S. Lakes. 10. "Biomaterials: The Intersection of Biology and Materials Science" by W. Mark Saltzman. These books cover various aspects of biomaterials, including their properties, synthesis and processing, applications, and the	**Available** Online

	intersection between biology and materials science. They provide a comprehensive understanding of the field and serve as valuable references for students, researchers, and professionals working in biomaterials and related disciplines.	
Recommended Texts	1. "Biomaterials Science: An Introduction to Materials in Medicine" by Buddy D. Ratner, Allan S. Hoffman, Frederick J. Schoen, and Jack E. Lemons.	No
Websites	Any website	

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)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – 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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية				
Module Title	Material science and nanotechnology		**Module Delivery**	
Module Type	**Core**		☒ Theory ☐Lecture ☐Lab ☒Tutorial ☐ Practical ☐ Seminar	
Module Code	MPH-423			
ECTS Credits	5			
SWL (hr/sem)	**125**			
Module Level	4	**Semester of Delivery**		8
Administering Department	MPH	**College**	Applied Sciences - Heet	
Module Leader	Mawlood Maajal Ali	**e-mail**	mawloodmali@uoanbar.edu.iq	
Module Leader's Acad. Title	Lect.	**Module Leader's Qualification**		Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail	
Peer Reviewer Name		**e-mail**	E-mail	
Scientific Committee Approval Date	/ /2023	**Version Number**	1.0	

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

	Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية
Module Objectives أهداف المادة الدراسية	15. Manipulating and controlling matter at the nanoscale: Nanotechnology aims to understand and harness the unique properties of materials at the nanoscale (typically between 1 and 100 nanometers) and develop techniques to manipulate and control matter at this level. 16. Nanomaterials Synthesis: Develop techniques for synthesizing nanomaterials with precise control over their size, shape, composition, and structure. This objective involves exploring various synthesis methods such as top-down and bottom-up approaches, chemical vapor deposition, self-assembly, and nanolithography. 17. Characterization and measurement techniques: Another objective is to develop advanced tools and techniques for characterizing and measuring nanoscale materials and devices. This includes imaging and spectroscopic techniques that can provide detailed information about the structure, properties, and behavior of nanomaterials. 18. Nanodevices and Nanosystems: Nanotechnology aims to design, fabricate, and integrate nanoscale devices and systems for various applications. This includes developing nanoelectronics, nanosensors, nanomachines, and other functional nanoscale devices that can be used in areas such as electronics, medicine, energy, and environmental monitoring.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• **Understand the fundamentals of nanoscience**: Gain knowledge of the basic principles and concepts of nanoscience, including quantum mechanics, surface science, and materials science at the nanoscale. • **Comprehend nanomaterials**: Learn about different types of nanomaterials, their properties, synthesis methods, and characterization techniques. Understand how the unique properties of nanomaterials arise from their size-dependent behavior. • **Analyze nanoscale phenomena**: Develop the ability to analyze and interpret phenomena that occur at the nanoscale, such as quantum confinement, surface plasmon resonance, and electron transport properties. • **Explore nanofabrication techniques**: Familiarize yourself with various nanofabrication techniques used to manufacture nanoscale structures and devices, such as top-down lithography, bottom-up self-assembly, and nanolithography. • **Study nanodevices and applications**: Gain knowledge of nanoscale devices and their applications in various fields, such as electronics, medicine, energy, and environmental science.

Indicative Contents المحتويات الإرشادية	- Nanomaterials: Types, synthesis methods, and characterization techniques, Properties and behavior of nanomaterials - Nanodevices: Principles and applications, Nanofabrication techniques: Lithography, self-assembly, and etching - Nanosensors and nanobiosensors: Principles and applications - Fabrication methods - Types of Nanomaterials and Their Properties - Synthesis methods of nanomaterials - Characterization methods - Nanotechnology safety and ethical considerations and Regulatory aspects of nanotechnology - Nanomedicine: Applications in drug delivery and diagnostics, Nanoparticles in medicine: Synthesis, targeting, and toxicity considerations - Nanotechnology in energy and environment, Nanomaterials for energy storage and conversion and Environmental applications of nanotechnology - Nanotechnology in Energy: Applications in renewable energy and energy storage - Nanobiotechnology: Intersection of nanotechnology and biology, Nanomedicine:

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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 types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	49	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3.3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	76	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.1

Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	15% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	-	-	-	-
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	1hr	15% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Quantum Mechanics:Introduction, Matter Waves, Heisenberg's Uncertainty Principle, Schrödinger Equation and Electron Confinement
Week 2	Introduction to Nanotechnology: History, definition, and applications, Nanoscale phenomena and properties, Fabrication techniques: Top-down and bottom-up approaches
Week 3	structure and Bonding: Introduction, Arrangement of Atoms, 0D, 1D and 2D
Week 4	Nanomaterials: Types, synthesis methods, and characterization techniques, Properties and behavior of nanomaterials
Week 5	Nanodevices: Principles and applications, Nanofabrication techniques: Lithography, self-assembly, and etching
Week 6	Nanosensors and nanobiosensors: Principles and applications Fabrication methods
Week 7	Mid exam
Week 8	Types of Nanomaterials and Their Properties
Week 9	Synthesis methods of nanomaterials
Week 10	Characterization methods
Week 11	Nanotechnology safety and ethical considerations and Regulatory aspects of nanotechnology

Week 12	Nanomedicine: Applications in drug delivery and diagnostics, Nanoparticles in medicine: Synthesis, targeting, and toxicity considerations
Week 13	Nanotechnology in energy and environment, Nanomaterials for energy storage and conversion and Environmental applications of nanotechnology
Week 14	Nanotechnology in Energy: Applications in renewable energy and energy storage
Week 15	Nanobiotechnology: Intersection of nanotechnology and biology, Nanomedicine:
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Introduction to nanoscience and nanotechnology, CRC Press, Tylor and Francis Group, Boca Raton, G. L. Hornyak, H. F. Tibbals, J. Dutta and J J. Moore	No
Recommended Texts	Introductory Nanoscience: Physical and Chemical Concepts, CRC Press, Tylor and Francis Group, Boca Raton, M. Kuno.	No
Websites		

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	**Medical Physics -2**	**Module Delivery**	
Module Type	**Core**	☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	MPH-421		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	4	**Semester of Delivery**	8
Administering Department	MPH	**College**	Applied Sciences- Heet
Module Leader	Ahmed A. Sarhan	**e-mail**	Aas_alhity@uoanbar.edu.iq
Module Leader's Acad. Title	Lect.	**Module Leader's Qualification**	Ph.D.
Module Tutor	N/A	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	/ /2023	**Version Number**	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	MPH-311	**Semester**	5
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	5. Develop basic understanding of medical physics concepts, 6. Develop problem-solving and critical-thinking skills, 7. Learn to integrate and apply various physics concepts to a single problem, 8. Develop scientific communication skills
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of the course, students will be expected to be able to… 1– Describe an imaging system and break it down into its components and physical principles for each of the imaging modalities covered (x-ray, CT, NM, US, MRI). 2– Identify the key factors that affect image quality and address these factors for the different imaging modalities. 3– Learn to communicate the physical principles behind medical technology, radiation safety, and relevant applications
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	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 types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation

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

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Radiation therapy and techniques
Week 2	Radiation Dosimetry
Week 3	Physics of CT scanning Reflection on precautions of Radiation Therapy
Week 4	Safety precautions to use Radiation Therapy
Week 5	Project 1 Discussion
Week 6	Radiation Detection Instrumentation
Week 7	Midterm Exam
Week 8	Interaction of Radiation with Matter
Week 9	Physics of nuclear medicine
Week 10	Radiation Protection in Radiotherapy
Week 11	Radiosensitivity and Protection
Week 12	Project 2 Discussion
Week 13	Geiger Muller Detection and Applications
Week 14	Phantom design and purposes
Week 15	Preparatory week before the final Exam
Week 16	Final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	*Medical Imaging Physics*, by W.R. Hendee and E.R. Ritenour, ISBN 0471382264; available in The Book Store at Western (www.bookstore.uwo.ca) M. Maqbool (ed.), An Introduction to Medical Physics, Biological and Medical Physics, Biomedical Engineering, DOI 10.1007/978-3-319-61540-0_11	No
Recommended Texts	• *Physics of Radiology*, A.B. Wolbarst, ISBN 0838557694, UWO Library. • Biological and Medical Physics, Biomedical Engineering ISSN 1618-7210 ، P V Lawford	No
Websites	https://link.springer.com/book/10.1007/978-3-319-61540-0 https://onlinelibrary.wiley.com/doi/book/10.1002/0471221155	

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)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – 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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

