MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information					
Module Title	NEUROPHYSICS			Module Delivery	
Module Type	C			☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	MPH-48138				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	4		Semester of Delivery	8	
Administering Department	Medical physics		College	Sciences	
Module Leader	Enaam Ahmed Hamza		e-mail	Dr.enaam.hamza@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification	Ph.D.	
Module Tutor	Samaher hazim sultan		e-mail	samaherhazim@uomosul.edu.iq	
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date	/06/2023		Version Number	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	MPH-36126	Semester	6
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	1. Clarification of how Neurobiophysics can make significant contributions to a 2. Identify the basic of neurobiophysics which are useful in in medical physics sciences. 3. This course deals with the basic concept of the nervous system 4. Learn about the most important classification of nervous system 5. To understand the relationship between body organs and nervous system. 6. Emphasizing the importance of maintaining a healthy body and preventing disease caused by imbalance in the function of the nervous system This will be achieved through, theoretical lectures, tutorials and laboratory
Module Learning Outcomes	1. List with description, the classification of nervous system and neuron. 2.. Summarize what is Action potential 3. Discuss the types of synapes. 4.teach students how to listen to different heart sound 5. teach students how to counnect EEG electrodes and read EEG 6 teach students how to work on EMG 7. teach students how toexamine optic nerve.
Indicative Contents	Itroduction of nervous system, structure and function ,classification[*9* hrs] Nervous tissue, neuron , classification of neuron , reflex . Neuroglia , types, function CNS, Spinal cord ,function , Human brain,lobes of brain, function [*9* hrs] Meninges ,types, disease Cerebrospinal fluid CSF[*9* hrs] Nerve impuls, action potential Synapse, types of synapes[*9* hrs] Neurotransmitters ,types , function

	Memory, model disease result in dysfunction of nervous system Sensory receptors, , function, types [9 hrs] Revision problem classes [4 hrs] Part B – Practical labs Biophysics of neuron Resting membrane potential Chemical to electrical transduction Signal summation Action potential Heart sound [15 hrs] Examination of ECG Examination of(EMG) Electromyography Vision test Hearing test Assessment of nervous system function Learing and memory[15 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents help to understand Medical physics science. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods for microfossils and 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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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)	2,5	CLO-1, CLO-2 _ CLO-4, CLO-5
	Assignments	2	10% (10)	7 and 12	CLO-4, CLO-6
	Projects / Lab.	6	10% (10)	Continuous	All
	Report	1	10% (10)	10	CLO -3, 8 and -10
Summative assessment	Midterm Exam	2hr	10% (10)	7	CLO-1, CLO-2, CLO-3, CLO-4 CLO-5 and CLO-6
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

ملاحظة: في حالة كون المادة لا تحتوي على جانب عملي تضاف الدرجة الخاصة بها الى أي محور اخر يختاره استاذ المادة من تفصيلات الدرجة اعلاه

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction of nervous system,
Week 2	structure and function ,classification
Week 3	Nervous tissue, neuron , classification of neuron
Week 4	Neuroglia , types, function
Week 5	Spinal cord,function , reflex
Week 6	Human brain,lobes of brain, function
Week 7	Meninges ,types, disease
Week 8	Cerebrospinal fluid CSF
Week 9	Nerve impuls, action potential
Week 10	Synapse, types of synapes
Week 11	Neurotransmitters ,types , function
Week 12	Memory, model disease result in dysfunction of nervous system
Week 13	Sensory receptors, , function, types
Week 14	
Week 15	

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Biophysics of neuron
Week 2	Resting membrane potential
Week 3	Chemical to electrical transduction
Week 4	Signal summation
Week 5	Action potential
Week 6	Heart sound
Week 7	Examination of ECG
Week 8	Examination of(EMG) Electromyography
Week 9	Vision test
Week10	Hearing test
Week 11	Assessment of nervous system function
Week 12	Learing and memory

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts		
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					
Module Title	Optics			Module Delivery	
Module Type	C			☒ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☒ Practical ☐ Seminar	
Module Code	MPH-2319				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	2		Semester of Delivery	3	
Administering Department	Medical physics		College	Sciences	
Module Leader	Huda Masood Mohammed		e-mail	huda.phy@uomosul.edu.iq	
Module Leader's Acad. Title	Instructor		Module Leader's Qualification	Ph.D.	
Module Tutor			e-mail		
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date	/06/2023		Version Number		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	MPH-1204	Semester	2
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	1. Study the hypotheses and theories that studied the nature of light and the phenomena that explained it, with the important knowledge such as the electromagnetic spectrum. 2. Identify the importance of studding the geometrical law of light such as reflection and refraction to understand how the light transmit in the medium. 3. Learn about the most important scientific terms (Terminology) and their definitions related to this topic, such as RADIOMETRY. 4. This course deals with the basic concept of light by its law: Huygens' principle, Fermat's principle. 5. Discuss the impact of the imaging by an optical system. 6. Understand and comprehend the optical instrumentation, such as the Camera, and Microscopes. 7. To understand the wave equation, and superposition of waves. 8. At the end of the course the students will have broad knowledge of the basic concepts, technique and applications of biophysics. This will be achieved through, theoretical lectures, tutorials and laboratory.
Module Learning Outcomes	1. Define the various terms of light phenomena. 2. Define radiometry, and radiation and their importance in medical science. 3. Summarize the optical system features, and the geometrical laws. 4. Discuss the general properties of light and the wave equation. 5. Describe the geometry of light in the optical instrument and how the image formation. 6. Define light and identify the laws of light and its interactions with body's tissues. 7. Explain the light diffusion and their equations.
Indicative Contents	<u>Part A – Theoretical lectures</u> Introduction: Properties of Light, Electromagnetic Spectrum. [2hr] Geometrical Laws of light: Reflection, Refraction and their application and techniques. [2hr] Geometrical Optics: Huygens' Principle and Fermat's principle.[2hr] Principle of Reversibility, Reflection in Plane Mirrors, Refraction Through Plane Surfaces. [2hr] Imaging by an Optical System. [2hr] Reflection at a Spherical Surface, Refraction at a Spherical Surface, Thin Lenses, Newtonian Equation for the Thin Lens. [4hr] Optical Instrumentation: Prisms, The Camera, Microscopes, Telescopes. [2hr] Wave Equations: One-Dimensional Wave Equation, Harmonic Waves, Plane Waves, Spherical Waves. [2hr] Superposition of Waves, Superposition Principle. [3hr], Random and Coherent Sources, Standing Waves. [2hr] Optics of the Eye, Biological Structure of the Eye, Functions of the Eye. [3h] Vision Correction with External Lenses, Surgical Vision Correction. [2hr] , Optical Properties of Materials, Propagation of Light Waves. Fiber Optics, Applications, medical application. [3hr]

	Part B – Practical labs The focal length of convex lenses using a graphical method. [2hr] Focal length of concave mirror. [2hr] ,Focal length of convex mirror. [2hr] Focal length of lens. [2hr] Snell's chart test vision [2hr] The refraction index of a glass prism [2hr] The refraction index of glass block [2hr] The index coefficient by concave mirror [2hr]
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about optics science and its contents. In addition to the use of different tools and experiments in distinguishing the light interaction through observations and measuring. This will be achieved through lectures, labs, and interactive tutorials and by types of practical activities.