<table>
<tr><td colspan="4" align="center">Module Information
معلومات المادة الدراسية</td></tr>
<tr><td>Module Title</td><td>Medical instrumentation physics</td><td colspan="2">Module Delivery</td></tr>
<tr><td>Module Type</td><td>Core</td><td colspan="2" rowspan="4">☒ Theory
☐Lecture
☒ Lab
☒Tutorial
☐ Practical
☐ Seminar</td></tr>
<tr><td>Module Code</td><td>MPH-412</td></tr>
<tr><td>ECTS Credits</td><td>5</td></tr>
<tr><td>SWL (hr/sem)</td><td>125</td></tr>
<tr><td>Module Level</td><td>4</td><td>Semester of Delivery</td><td>7</td></tr>
<tr><td>Administering Department</td><td>MPH</td><td>College</td><td>Applied Sciences - Heet</td></tr>
<tr><td>Module Leader</td><td>Mawlood Maajal Ali</td><td>e-mail</td><td>mawloodmali@uoanbar.edu.iq</td></tr>
<tr><td>Module Leader's Acad. Title</td><td>Lect.</td><td>Module Leader's Qualification</td><td>Ph.D.</td></tr>
<tr><td>Module Tutor</td><td>Name (if available)</td><td>e-mail</td><td>E-mail</td></tr>
<tr><td>Peer Reviewer Name</td><td></td><td>e-mail</td><td>E-mail</td></tr>
<tr><td>Scientific Committee Approval Date</td><td>/ /2023</td><td>Version Number</td><td>1.0</td></tr>
</table>

<table>
<tr><td colspan="3" align="center">Relation with other Modules
العلاقة مع المواد الدراسية الأخرى</td></tr>
<tr><td>Prerequisite module</td><td>None</td><td>Semester</td><td></td></tr>
<tr><td>Co-requisites module</td><td>None</td><td>Semester</td><td></td></tr>
</table>

	Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية
Module Objectives أهداف المادة الدراسية	19. Understanding Medical Devices: Gain a comprehensive understanding of medical devices, including their definition, classification, and various types of medical devices used in healthcare. 20. Principles of Medical Device Design: Familiarize students with the principles and methodologies involved in the design and development of medical devices, considering factors such as user needs, functionality, safety, and regulatory compliance. 21. Regulatory Framework: Develop an understanding of the regulatory environment governing medical devices, including national and international regulations, standards, and quality management systems. Learn about the process of obtaining regulatory approvals and clearances for medical devices. 22. Safety and Risk Assessment: Learn to assess and manage the risks associated with medical devices. Understand the concepts of risk analysis, hazard identification, risk mitigation, and risk management in the context of medical device development and usage. 23. Ethical and Legal Considerations: Develop an understanding of the ethical and legal considerations related to medical devices, including patient safety, privacy, confidentiality, and informed consent. Explore the ethical implications of medical device development, usage, and data management. 24. Interdisciplinary Collaboration: Recognize the importance of interdisciplinary collaboration in the development and deployment of medical devices. Develop teamwork and communication skills to effectively work with professionals from different disciplines.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• **Knowledge and Understanding**: Acquire a comprehensive knowledge and understanding of medical devices, including their classification, design principles, regulatory requirements, and ethical considerations. • **Design and Development Skills**: Develop skills in the design and development of medical devices, considering user needs, functionality, safety, and regulatory compliance. • **Risk Assessment and Management** • **Emerging Technologies and Innovations**: Stay updated with the latest advancements and emerging technologies in the field of medical devices. • **Ethical and Legal Awareness.** • **Interdisciplinary Collaboration** • **Quality Assurance and Post-Market Surveillance**: Apply quality assurance principles and practices to ensure the safety and effectiveness of medical devices. • **Critical Thinking and Problem-Solving**: Apply critical thinking skills to analyze and solve complex problems related to medical devices. Evaluate and propose solutions to challenges faced in the development, manufacturing, and usage of medical devices.

Indicative Contents المحتويات الإرشادية	Introduction to the concept of medical devices, Scientific principles in instrument development Overview of the medical device industry Ways to use the devices, Concepts of safety ethical aspects ,Definition of some terms scaling factors Classification of medical devices X-ray machine: X-ray tube, Thermal emission, Edison effect, Other parts of the x-ray machine heat dissipation methods, X-ray exposure and safety guidance radiation, Diagnostic x-rays [15h] Ionizing radiation, Radiation safety rules, Factors affecting X-ray radiation X-ray protection methods, How x-rays interact with patients, traditional film, Digital radiography and Kidney dialysis machine, Indications for hemodialysis, Dialysis goals, The working principle of the dialysis machine, [15h] Mid Exam Dialyzer, Dialysate, blood delivery system, Types of treatment, Control and monitoring and Cleaning and disinfection ABG blood gas analyzer, Blood gas test, Risks of blood gas testing, ABG Component, ABG Apps and Assessment of acid-base balance Pacemaker, Pacemaker components, Types of pacemaker, Indication for the use of a permanent pacemaker and The working principle of a pacemaker Pulmonary function tests (PFTs). The purpose of the test Testing of pulmonary function by PFTs, Spirometry, Modern spirometer, Lung volumes and capacities, Interpretation of the FEV1, FVC, and FEV1/FVC ratio Interpretation of spirometry, Graph pattern and score analysis and Chronic obstructive pulmonary disease [15h] CBC, Introduction, Classification of blood cells, Types of Automated Hematology Analyzers, Disadvantages of manual cell counting, CBC parts, reagents, Diluents, cleaning solution Ultrasound imaging, Ultrasound Physics, mechanical waves middle properties, Types of wave interactions with tissues controls, Power transformer and its main parts and Types of transducer Ultrasound imaging, photography patterns, Study transformers according to frequency, Study methods of adjusting power transformer geometry Characteristics of the sound image[15h] Doppler types and The use of ultrasound in treatment ECG, basic Concepts, ECG electrodes and Methods for connecting electrodes

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	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 types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5.3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

	المنهاج الاسبوعي النظري
	Material Covered
Week 1	Introduction to the concept of medical devices, Scientific principles in instrument development Overview of the medical device industry, Concepts of safety ethical aspects
Week 2	Definition of some terms scaling factors Classification of medical devices
Week 3	X-ray machine: X-ray tube, Thermal emission, Edison effect, Other parts of the x-ray machine
Week 4	heat dissipation methods, X-ray exposure and safety guidance, Diagnostic x-rays
Week 5	Ionizing radiation, Radiation safety rules, Factors affecting X-ray radiation X-ray protection methods, How x-rays interact with patients, traditional film, Digital radiography
Week 6	Kidney dialysis machine, Indications for hemodialysis, Dialysis goals, The working principle of the dialysis machine,
Week 7	Mid Exam
Week 8	Dialyzer, Dialysate, blood delivery system, Types of treatment, Control and monitoring and Cleaning and disinfection
Week 9	ABG blood gas analyzer, Blood gas test, Risks of blood gas testing, ABG Component, ABG Apps and Assessment of acid-base balance
Week 10	Pacemaker, Pacemaker components, Types of pacemaker, Indication for the use of a permanent pacemaker and The working principle of a pacemaker
Week 11	Pulmonary function tests (PFTs). The purpose of the test Testing of pulmonary function by PFTs, Spirometry, Modern spirometer, Lung volumes and capacities, Interpretation of the FEV1, FVC, and FEV1/FVC ratio Interpretation of spirometry, Graph pattern and Chronic obstructive pulmonary disease
Week 12	CBC, Introduction, Classification of blood cells, Types of Automated Hematology Analyzers, Disadvantages of manual cell counting, CBC parts, reagents, Diluents, cleaning solution
Week 13	Ultrasound imaging, Ultrasound Physics, mechanical waves middle properties, Types of wave interactions with tissues controls, Power transformer and its main parts and Types of transducer
Week 14	Ultrasound imaging, photography patterns, Study transformers according to frequency, Study methods of adjusting power transformer geometry Characteristics of the sound image, Doppler types and The use of ultrasound in treatment
Week 15	ECG, basic Concepts, ECG electrodes and Methods for connecting electrodes
Week 16	**Preparatory week before the final Exam**

	Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر
	Material Covered
Week 1 – week 14	HOSPITAL TRAINING

Learning and Teaching Resources

مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	D. Griffiths, Introduction to Quantum Mechanics Cambridge University Press, 2016.	No
Recommended Texts	Kenneth S. Krane, Introductory Nuclear Physics, John Wiley-1988	No
Websites		