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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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)	6 and 10	CLO-1, CLO-2 , CLO-5, CLO-9 , CLO-12
	Assignments	4	10% (10)	3, 5, 7, 12	CLO-4, CLO-6
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	
Summative assessment	Midterm Exam	2 hr	10% (10)	7	
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

ملاحظة: في حالة كون المادة لا تحتوي على جانب عملي تضاف الدرجة الخاصة بها الى أي محور اخر يختاره استاذ المادة من تفصيلات الدرجة اعلاه

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction: Properties of Light, Electromagnetic Spectrum.
Week 2	Geometrical Laws of light: Reflection, Refraction and their application and techniques.
Week 3	Geometrical Optics: Huygens' Principle and Fermat's principle.
Week 4	Principle of Reversibility, Reflection in Plane Mirrors, Refraction Through Plane Surfaces.
Week 5	Imaging by an Optical System
Week 6	Reflection at a Spherical Surface, Refraction at a Spherical Surface.
Week 7	Thin Lenses, Newtonian Equation for the Thin Lens
Week 8	Optical Instrumentation: Prisms, The Camera, Microscopes, Telescopes.
Week 9	Wave Equations: One-Dimensional Wave Equation, Harmonic Waves, Plane Waves, Spherical Waves.
Week 10	Superposition of Waves, Superposition Principle.
Week 11	Random and Coherent Sources, Standing Waves.
Week 12	Optics of the Eye, Biological Structure of the Eye, Functions of the Eye.
Week 13	Vision Correction with External Lenses, Surgical Vision Correction.
Week 14	Optical Properties of Materials, Propagation of Light Waves.
Week 15	Fiber Optics, Applications, medical application.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab Report Guidelines
Week 2	How to Draw Graphs ?
Week 3	Physical quantities, unit conversion
Week 4	The focal length of convex lenses using a graphical method
Week 5	Focal length of concave mirror
Week 6	Focal length of convex mirror
Week 7	Focal length of lens
Week 8	Snell's chart test vision
Week 9	The refraction index of a glass prism
Week10	The refraction index of glass block
Week 11	The index coefficient by concave mirror

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	• FRANK L. PEDROTTI, S.J., LENO M. PEDROTTI, LENO S. PEDROTTI , “Introduction to optics”, third edition,.	Yes
Recommended Texts	• F.A Jenkins and H.E. White, “Fundamentals of Optics”;-Mc. grow-Hill prim 1Custom publishing, 2001.	yes
Websites	https://sciences-library.blogspot.com/2018/03/Book-of-Optics-pdf.html?m=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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Organic Chemistry**			Module Delivery	
Module Type	**C**			☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	**MPH-1217**				
ECTS Credits	7				
SWL (hr/sem)	175				
Module Level	1		Semester of Delivery	2	
Administering Department	Type Dept. Code		College	Type College Code	
Module Leader	Eman Muwafaq Ramadthan		e-mail	emanmuwafiq@uomosul.edu.iq	
Module Leader's Acad. Title	Lecturer		Module Leader's Qualification	Msc .	
Module Tutor	Eman Bahjat		e-mail	emanbahjat@uomosul.edu.iq	
Peer Reviewer Name	Muna subhy		e-mail	munasubhy@uomosul.edu.iq	
Scientific Committee Approval Date	02/06/2023		Version Number	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	MPH-1102	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. Clarification of how hydrocarbons can make significant contributions to in chemistry science . 2. Identify hydrocarbons and IUPAC Nomenclature of alkane , alkenes and alkynes which are useful in chemistry-. 3. This course deals with the basic concept of the most important preparation of alkane , alkene and alkynes and this modulare. 4. Learn about the most important scientific terms (Terminology) and their definitions related to this topic. 5. To understand the impact of these Uses of alkenes and alkynes and isomerism . in chemistry 6. To perform different applications of properties of saturated and un saturated hydrocarbons . .
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. Discuss the properties and involvement of hydrocarbons and IUPAC Nomenclature of alkane , alkenes and alkynes 2.Define saturated hydrocarbons ,unsaturated hydrocarbons and aromatic hydrocarbons 3. Identify the alkanes , alkenes and alkynes. 4. Explain the preparation of alkane , alkene and alkynes. 5.List and Describe the properties of saturated and un saturated hydrocarbons . . 6.Identify the Uses of alkenes and alkynes and isomerism .
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> Hydrocarbons , What are hydrocarbons , Classification and types of Hydrocarbons Types of Hydrocarbons , Alkanes , Saturated Hydrocarbons , List of alkanes and its structure Physical properties of alkanes , Alkanes Formula and its Condensed structure Alkane Formula chemistry , Branched chain alkane formula Alkyl groups , preparation of alkane from unsaturated hydrocarbons. [*10* hrs] Alkenes ,unsaturated Hydrocarbons , Physical properties of alkenes Classification of alkenes , Uses of alkenes Method of preparation of alkenes in the laboratory [*8* hrs] Alkyne , Isomerism in alkyne , Tastes for the presence of a triple bond Uses of alkyne , preparation of alkynes from vicinal dihalides and calcium carbide IUPAC Nomenclature of alkanes , alkenes and alkynes .[*10* hrs]

	Aromatic hydrocarbons , properties of aromatic hydrocarbons Reaction of Aromatic hydrocarbons. [8 hrs] Uses of Aromatic hydrocarbons , polycyclic aromatic hydrocarbons .[3 hrs] <u>Part B – Practical labs</u> EXP1: Determination of melting point EXP2: Determination of boiling point EXP3: Simple distillation EXP4 : Fractional distillation EXP5 : steam distillation EXP 6: Recrystallization EXP7: Sublimation. [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Develop student skill in studying organic chemistry and studying hydrocarbons aliphatic and aromatic and saturated and unsaturated hydrocarbons and method of preparation them .

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	6.5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	81	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.5
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	LO #1, #2 and #3, #5
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6,
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #3 #4 and #6
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #6
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Hydrocarbons , What are hydrocarbons , Classification and types of Hydrocarbons
Week 2	Types of Hydrocarbons , Alkanes , Saturated Hydrocarbons , List of alkanes and its structure
Week 3	Physical properties of alkanes , Alkanes Formula and its Condensed structure
Week 4	Alkane Formula chemistry , Branched chain alkane formula
Week 5	Alkyl groups , preparation of alkane from unsaturated hydrocarbons
Week 6	preparation of alkane from alkyl halide, preparation of alkane from carboxylic acid
Week 7	Alkenes ,unsaturated Hydrocarbons , Physical properties of alkenes
Week 8	Classification of alkenes , Uses of alkenes
Week 9	Method of preparation of alkenes in the laboratory
Week 10	Alkyne , Isomerism in alkyne , Tastes for the presence of a triple bond
Week 11	Uses of alkyne , preparation of alkynes from vicinal halides and calcium carbide
Week 12	IUPAC Nomenclature of alkanes , alkenes and alkynes
Week 13	Aromatic hydrocarbons , properties of aromatic hydrocarbons
Week 14	Reaction of Aromatic hydrocarbons
Week 15	Uses of Aromatic hydrocarbons , polycyclic aromatic hydrocarbons

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1:. Introduction of organic chemistry
Week 2	Lab 2: Requirements of organic process such as glass ware
Week 3	Lab 3:Determination of melting poi
Week 4	Lab 4: Determination of boiling point
Week 5	Lab 5: Simple distillation
Week 6	Lab 6: Fractional distillation
Week 7	Lab 7:. steam distillation
Week 8	Lab 8: Recrystallization
Week 9	Lab9. Sublimation
Week10	Lab 10: Detectore
Week 11	Lab 11:Methane gas
Week 12	Lab 12: Ethane gas

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Second Edition ,(1974). 2. Laboratory text for organic chemistry ..4th .ed. by Roy and F. Bossert and Wallace . R.B.rode .	Yes
Recommended Texts	Organic experiments by Lois.F.Fieser and Kenneth L.Williamson 5th. ed.	Yes
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	**Phonetics Science**			Module Delivery	
Module Type	**B**			☒ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	MPH-24118				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	2		Semester of Delivery	4	
Administering Department	Type Dept. Code		College	Type College Code	
Module Leader	Marwan Zuhair Elias		e-mail	marwanzt@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification	Ph.D.	
Module Tutor			e-mail		
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date	02/06/2023		Version Number	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	MPH-1204	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	1. Clarification of how sound and wave motion can make significant and contribute to a wide range of technical applications. 2. Identify basic of sound and wave motion. 3. This course deals with the basic concept of the most important elements in wave motion such as Free Vibration, structure of simple harmonic motions and Embedded vibration 4. Learn about the most important scientific terms (Terminology) and their definitions related to this topic. 5. To understand and comprehend the impact of these elements from Physics point of view. 6. To understand the applications of ultrasound in medical fields
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. To know about wave motion in details 2. To understand structures of wave motion 3. To understand energy diagrams related to sound 4. To comprehend conditions of movement of wave motion 5. To go through applications of wave motion and Forced Vibration. 6. To experience transversal waves in one dimension 7. To experience Longitudinal Waves analysis and application.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures Chapter One (Basic Concepts of wave motion): Introduction, procedures of energy transfer, what is the wave motion? Types of wave motion, essential properties of mechanical wave motion, examples of mechanical wave motion, sound waves, types of mechanical wave motion, Characteristics of mechanical wave motion, velocities of Wave and particles, mathematical present of wave motion, general equation of wave motion. [*10* hrs] Chapter Two (Free Vibration): Introduction, oscillatory motion, Simple harmonic motion equation, solution of Simple harmonic motion equation, instantaneous velocity and instantaneous acceleration of the simple harmonic oscillator, The energy of the simple harmonic oscillation, applications of simple harmonic motion (a simple pendulum, a floating body, a liquid in a U tube, bonded mass and oscillating wire, piston in cylinder, deflectors, simple angular motion). [*8* hrs] Chapter Three (structure of simple harmonic motions) Composition rule, a combination of two simple harmonic motions in the same direction, Lissajous figures, the composition of two perpendicular simple harmonic motions of the same frequency, The graphic method for the composition of two simple harmonic movements perpendicular, the composition of two simple harmonic movements perpendicular to their frequency ratio 1:2, the beats. [8 hrs]

	Chapter Four (Embedded vibration) Introduction, the force causing vibration decay, decaying harmonic motion equation, solution of decaying harmonic motion equation (non-decay state, under-decay state, critical state, over-decay state, decay measurement (logarithmic decay, relaxation time, specificity equation). [8 hrs] Chapter Five (Forced Vibration) Introduction, Equation of Motion for a Decaying Vibrator Under the Action of a Periodic External Force, solution of forced vibration equation, resonance, the amplitude of vibration at resonance, the relationship between the resonant frequency, the natural frequencies of the oscillator, the relationship of phase angle, forced frequency and resonance. [4 hrs] Chapter 6, 7 and 8 (transversal waves in one dimension and Longitudinal Waves) Introduction, Vibrational motion and wave motion, Transverse wave motion in one dimension, Equation of transverse wave motion in an oscillating string, Transverse wave energy, Wave reflection (at the stationary end of a bonded wire, at the free end, at the movable shelf of tight wire), standing waves, Free Vibration of a Stringed String of Limited Length, Sonometry, Laws of Vibrating Strings. [4 hrs] Ultrasound and its Applications Introduction, a brief history of ultrasonic waves, the mechanism of the formation of ultrasonic waves, Audio, components of the ultrasound device, the effect of ultrasonic waves on vital cells, the behaviour of ultrasound waves in the human body, some applications of ultrasound (Detection of defects and cracks, estimation of works s by resonance, metallurgy, biomedical applications) [3 hrs] Revision problem classes [3 hrs] Part B – Practical labs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents. In addition, assisting students in knowledge gathering of basic sound and wave motion principles and concepts through understanding behaviors of certain wave components. Practical work should enhance perceptions of students about particular design and analysis of wave motion.

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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	77	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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 #9, #10
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #5, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #12
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #9
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Basic Concepts of wave motion.
Week 2	Free Vibration
Week 3	structure of simple harmonic motions
Week 4	Embedded vibration
Week 5	Forced Vibration
Week 6	transversal waves in one dimension
Week 7	Longitudinal Waves

Week 8	Sound Waves
Week 9	General Considerations in Sound and
Week 10	Wave Phenomenon
Week 11	Ultrasound
Week 12	Ultrasound and its Applications
Week 13	Mechanism of the formation of ultrasonic waves
Week 14	estimation of works s by resonance
Week 15	Doppler phenomenon

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	
Week10	
Week 11	
Week 12	
Week 13	
Week 14	
Week 15	

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	فيزياء الصوت والحركة الموجية ، د.امجد عبد الرزاق	Yes
Recommended Texts	Mechanics and Properties of Matter , By: Kohle.	Yes
Websites	Any website includes above materials	

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					
Module Title	Phsiology			Module Delivery	
Module Type	S			☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	MPH-23111				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	2		Semester of Delivery	3	
Administering Department	Medical physics		College	Sciences	
Module Leader	Enaam Ahmed Hamza		e-mail	Dr.enaam.hamza@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification	Ph.D.	
Module Tutor	Samaher hazim sultan		e-mail	samaherhazim@uomosul.edu.iq	
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date	/06/2023		Version Number	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	MPH-1216	Semester	2
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	1. Clarification of how physiology can make significant contributions to a 2. Identify the basic of cell and human physiology which are useful in in medical physics sciences. 3. This course deals with the basic concept of the most important cell as living units of the body, molecular movement and cell ,body fluid , cell junction and locomotion. 4. Learn about the most important scientific human physiology of number of body systems. 5. To understand the relationship between body organs. 6. Emphasizing the importance of maintaining a healthy body and preventing disease caused by imbalance in the function of the organs of the body This will be achieved through, theoretical lectures, tutorials and laboratory
Module Learning Outcomes	1. Identify different lab tools and how to use the microscope 2. Learn how to count RBCs and discuss some medical aspects related to it.. 3. Definition of the molecular movement of cell. 4. Identify different types of WBCs and discuss their function and related medical aspects. 5. Learn how to get PCV (Hematocrit) and discuss some medical aspects related to it.. 6. Learn how to get bleeding time and discuss some medical aspects related to it.. 7. Learn how to do blood grouping test and discuss some medical aspects related to it.
Indicative Contents	Introduction, Cell membrane and permeability, cytoplasm and its organelles . Ingestion by the cell, endocytosis, exocytosis. Molecular movement , passive and active transport Body fluid ,. [*10* hrs] Cellular junction(gap, anchoring , occluding) locomotion of the cell . [*8* hrs] Tissue types and function . Physiology of digestive system . Physiology of muscular system . [*10* hrs] Physiology of respiratory system. Physiology of urinary system Physiology of cardiovasecular system Disease result from dysfunction of body organs [8 hrs] Revision problem classes [3 hrs]

	Part B – Practical labs Erythrocyte sedmentation . Rate- blood pressure Estimation of hemoglobin- erythrocyte Osmotic fragility test Packed cell volumetes (PCV) Differential count of WBC [18 hrs] WBC count Total RBC count Bleeding times-blood group- Platelet count Low density lipoprotein Liver function test Megnesium test [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents help to understand Medical physics science. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods for microfossils and 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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	45	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
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)	2,5	CLO-1, CLO-2 _ CLO-4, CLO-5
	Assignments	2	10% (10)	7 and 12	CLO-4, CLO-6
	Projects / Lab.	6	10% (10)	Continuous	All
	Report	1	10% (10)	10	CLO -3, 8 and -10
Summative assessment	Midterm Exam	2hr	10% (10)	7	CLO-1, CLO-2, CLO-3, CLO-4 CLO-5 and CLO-6
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

ملاحظة: في حالة كون المادة لا تحتوي على جانب عملي تضاف الدرجة الخاصة بها الى أي محور اخر يختاره استاذ المادة من تفصيلات الدرجة اعلاه

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Cell membrane and permeability, cytoplasm and its organelles
Week 2	Ingestion by the cell, endocytosis, exocytosis
Week 3	Molecular movement , passive and active transport
Week 4	Body fluid ,
Week 5	Cellular junction(gap, anchoring , occluding)
Week 6	locomotion of the cell
Week 7	Tissue types and function
Week 8	Physiology of digestive system
Week 9	Physiology of muscular system
Week 10	Physiology of respiratory system
Week 11	Physiology of urinary system
Week 12	Physiology of cardiovasecular system
Week 13	
Week 14	

Week 15	

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Erythrocyte sedmentation
Week 2	Rate- blood pressure
Week 3	Estimation of hemoglobin- erythrocyte
Week 4	Osmotic fragility test
Week 5	Packed cell volumetes (PCV)
Week 6	Differential count of WBC
Week 7	WBC count
Week 8	Total RBC count
Week 9	Bleeding times-blood group- Platelet count
Week10	Low density lipoprotein
Week 11	Liver function test
Week 12	Megnesium test

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	**Human anatomy and physiology (2020) by** **Dr. S. B. BHISE** **Dr. A.V.YADAV**	
Recommended Texts	Essential medical physiology (20019) By Prem sembulingam, K Sembulingam	
Websites	ttps://www.britannica.com/science/cell-biologyhttps://www.cambridge.org/core/books/clinical-physiology/cel https://www.britannica.com/science/human-body	