			Grading Scheme	
		مخطط الدرجات		
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title اسم المادة او الوحدة	**Neurophysics**	**Module Delivery**	
Module Type نوع الوحدة	**Core**	☒ Theory ☐ Lecture ☒ L Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code كود الوحدة	**MPH-422**		
ECTS Credits 	**6**		
SWL (hr/sem)	**150**		
Module Level المرحلة الدراسية	4	**Semester of Delivery** الكورس	8
Administering Department القسم	MPH	**College** الكلية	كلية العلوم التطبيقية ـ هيت College of Applied Sciences - Heet
Module Leader مسؤول الوحدة	أ.د. عدي صباح عسكر	**e-mail** الاميل	Audai.sabah@uoanbar.edu.iq
Module Leader's Acad. Title العنوان الاكاديمي لمسؤول الوحدة	استاذ	**Module Leader's Qualification** مؤهلات مسؤول الوحدة	دكتوراه
Module Tutor مدرس مساعد	م.م.برهان ماجد نصار	**e-mai** الاميل	
Peer Reviewer Name اسم البديل	ا.م.د.مروان محمود صالح	**e-mai** الايميل	
Scientific Committee Approval Date تاريخ موافقة اللجنة العلمية	/ /2023	**Version Number** رقم الكورس	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module مادة اساسية تدرس قبلها	MPH-312	**Semester** الفصل الدراسي	5
Co-requisites module مادة دراسية تدرس معها مشتركة	Non	**Semester** الفصل الدراسي	Non

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	أهداف المقرر: 1-مساعدة الطالب على فهم الجهاز العصبي وعمله 2-مساعدة الطالب في فهم أجزاء الجهاز العصبي 3-معرفة طرق حماية الجهاز العصبي المركزي 4-تعلم انتقال الايعازات العصبية وتفاعلاتها 5-تعلم طرق الوقاية من الإصابات التي تسبب شلل أجزاء الجسم 6- الاعصاب المركزية والاعصاب المحيطية
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Cognitive goals أ- الأهداف المعرفية: 1-معرفة الجهاز العصبي وطريقة عمله 2- معرفة الخلايا العصبية ومكوناتها 3-دراسة الايعاز العصبي 4- معرفة الية انتقال الايعاز العصبي 5 معرفة التشابكات العصبية وانواعها 6 معرفة الاعصاب ومهامها في الجسم 7- الاليات المستخدمة لربط أجهزة الجسم بالجهاز العصبي
Indicative Contents المحتويات الإرشادية	الأهداف الوجدانية والقيمية: 1-تعلم مهارات العمل في مختبرات الاشعة السينية 2- التفريق بين مناطق العمود الفقري وعدد الفقرات 3- تعلم طرق ايصال الايعازات العصبية 4- تجربة الاعصاب المحيطية والاعصاب الدماغية ووظيفة كل عصب منها 5- كيفية حدوث الايعاز العصبي والقوس الانعكاسي 6- معرفة مضخات الايونات واهمها مضخة الصوديوم بوتاسيوم

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1- تنمية قدرة الطالب على التعلم وقراءة الابحاث التي تخص الاعصاب 2- تنمية مهارات البحث العلمي لدى الطالب 3- تحفيز الطالب على التجربة للبحث والتقصي 4- توجيه المجاميع من الطلاب لجمع معلومات حول انواع الايعازات المختلفة 5- تنمية قدرات الطالب للمساهمة في حماية نفسه والمجتمع من قطع العصب

Student Workload (SWL)			
الفصل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.7
Total SWL (h/sem)	**150**		

الحمل الدراسي الكلي للطالب خلال الفصل	

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	
	Assignments	2	10% (10)	2 and 12	
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	
Summative assessment	Midterm Exam	1hr	10% (10)	7	
	Final Exam	3hr	50% (50)	16	
Total assessment			100% (100 Marks		

Delivery Plan (Weekly+Lab Syllabus)

المنهاج الاسبوعي النظري والعملي

	Material Covered
Week 1	مقدمة عن الجهاز العصبي
Week 2	أعضاء الجهاز العصبي
Week 3	تقسيم الجهاز العصبي
Week 4	الخلية العصبية
Week 5	الايعاز العصبي
Week 6	القوس الانعكاسي
Week 7	Exam امتحان
Week 8	التشابك العصبي
Week 9	تولد الاستقطاب وزوال الاستقطاب
Week 10	مضخات الايونات
Week 11	مضخة الصوديوم -بوتاسيوم
Week 12	الجهاز العصبي المحيطي
Week 13	الاعصاب المحيطية
Week 14	الاعصاب الدماغية
Week 15	الإحساس والحواس
Week 16	ما قبل الامتحان النهائي مراجعة

	Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered	
Week 1	Lab 1: أجزاء المختبر	
Week 2	Lab 2: تشريح دماغ الحيوان	
Week 3	Lab 3: اقسام الجهاز العصبي	
Week 4	Lab 4: تفاعلات الايونات	
Week 5	Lab 5: تولد الجهد وفرق الجهد	
Week 6	Lab 6: الاتصال العضلي العصبي	
Week 7	Lab 7: الحواس الخمسة	

	Learning and Teaching Resources مصادر التعلم والتدريس	
	Text	**Available in the Library?**
Required Texts	1- علم وظائف الاعضاء	ـ الكتب المقررة المطلوبة
Recommended Texts مصادر للاطلاع	الدماغ تشريحه ووظائفه	الكتب والمراجع التي يوصى بها (المجلات العلمية ، التقارير

Websites مواقع الويب		المراجع الالكترونية، مواقع الانترنيت المكتبة الافتراضية مواقع المكتبات في بعض الجامعات العالمية

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)	**FX – Fail**	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

مدرس المادة / أ.د. عدي صباح عسكر

البريد الالكتروني / audai.sabah@uoanbar.edu.iq.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية				
Module Title	Radiotherapy Physics		**Module Delivery**	
Module Type	**Basic**		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	MPH-413			
ECTS Credits	**6**			
SWL (hr/sem)	**150**			
Module Level	4	**Semester of Delivery**		7
Administering Department	MPH	**College**	Applied sciences- HEET	
Module Leader	Yasser Yousef Ali	**e-mail**	yasirdr2003@gmail.com	
Module Leader's Acad. Title	Lecturer	**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	/ /2023	**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	MPH-323	**Semester**	6
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Physiotherapy course is determined according to the study plan prepared in the Department of Medical Physics. 2. The course aims to introduce the student to the general concepts of physiotherapy and its importance and uses in various fields. 3. It also aims to study in detail the different types of physiotherapy and its foundations. The course also aims to introduce the student to everything related to the subject.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	4. The student should know the general concepts of Physiotherapy. 5. To familiarize the student with the basics and rules of Physiotherapy. 6. That the student knows the basic principles and the importance of Physiotherapy.
Indicative Contents المحتويات الإرشادية	a- Methods of teaching and learning 1- Giving lectures. 2- Using the method of recitation, discussion and solving questions. 3- Giving assignments to students to strengthen them and prepare them for the final and final exams. b- Evaluation methods 1- Daily and monthly exams 2- Duties 3- In-class exercises

Learning and Teaching Strategies	
استراتيجيات التعلم والتعليم	
Strategies	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 types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.7

Total SWL (h/sem) 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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	1hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	**Introduction and principles in Physiotherapy**
Week 2	**Physiotherapy and Medical applications**
Week 3	**Methods used in Physiotherapy**
Week 4	**Factors to consider when using hydrotherapy**
Week 5	**Electrotherapy**
Week 6	**Thermotherapy**
Week 7	**Thermotherapy and physiotherapy**
Week 8	**First month exam**
Week 9	**Infrared**
Week 10	**laser therapy**
Week 11	**Traction therapy**
Week 12	**Kinesiotherapy**
Week 13	**Second month exam**
Week 14	**Massage therapy**
Week 15	**Relationship of the Department of Medical Physics and Physiotherapy**

Week 16	Comprehensive review, applications and problem solving

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	1-Use of ultra sound in treatment of wrist joint pain.
Week 2	Cervical traction for relieve neck pain.
Week 3	Lumbar traction for relieve back pain.
Week 4	TENS use in physiotherapy.
Week 5	Thermotherapy use in physiotherapists.
Week 6	Use of infrared in physiotherapy.
Week 7	Wax path and hand injury.

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	The End of Physiotherapy, Taylor & Francis, David A. Nicholls , 1-298, 2017.	No
Recommended Texts	Applied Sociology for Nursing & Allied Health Sciences, Jaypee Brothers Medical Publishers Pvt Limited, Tara Madhusudan. 1-250. 2022.	No
Websites	https://www.google.iq/books/edition/Applied_Sociology_for_Nursing_Allied_Hea/Bj15zwEACAAJ?hl=ar	

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)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – 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.

Dr. Yasser Yousef Ali

11 / 6 / 2023