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					
Module Title	Physics of Diagnostic radiology			Module Delivery	
Module Type	C			☒Theory ☒ Lecture ☐ Lab ☒ Tutorial ☒Practical ☐ Seminar	
Module Code	MPH-35122				
ECTS Credits	6.00				
SWL (hr/sem)	150				
Module Level	3		Semester of Delivery	5	
Administering Department	Medical physics		College	Sciences	
Module Leader	Marwan Zuhair Elias		e-mail	marwanzt@uomosul>edu.iq	
Module Leader's Acad. Title	Ass. Prof		Module Leader's Qualification	Ph.D.	
Module Tutor	Huda Masood Mohammed		e-mail	Huda.phy@uomosul.edu.iq	
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date	/06/2023		Version Number		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	MPH-24013	Semester	4
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	1. Study the fundamentals of radiation and radioactivity. 2. Identify the importance of studding radiation and its effects on the matter and tissue. 3. This course deals with the basic concept of radiation, radiation protection and how the image generate. 4. Learn about the most important scientific terms (Terminology) and their definitions related to this topic, such as radiology. 5. To perform different radiation applications to diagnostic different disease. 6. To perform and develop new techniques for diagnosing machine. *For example*: x-ray, CT scan. 7. At the end of the course the students will have broad knowledge of the basic concepts, technique and applications of radiation. This will be achieved through, theoretical lectures, tutorials and laboratory.
Module Learning Outcomes	1. Define the various terms of radiation science. 2. Define radiation and their importance in medical applications. 3. Summarize the radiation measurements, and Special radiographic techniques. 4. Explain Diagnostic ultrasound. 5. List and Describe the Magnetic resonance imaging and the basic principle of nuclear magnetism, effect of an external magnetic field, and relaxation processes. 6. Discuss the Special radiographic techniques, such as Mammography.
Indicative Contents	Part A – Theoretical lectures -Fundamentals of radiation physics and radioactivity [4hr]. Production of x-rays [2hr] - Interaction of x-rays and gamma rays with matter and the interaction processes. [4hr]. - Radiation measurement [4hr]. -The image receptor and The radiological image [4 hr] - Tomographic imaging with x-ray, and Special radiographic techniques [4hr]. - -Diagnostic imaging with radioactive materials [2hr] - Positron emission tomographic imaging (PET): [2hr] - Practical radiation protection and legislation [1hr] - Diagnostic ultrasound [4hr] - -Magnetic resonance imaging [4hr]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	- Expanding students' perceptions about radiation science. - In addition to the use of different tools and experiments in distinguishing the radiation interaction with tissue through observations and measuring. This will be achieved through lectures, labs, and interactive tutorials and by types of practical activities.

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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	56	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
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)	6 and 10	CLO-1, CLO-2 , CLO-5, CLO-9 , CLO-12
	Assignments	4	10% (10)	3, 5, 7, 12	CLO-4, CLO-6
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	1	
Summative assessment	Midterm Exam	2 hr	10% (10)	7	CLO-1, CLO-2, CLO-3, CLO-4 and CLO-5
	Final Exam	4 hr	50% (50)	16	All
Total assessment					

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	- Fundamentals of radiation physics and radioactivity: Structure of the atom, nuclear stability and instability, radioactive decay process, exponential decay, Half-life, biological and effective half-life, Quantum properties of radiation, inverse square law, interaction of radiation with matter.
Week 2	-Production of x-rays: The x-ray spectrum, components of the x-ray tube, spatial distribution of x-ray.
Week 3	- Interaction of x-rays and gamma rays with matter: Introduction to the interaction processes (bound and free electron, attenuation, scatter and absorption), the interaction processes (elastic scattering, photoelectric effect, the Compton effect).
Week 4	- Radiation measurement: Ionization, the ionization chamber, the Geiger-Muller counter, semi-conductor detectors.
Week 5	-The image receptor: Analogue and digital images, fluorescence, x-ray film, reciprocity, digital radiography, film digitization.
Week 6	-The radiological image: The primary image, effect of overlying and underlying tissue, grids, resolution and unsharpness, image processing.
Week 7	-Tomographic imaging with x-ray: Longitudinal tomography, principle of x-ray computed tomography, single slice CT, multi-slice CT, image quality, special applications.
Week 8	-Special radiographic techniques: Mammography, high voltage radiography, magnification radiography, subtraction techniques, interventional radiology.
Week 9	-Diagnostic imaging with radioactive materials: Principle of imaging, factor affecting the quality of radionuclide images, data display.
Week 10	-Positron emission tomographic imaging (PET): PET radionuclide production and properties, detector geometry, detector construction,

	detector resolution, image formation, image reconstruction.
Week 11	-Radiobiology and generic radiation risks: Radiation sensitivity of biological materials, radiation weighting factors, generic risk factors.
Week 12	-Radiation dose and risks to patient: Why are dose measured? Principle of patient dose measurement, review of patient doses, effect of digital receptors on patient dose.
Week 13	-Practical radiation protection and legislation: Role of radiation protection in diagnostic radiology, patient protection, x-ray rooms.
Week 14	-Diagnostic ultrasound: The ultrasound wave and the principles of echo mapping, production of echoes, ultrasound props, and how they work. diagnostic ultrasound modes.
Week 15	-Magnetic resonance imaging: Basic principle of nuclear magnetism, effect of an external magnetic field, relaxation processes.

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	
Week10	
Week 11	
Week 12	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	P. P. Dendy, B. Heaton, “physics for diagnostic radiology”, 3rd edition, 2012.	yes
Recommended Texts	D.R. Dance, et al “diagnostic radiological physics”, 2014.	On web
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	**Physics of nuclear medicine**			Module Delivery	
Module Type	**Core**			☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	**MPH-36027**				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	3		Semester of Delivery	6	
Administering Department	Type Dept. Code		College	Type College Code	
Module Leader	Khalid Qasim Kheder		e-mail	khalid.alshawi@uomosul.edu.iq	
Module Leader's Acad. Title	Lecturer		Module Leader's Qualification	Ph.D.	
Module Tutor	Aseel Abdulmonem Al Layla		e-mail	asselallayla@uomosul.edu.iq	
Peer Reviewer Name	Name		e-mail	E-mail	
Scientific Committee Approval Date	06/06/2023		Version Number	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Introducing the students to the basics of nuclear physics. Classification of radiation. Ionizing and nonionizing radiation. Classification of ionizing radiation. Radioactivity, Alpha Decay. Beta decay. Gamma decay. Nuclear binding energy. Nuclear fusion and fission. Photon interactions with matter. Exponential absorption of photon beam in absorber. Radiobiology. Radiation effects and time scales. Molecular effects of radiation and their modifiers. DNA damage and repair. Cellular effects of radiation. Concept of cell death. Cell survival curves. Gross radiation effects on tumors and tissues/organs. Basic principles of radiation protection.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Knowledge and understanding: A - Preparing trained and qualified cadres to work in scientific institutions, health and industrial centers. B- Enable the student to know and understand the nuclear material and the properties of the nuclei (theoretical and practical) and use them in community service. 2. Special skills: A- Acquires skill in dealing with all types of nuclear radiation and its sources B- Work in the field of radiation shielding and ways of protection from radiation. C -Work in the field of combating radioactive contamination in any area exposed to radiation D- Working in the field of radiotherapy and nuclear medicine, as a person who possesses skill in the basis of the mechanism of action of medical devices, especially in scans and diagnostics with magnetic separators, in addition to CT-SCAN diagnostics in positron emission. E- Express the basic concepts of nuclear physics. F- It can tell the chronology of some major events in nuclear physics. G- Familiarize yourself with some introductory terms Units and dimensions can be used. H- It can express radioactive decay, and it can show some quantities that characterize decay such as half-life, decay constant.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1 Nuclear Properties : charge of nuclei ,radius of nuclei, , mass excess , mass spectroscope , nuclear binding energy , separation energy , semi empirical mass formula , magnetic dipole moment ,quadrupole electric moment , parity , fermi Dirac , and Bose Einstein statistics. 2- Radioactivity: Law decay , half life , mean life , total number of radioactive nuclei , mixture of radioactive samples , production of radioactive isotopes by a decaying parent , transient equilibrium , ideal equilibrium , time of maximum activity of daughter product , multi processes decay , width of decaying states , units of radioactivity .

	3- Interaction of radiation with matter: Breaking radiation , interaction of charged particle with matter , heavy charged particle , energy loss by collision , electron interaction , neutron slowing down . 4- Alpha decay : The radiation series , energetic of alpha decay , alpha decay systematic , theory of alpha emission , hindrance factor , rang – energy relationship . 5 – Beta –Decay : Neutrino hypothesis , parity non conservation , energy release in beta decay , fermi theory in beta decay , shape of beta spectrum ,neutrino mass measurement , total decay rate and life time of beta decay selection rules . 6- Gamma decay : interaction of gamma ray with matter , annihilation electromagnetic transition probability , selection rules , internal conversion , Mossbauer effect. 7- Nuclear reaction : type of nuclear reaction , energetic of nuclear reaction , exoergic reactions , endoergic reactions , threshold energy , nuclear reaction cross-section , theories of nuclear reaction , compound – nucleus reactions , direct reaction resonance reactions , cross –section and Breit – Wigner formula. 8- Radiobiology: biological properties of ionizing radiation. Molecular effects of radiation and their modifiers Radiation induced damage to biological targets may result from direct or indirect action of radiation. 9. Radiation Protection: basic principles of radiation protection.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Teaching strategies vary according to the grade level and subject being taught. The most common teaching strategies are: direct instruction, indirect instruction, interactive instruction, independent study and experimental learning. Simply put, a teaching strategy is the way an instructor chooses to convey information and facilitate learning. Generally, teaching strategies fall into one of two categories: active learning or inclusive teaching. Active learning involves directing students to analyze course material. For example, giving a lecture, assigned readings, group discussions and class activities that involve problem solving are all active learning teaching strategies. Direct instruction, indirect instruction, independent study and interactive instruction are all teaching strategies that are considered to be active learning. On the other hand, inclusive teaching means instructors vary their teaching strategy according to the learning styles of their students to include all students in the learning process. A teacher may employ a number of active learning methods to teach students; the difference is that active learning involves using one method for all students and inclusive teaching involves using several different active learning strategies simultaneously. Because the goal of inclusive teaching is adapting to

	learning styles, experimental learning is most often used for inclusive teaching.

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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري (الكورس الأول)	
	Material Covered
Week 1	Introduction to Nuclear Medicine.
Week 2	Stable properties and dynamic properties :
Week 3	Magnetic dipole moment and electric quadrupole moment

Week 4	Parity and Statistics , Discussion and Quiz :
Week 5	Introduction to radioactivity Law decay , half life , mean life , total number of radioactive nuclei , , transient equilibrium , ideal equilibrium , time of maximum activity of daughter product , multi processes decay , width of decaying states , units of radioactivity .
Week 6	Mixture of radioactive samples , production of radioactive isotopes by a decaying parent
Week 7	Transient equilibrium , ideal equilibrium , time of maximum activity of daughter product , multi processes decay , width of decaying states , units of radioactivity .
Week 8	Interaction of radiation with matter: Breaking radiation , interaction of charged particle with matter
Week 9	Heavy charged particle , energy loss by collision ,
Week 10	Electron interaction , neutron slowing down .
Week 11	Discussion and Quiz
Week 12	Radiobiology. Biological properties of ionizing radiation
Week 13	Molecular effects of radiation and their modifiers. Role of oxygen. DNA damage and repair
Week 14	Radiation protection, basic principles of radiation protection . Radiation protection quantities and units
Week 15	Discussion and Quiz

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	
Week10	
Week 11	
Week 12	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1- Nuclear medicine physics : a handbook for students and teachers. — Vienna : International Atomic Energy Agency, 2014. 2- 2-Introductry nuclear physics, Sixth Edition, Samuel_S._M._Wong, Washington University Press, 2006.	Yes Yes
Recommended Texts	An Introduction to Nuclear Physics Second edition W. N. COTTINGHAM University of Bristol D. A. GREENWOOD University of Bristol. Cambridge University Press 1986, 2004.	Yes
Websites	1- https://www.googleadservices.com/pagead/aclk?sa=L&ai=DChcSEwjOudmM-bX_AhVOh9UKHZnqCbUYABAEGgJ3cw&ohost=www.google.com&cid=CAESbeD2PPoqoHQgZvYn88kL70JmUq-C-MHL2XeyHkcl-NboHZeOacm1QIoWyCu4Xy39naNO6WaMX5V25wPfaoLcxdIAZy5ujcp-Wi9N0-UkoIT5b0qphQ2eLOkURcTJNGpUfiy2CYTJeS2hRXRaXJA&sig=AOD64_3iXS7Qe3FxLIINUXVdAPfCBIz_wg&q&adurl&ved=2ahUKEwjR1dKM-bX_AhW3XfEDHaWMCoQQ0Qx6BAgCEAE 2- https://www.googleadservices.com/pagead/aclk?sa=L&ai=DChcSEwjOudmM-bX_AhVOh9UKHZnqCbUYABAGGgJ3cw&ohost=www.google.com&cid=CAESbeD2PPoqoHQgZvYn88kL70JmUq-C-MHL2XeyHkcl-	

	NboHZeOacm1QloWyCu4Xy39naNO6WaMX5V25wPfaoLcxdlAZy5ujcp-Wi9N0-UkolT5b0qphQ2eLOkURcTJNGpUfiy2CYTJeS2hRXRaXJA&sig=AOD64_1WWke3gB5usSCwZRSF33Woil79Zg&q&adurl&ved=2ahUKEwjR1dKM-bX_AhW3XfEDHaWMCoQQ0Qx6BAgIEAE 3- https://www.energy.gov/science/np/nuclear-physics

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					
Module Title	physiology of infectious diseases			Module Delivery	
Module Type	Elective			☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	MPH-48041				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level	4		Semester of Delivery	8	
Administering Department	Medical physics		College	**College of Science**	
Module Leader	Sumaya Adnan Salih		e-mail	sumaya.adnan@uomosul.edu.iq	
Module Leader's Acad. Title	Lecturer		Module Leader's Qualification	Ph.D.	
Module Tutor	Raghad Riyadh		e-mail	raghad.riyadh@uomosul.edu.iq	
Peer Reviewer Name	none		e-mail	none	
Scientific Committee Approval Date	/06/2023		Version Number	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	The course aims to provide the student with full definition and the mode of transmission of some common infectious diseases in different part of the human body; and also to introduce information about the etiological pathogens and the factors of pathogenicity. It also explains the mechanism of pathogenicity and the physiological events occur in the human cells and tissues and the host immune responses during the process of infection. In addition to, the course aims to provide full information that help the student to understand the body response and manifestations resulted from imbalances in homeostasis during these diseases. The course also helps the student to relate symptoms and manifestations to analyze and solve problems related to the diagnosis and treatment of infectious diseases. The course also aims to help the student to bind the medical microbiology with anatomic pathology to prepare a professional staff with clinical and literature skills able to offer a required care to patients with infectious diseases.
Module Learning Outcomes	CLO-1 The student will be able to describe infectious diseases and their mode of transmission. CLO-2 The student will be able to describe the causative pathogens and pathogenicity factors CLO-3 The student will be able to describe how the body responses to different infectious diseases and symptoms of infections. CLO-4 The student will have adequate information about the processes of inflammation, and imbalances related to infectious diseases CLO-5 The student will be able to identify changes in the structure, function and metabolic disorders in the human body associated with the infectious process. CLO-6 The student will become skilled in combining symptoms and manifestations with the diagnosis, and in the management and prevention of infectious disease. CLO-7 The student will become skilled in combining the medical microbiology with the pathology of human diseases
Indicative Contents	Part – Theoretical lectures Introduction to infectious disease and causative agents (3hr). Physiology of the common infectious diseases in the gastrointestinal tract and respiratory tract (12hr). Physiology of the common infectious diseases in the skin, ears and eyes (14hr). Physiology of the common infectious diseases in the nervous system, circulatory system and urogenital tract (10hr). Mechanism of direct and indirect damage of cells and tissues, microbial strategy in relation to immune response, recovery from infection, failure to eliminate microbes, and exit of microbes from the body (9hr).

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Increase students' perceptions about this science and its items using different tools through lectures, seminars, and interactive tutorials and online lecture.

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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
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	5	10%(10)	2, 4,5,11,12	CLO-1,2,3, 4,
	Assignments	4	10%(10)		CLO- 5,6,7
	Projects / Lab.	0			
	Report	0			
Summative assessment	Midterm Exam	2hr	30%(10)	7	CLO-3,4,5,6,7
	Final Exam	3hr	50%(50)	16	All
Total assessment			100%(100)		

ملاحظة: في حالة كون المادة لا تحتوي على جانب عملي تضاف الدرجة الخاصة بها الى أي محور اخر يختاره استاذ المادة من تفصيلات الدرجة اعلاه

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction to infectious diseases: classification, epidemiology, etiology, defensive and offensive virulence factors, mode of transmission, and methods of investigation.
Week 2	Physiology of the common infectious diseases in the gastrointestinal tract: type of infection, etiology, portal of entry, microbial ligand, target cell receptor and attachment, invasion and growth in cell, colonization and spread, and manifestation. (part I)
Week 3	Physiology of the common infectious diseases in the gastrointestinal tract: Part II
Week 4	Physiology of the common infectious diseases in the respiratory tract: type of infection, etiology, portal of entry, microbial ligand, target cell receptor and attachment, invasion, colonization and spread, and manifestation. (Part I)
Week 5	Physiology of the common infectious diseases in the respiratory tract: Part II
Week 6	Physiology of the common infectious diseases in the skin: type of infection, etiology, portal of entry, microbial ligand, target cell receptor and attachment, invasion, colonization and spread, and manifestation. (Part I)
Week 7	Physiology of the common infectious diseases in the skin: Part II
Week 8	Physiology of the common infectious diseases in the ears: type of infection, etiology, portal of entry, microbial ligand, target cell receptor and attachment, invasion, colonization and spread, and manifestation
Week 9	Physiology of the common infectious diseases in the eyes: type of infection, etiology, portal of entry, microbial ligand, target cell receptor and attachment, invasion, colonization and spread, and manifestation
Week 10	Physiology of the common infectious diseases in the nervous system: type of infection, etiology, portal of entry, microbial ligand, target cell receptor and attachment, invasion, colonization and spread, and manifestation
Week 11	Physiology of the common infectious diseases in the circulatory system: type of infection, etiology, portal of entry, microbial ligand, target cell receptor and attachment, invasion, colonization and spread, and manifestation
Week 12	Physiology of the common infectious diseases in the urogenital tract: type of infection, etiology, portal of entry, microbial ligand, target cell receptor and attachment, invasion, colonization and spread, and manifestation
Week 13	Mechanism of direct cell and tissue damage by microorganisms and toxins, and indirect damage by inflammation and immune response
Week 14	Microbial strategy in relation to immune response. Recovery from infection by immunological factors. Failure to eliminate microbes (latency, persistent infection)
Week 15	Exit of microbes from the body (from the respiratory tract, saliva, skin, intestinal tract, urogenital tract, blood).

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Mechanism of microbial infections By James F. Zachary	No
Recommended Texts	Mem's pathogenesis of infectious diseases. By Anthony A. Nash	No
Websites	https://www.intechopen.com/chapters/56631 , https://www.ncbi.nlm.nih.gov/books/NBK26917/	

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	**Radiotherapy physics**			Module Delivery	
Module Type	**C**			☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	**MPH-47133**				
ECTS Credits	6				
SWL (hr/sem)	**150**				
Module Level	2		Semester of Delivery	3	
Administering Department	Medical physics		College	Science	
Module Leader	Qusay Kh. Al-Dulamey		e-mail	qusaykhatab@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification	MSc.	
Module Tutor	Shaimaa Talal Atalla		e-mail	shaimaa.talal@uomosul.edu.iq	
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date	/06/2023		Version Number	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	MPH-36027	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	Introduction in special theory of External Beam Radiation Therapy (EBRT) ,Photon Beam Therapy, Proton Beam Therapy.How are Photon and Proton Beam Therapies different from each other? ,Brachytherapy (BT),Radiation Therapy Combined with Surgery,Advantages and Disadvantages of Radiation Therapy,Possible Side Effects of Radiation Therapy .
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The balance in this course learns more toward ideas than toward experimental methods and practical applications , because I believe that the beginning student is better served by conceptual framework than by Radiation Therapy of details . Whenever possible , important subjects are introduced on an elementary level , which enables even relatively unprepared students to understand what is going on from the start and also encourages the development of physical intuition in readers in whom the mathematics (rather modest) inspires no terror. Because the ideas of represented totally new directions in thought when first proposed rather than extensions of previous knowledge , the story of development is exceptionally interesting .
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> 1 Special relativity, Michelson and Morley experiment , time dilation ,length contraction , twin paradox ,relativistic momentum , relativistic mass , relativistic energy . 2 Particle nature of waves , x- ray , photoelectric effect , x- ray diffraction , Compton effect ,pair production. 3 Wave nature of particles ,wave function , uncertainty principles 4 Atomic structure , atomic spectrum , Bohr atom , energy levels

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	For this course of modern physics the treatment of special relativity , quantum mechanics , and elementary particles received major revisions . There is more material on aspects of astrophysics that nicely illustrate important elements of modern physics , which for this reason are discussed where relevant in the text rather than being concentrated in single chapter.

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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered

Week 1	Introduction about Radiotherapy
Week 2	What is the difference between Chemotherapy and Radiation Therapy?
Week 3	How Radiation Therapy Works
Week 4	Gamma Knife therapy , diagnostic
Week 5	Proton therapy
Week 6	External Beam Radiation Therapy (EBRT)
Week 7	Possible Side Effects of Radiation Therapy
Week 8	Proton Beam Therapy ,mechanism
Week 9	How are Photon and Proton Beam Therapies different from each other?
Week 10	Radioactive material using in nuclear medicine
Week 11	. Brachytherapy effect
Week 12	. Beta particle as therapy. Radiation Therapy Combined with Surgery
Week 13	Advantages and Disadvantages of Radiation Therapy
Week 14	The Future of Radiation Therapy
Week 15	Know the Flow: Radiation Therapy

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Concepts of Modern Physics (Second Edition) Arthur Beiser Concepts of Modern Physics (Sixth Edition) Arthur Beiser	Yes Yes
Recommended Texts	مفاهيم في الفيزياء الحديثة : ترجمة د. منعم مشكور .	Yes
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	**Research Methodology**			Module Delivery	
Module Type	**Core**			☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☒ Seminar	
Module Code	MPH-47036				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	4		Semester of Delivery	7	
Administering Department	Medical Physics		College	College ofScience	
Module Leader	Sundus nather alkalak		e-mail	profdrsundusalkallak@uomosul.edu.iq	
Module Leader's Acad. Title	Prof.		Module Leader's Qualification	Ph.D.	
Module Tutor			e-mail		
Peer Reviewer Name	Name		e-mail	E-mail	
Scientific Committee Approval Date	02/06/2023		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	This module is designed to introduce postgraduate students to research methods and statistical analysis. Theoretical, historical and statistical concepts are taught in lectures with hands on practical lab sessions using both quantitative and qualitative techniques that allow students to put theory into practice.
Module Learning Outcomes	By the end of this module the student should be able to: 1. Critically review current knowledge in a specified area, and establish its status and limitations 2. Identify, conceptualize and define a research question(s) and justify its relevance to practice and its significance as a potential contribution to existing knowledge. 3. Select and justify a research methodology to meet specified research aims and objectives. 4. Critically analyze and interpret primary/secondary research data (quantitative and/ or qualitative), testing for validity and reliability of the results.
Indicative Contents	1 Introduction to Research The nature and purpose of research; different types of research (quantitative qualitative, mixed methods, developmental, practice based) and their mapping within different philosophical paradigms (positivism, interpretivism, pragmatism); strengths and weaknesses. 2 Dealing with Practical Issues, Ethics The research process; identifying a research topic and setting research objectives; developing a research strategy; characteristics of a good research project; ethical issues in conducting research. 3 Searching and Reviewing the Literature The purposes and main steps of a literature review; searching, evaluating, organizing and synthesizing the relevant literature; and, writing a literature review and managing bibliographic records. In addition, developing research questions for qualitative and quantitative research; and identifying characteristics/attributes 4 Data Collection and Analysis Approaches to data collection and analysis (quantitative, qualitative, mixed-methods, iterative); questionnaire design; populations, samples, and sampling methods; data Mining. 5 Writing your Research Proposal Identifying a research problem or issue, the purpose of the research and the

	main research question(s); choosing the research strategy and methods; writing a research proposal. In addition: discussing findings, formulating conclusions, making recommendations, and reporting; planning, executing, writing up, and submitting a dissertation. 6 Descriptive Statistics for Quantitative and Qualitative D Summarizing and visualizing data sets; finding trends in data and formulating a research hypothesis. 7 Introduction to Probability and Statistical Inference Basic concepts of probability and probability distribution; discrete and continuous random variables; basic probability distributions; introduction to the hypothesis testing procedure. 8 The Hypothesis Testing Procedure Parametric and non-parametric tests; Chi-squared Test for Association; Independent Sample t-Test; One and Two Way Analysis of Variance ANOVA; power calculation and sample size estimation. 9 Correlation and Regression Relationship between two numeric variables, dependent and independent variable; Pearsons Correlation Coefficient; Simple Linear Regression. 10 Multiple Regression Multiple Regression Analysis and introduction to the General Linear Model.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The aim of this module is to provide the student with a critical understanding of theories, concepts and principles of research methodology and the range of methods used in conducting research in different disciplines; and, to give the student the skills and knowledge necessary to undertake an original in-depth investigation in those fields

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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	67	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	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	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الأسبوعي النظري

	Material Covered
Week 1	principles of research methodology
Week 2	define a research question(s)
Week 3	Writing your Research Proposal
Week 4	Testing Procedure
Week 5	practice based
Week 6	calculation and sample size estimation
Week 7	discussing findings
Week 8	reporting
Week 9	formulating conclusions
Week 10	quantitative techniques
Week 11	qualitative techniques
Week 12	statistical concepts
Week 13	interpret primary/secondary research data
Week 14	Correlation Coefficient
Week 15	Multiple Regression Analysis

Learning and Teaching Resources

مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts		
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
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	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	حقوق الانسان والديمقراطية Human Rights and Democracy			Module Delivery	
Module Type	B			☒ Theory ☐ Lecture ☐Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOM-104				
ECTS Credits	2.00				
SWL (hr/sem)	50				
Module Level	1		Semester of Delivery	2	
Administering Department	Type Dept. Code		College	Type College Code	
Module Leader	Fanar. Imad. Khalil		e-mail	fanar.khalil@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Teacher		Module Leader's Qualification	M.A.	
Module Tutor	Dalya. Adil. Sheet		e-mail		
Peer Reviewer Name	Name		e-mail	E-mail	
Scientific Committee Approval Date	02/06/2023		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	أ -المعرفة والفهم) الاهداف المعرفية(أ -1ان يكون الطالب ملماً بمفاهيم حقوق الانسان والديمقراطية ويكتسب الوعي والثقافة السياسية. أ -2يستطيع ان يميز بين المصطلحات والمفاهيم المختلفة مثل (حقوق الانسان، الدمقرطة، الديمقراطية، الانتقال الديمقراطي، العدالة الانتقالية.(أ -3القدرة على تحليل تطورات حقوق الانسان والمراحل التي مرت بها. أ -4ان يكون قادرا على ادراك واستيعاب الاعلانات والمواثيق الدولية لحقوق الانسان مثل الاعلان العالمي لحقوق الانسان. أ -5ان يكون قادرا على التعبير عن راية بخصوص واحترام اراء الاخرين . أ -6ان تكون لدية القدرة على تحليل اي مشكلة ووصفها والتنبأ بمستقبل الظاهرة السياسية . أ7- ان يتعرف على انواع الديمقراطية والتمييز فيما بينها داخل النظم السياسية المعاصرة. ب - المهارات الخاصة بالموضوع) الاهداف المهاراتية الخاصة بالمقرر(ب –- 1اكتساب الطالب لمهارات التفاوض والتواصل وتبادل الاراء مع الاخرين. ب – 2 اكتساب الطالب مهارات الحوار البناء الهادف . ب – 3 اكتساب الطالب مهارات مواجهة اي موقف والتعبير عن الراي بكل شجاعة وثقة بالنفس. ج- مهارات التفكير ج1- مهارات التحليل. ج2- مهارات التوظيف للمفردات التي تعلمها في الواقع العملي من خلال دراسة مشكلات محددة من الواقع. ج3- مهارات التنبؤ والدراسات المستقبلية للنظم الديمقراطية. د - المهارات العامة والمنقولة (المهارات الأخرى المتعلقة بقابلية التوظيف والتطور الشخصي). د1- القدرة على العمل كفريق. د2- التفاعل مع فريق العمل لتحقيق المهارات المطلوبة. د3- القدرة على القيام بعرض نظري لبعض الموضوعات ذات العلاقة بمفردات المادة. د4- اكتساب مهارات التحليل العلمي لاي ظاهرة سياسية تتعلق بحقوق الانسان.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	.1عرف المفاهيم الاتية: حقوق الانسان، الشرعة الدولية، الديمقراطية، الدمقرطة، التحول الديمقراطي. 2. وضح اهمية الحقوق السياسية والمدنية. 3. اذكر اهم ما جاء في المواثيق الدولية لحقوق الانسان فيما يخص حق الحياة. 4. تكلم باختصار عن انواع الحقوق الاقتصادية والاجتماعية والثقافية. .5ناقش ما جاء في الدستور العراقي لعام 2005 النافذ من ضمانات فيما يخص حقوق الانسان. .6حدد اهم خصائص النظام الديمقراطي .8اشرح انواع الديمقراطية ثم بين اهم الانواع القابلة للتطبيق العملي. .9عدد مع الشرح انواع النظم الانتخابية. .10ناقش الاطار الوظيفي للسلطة التشريعية ضمن مؤسسات النظام السياسي العراقي وفق ما جاء في دستور عام 2005. .11حدد الاطار البنيوي للمؤسسة التنفيذية في النظام السياسي العراقي وفق دستور 2005. .12تكلم عن اختصاصات مجلس النواب في اطار المؤسسة التشريعية. 13. ناقش شروط انتخاب رئيس الجمهورية وفق الدستور العراقي لعام 2005.
Indicative Contents المحتويات الإرشادية	يتضمن المحتوى الإرشادي ما يلي. مفهوم حقوق الانسان وتطور الحقوق تاريخياً يتناول تعريف الحق وتعريف الانسان، تعريفاً لغوياً واصطلاحياً واجرائياً، خصائص حقوق الانسان، ثم التطور التاريخي لحقوق الانسان، من العصور القديمة مروراً بالعصور الوسطى والحديثة، ومن ثم حقوق الانسان المعاصرة، وما انبثق منها من اشكال واجيال لحقوق الانسان، وانواع ومصادر حقوق الانسان ومن ضمنها الحقوق المدنية والسياسية والحقوق الاقتصادية والاجتماعية والثقافية، وحقوق الانسان في المواثيق الدولية والتشريعات الوطنية، والتحديات العالمية لحقوق الانسان ومن ضمنها التحديات الثقافية مثل العولمة والتطور التكنولوجي، والتحديات السياسية مثل الارهاب والحروب اللامتماثلة والحروب بين الدول. (5 ساعات) حقوق الانسان والحريات العامة في الدستور العراقي يتناول ما تضمنه الدستور العراقي من ضمانات قانونية لحماية حقوق الانسان وحرياته العامة، وانواع تلك الضمانات. (ساعتان).

	الحريات العامة والديمقراطية يتناول التطور التاريخي للديمقراطية، في الحضارات القديمة لاسيما في دول المدن اليونانية، مروراً بالديمقراطية عند المفكرين الغربيين امثال توماس هوبز ومونتسكيو وجان جاك روسو، ثم النماذج التقليدية للديمقراطية (انواع الديمقراطية)، المباشرة وغير المباشرة وشبه المباشرة، وخصائص وشروط النظام الديمقراطي، وانواع النظم الانتخابية في الانظمة الديمقراطية. (3 ساعات). الديمقراطية في نظام الحكم العراقي وفق دستور 2005 يتناول الاطار البنيوي لمؤسسات النظام السياسي العراقي، بنية المؤسسة التشريعية المكونة من مجلس النواب ومجلس الاتحاد، وبنية المؤسسة التنفيذية المكونة من رئيس الجمهورية ومجلس الوزراء، وبنية المؤسسة القضائية المكونة من مجلس القضاء الاعلى والمحكمة الاتحادية العليا، محكمة التمييز الاتحادية، وجهاز الادعاء العام، وهيئة الاشراف القضائي، والمحاكم الاتحادية الاخرى، ثم الاطار الوظيفي واختصاصات مؤسسات النظام السياسي العراقي (التشريعية، التنفيذية، القضائية)، واخيراً العلاقة بين السلطات (التوازن والتعاون، والفصل بين السلطات). (4 ساعات).

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. المحاضرة المصحوبة بالشرح والتحليل. 2. الحلقة النقاشية. 3. التقارير والبحوث. 4. عرض المادة عبر شرائح (بوربوينت) . 5. الاسئلة والاجوبة. 6. المشاركة الصفية .

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	34	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	1.5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	16	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	0.5
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	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	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	مفهوم حقوق الانسان
Week 2	التطور التاريخي لحقوق الانسان
Week 3	اشكال واجيال حقوق الانسان
Week 4	حقوق الانسان في المواثيق الدولية
Week 5	التحديات العالمية لحقوق الانسان
Week 6	الحقوق المدنية والسياسية والاقتصادية
Week 7	حقوق الانسان والحريات العامة في الدستور العراقي
Week 8	الحريات العامة والديمقراطية
Week 9	التطور التاريخي للديمقراطية
Week 10	النماذج التقليدية للديمقراطية (انواع الديمقراطية)
Week 11	خصائص وشروط النظام الديمقراطي
Week 12	الديمقراطية في نظام الحكم العراقي وفق دستور 2005
Week 13	الاطار البنيوي لمؤسسات النظام السياسي العراقي (التشريعية، التنفيذية، القضائية)
Week 14	الاطار الوظيفي واختصاصات مؤسسات النظام السياسي العراقي (التشريعية، التنفيذية، القضائية)
Week 15	اختبار

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered لا يوجد
Week 1	Lab 1:
Week 2	Lab 2:
Week 3	Lab 3:
Week 4	Lab 4:

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1. حافظ علوان حمادي الدليمي، حقوق الانسان، وزارة التعليم العالي والبحث العلمي، جامعة بغداد، 2013. 2. محمد سليم محمد، نظرات حول الديمقراطية، دار وائل للطباعة، عمان، 2000.	Yes Yes
Recommended Texts	1. بهاء الدين ابراهيم واخرون، حقوق الانسان بين التشريع والتطبيق، دار الجامعة الجديدة، الاسكندرية، 2008. 2. الدستور العراقي الدائم لعام 2005، الامانة العامة لمجلس الوزراء، بغداد، 2006.	Yes Yes
Websites	https://www.coe.int/en/web/compass/democracy.	

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	**Analog Electronics**			Module Delivery	
Module Type	**Core**			☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	**MPH-36129**				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	3		Semester of Delivery	6	
Administering Department	Medical physics		College	College of sceince	
Module Leader	Marwan zuhair elias		e-mail	marwanzt@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification	Ph.D.	
Module Tutor	Assist. Prof. Ammar Yaseen Burjes		e-mail	ammaryaseen@uomosul.edu.iq	
Peer Reviewer Name	Assist. Prof. Dr. Samir Mahmmod Ahmad		e-mail	dr.samir@uomosul.edu.iq	
Scientific Committee Approval Date	02/06/2023		Version Number	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	MPH-23112	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	1. Clarification of how analog elecronics can make significant contributions to a wide range of technical applications. 2. Identify circuit elements n details. 3. This course deals with the basic concept of the most important elements in electronics such as diodes, zener diodes and transistors amplifiers 4. Learn about the most important scientific terms (Terminology) and their definitions related to this topic. 5. To understand and comprehend the impact of these elements from Physics point of view. .
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. To know about semiconductor materials in details 2. To understand n type and p type structures 3. To understand energy diagrams related to pn junctions 4. To comprehend IV characteristic curve and diode bias conditions 5. To go through diode circuit analysis and applications. 6. To experience zener diode basic structure 7. To experience zener diode circuit analysis and application. 8. To understand npn and pnp Bipolar Junction Transistor (BJT) structures 9. To identify basic transistor biasing 10. To identify basic transistor operation 11. To identify common emitter transistor configuration 12. To identify about common emitter transistor amplifier 13. To identify about common base transistor configuration 14. To learn about common base transistor amplifier 15. To learn about common collector transistor configuration and amplifier concept
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures Silicon and Germanium atoms, conduction in semiconductor crystals, n-type and p-type semiconductors, the depletion layer, energy diagram of the pn junction, biasing the pn junction, energy diagram for the forward bias, reverse bias,reverse leakage current ideal diodes, diodes and applications, diode circuits problems and solutions, half wave rectifiers, full wave rectifiers and rectifier filters [*10* hrs] Zener diode symbol, IV curve for zener diode, zener breakdown, equivalent circuit for zener diode, zener diode examples, zener voltage regulation with solved problems, zener diode regulation with varying load with solved problems and percent load regulation [*8* hrs] Bipolar junction transistor basic structure, transistor operation, transistor currents, common emitter configuration with current gain, IV characteristic input and output

	equations, solved problems, collector curves, cutoff and saturation, common emitter solved configuration problems, dc operating point and common emitter amplifier with dc analysis, signal ac voltage at the base, input impedance analysis, output impedance analysis and emitter bypass capacitor case [*10* hrs] Common emitter transistor configuration with current gain, dc analysis, IV input and output characteristic curve, collector curves, cutoff and saturation with solved problems and dc operating point [8 hrs] Common emitter transistor amplifier with dc analysis, ac equivalent circuit, signal ac voltage at the base, input impedance, output impedance and emitter bypass capacitor case [4 hrs] Common base transistor configuration with current gain, common base transistor amplifier, with voltage gain, input impedance, output impedance, current gain, power gain with solved problems [4 hrs] Common collector transistor configuration with current gain, dc analysis. Common collector amplifier with voltage gain, input impedance, output impedance, current gain and power gain with solved problems [3 hrs] Revision problem classes [3 hrs] <u>Part B – Practical labs</u> Learning about instruments: voltmeter, ammeter, oscilloscope, dc and ac power supplies, function generators and learning about general features of electronic components such as resistors, capacitors, coils, diodes, zener diodes and npn transistors [8 hrs] Conducting experiments: IV characteristic curve of diodes in forward bias, IV characteristic curve of diodes in reverse bias, half and full wave rectifiers, zener diode voltage regulation, common emitter transistor configuration, common emitter transistor amplifier, common base transistor configuration, common base transistor amplifier, common collector transistor configuration and common collector transistor amplifier [21 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents. In addition, assisting students in knowledge gathering of basic electronics principles and concepts through understanding behaviors of certain electronic components. Practical work should enhance perceptions of students about particular circuit design and analysis.

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
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	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 #9, #10
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #5, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #12
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #9
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Silicon and Germanium atoms
Week 2	n-type and p-type semiconductors, pn junctions
Week 3	n-type and p-type semiconductors, pn junctions
Week 4	Diode circuit analysis and Solving diode circuits questions
Week 5	Diode circuit analysis and Solving diode circuits questions
Week 6	Diode circuit application and Solving diode circuits questions
Week 7	Zener diode circuit analysis and solving questions

Week 8	Zener diode circuit analysis and solving questions
Week 9	Bipolar Junction Transistor (BJT), basic operation
Week 10	Bipolar Junction Transistor (BJT), basic operation
Week 11	Configuration of Common Emitter (CE),
Week 12	Common Emitter (CE) transistor amplifier,
Week 13	Configuration of Common Base (CB),
Week 14	Common Base (CB) transistor amplifier,
Week 15	Common Collector (CB) configuration with transistor amplifier, revision of solved problems

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Learning about instruments: voltmeter, ammeter, oscilloscope, dc and ac power supplies, function generators
Week 2	Lab 2: Learning about general features of electronic components such as resistors, capacitors, coils, diodes, zener diodes and npn transistors
Week 3	Lab 3: Conducting experiments: IV input characteristic curve of diodes in forward and reverse bias
Week 4	Lab 4: Half and Full Wave Rectifiers
Week 5	Lab 5: Zener voltage regulation
Week 6	Lab 6: Common emitter transistor configuration, IV input characteristic curve
Week 7	Lab 7: Common emitter transistor configuration, IV output characteristic curve
Week 8	Lab 8:.Common emitter transistor amplifier, input resistance
Week 9	Lab9: Common emitter transistor amplifier, input resistance, voltage gain, current gain
Week10	Lab 10: Common base transistor configuration, IV input characteristic curve
Week 11	Lab 11: Common base transistor configuration, IV output characteristic curve
Week 12	Lab 12: Common base transistor amplifier, input resistance, voltage gain
Week 13	Lab 14: Common collector transistor configuration, IV input characteristic curve
Week 14	Lab 14: Common collector transistor amplifier
Week 15	Revision of All Experiments

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Thomas L. Floyd (2012), Electronic Devices, Ninth Edition, Pearson Education Inc., publishing as Prentice Hall, New Jersey.	Yes
Recommended Texts	Older Versions Thomas L. Floyd (2008, 2005, 2002, 1999), Electronic Devices, Pearson Education Inc.	Yes
Websites	https://www.analog.com/en/design-center/design-tools-and-calculators/ltspice-simulator.html	

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	**Analytical Chemistry**			Module Delivery	
Module Type	**Core**			☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	**MPH-1102**				
ECTS Credits	**8**				
SWL (hr/sem)	**200**				
Module Level	1		Semester of Delivery	1	
Administering Department	Type Dept. Code		College	Type College Code	
Module Leader	Eman Muwafaq Ramadthan		e-mail	emanmuwafiq@uomosul.edu.iq	
Module Leader's Acad. Title	Lecturer		Module Leader's Qualification	Msc .	
Module Tutor	Eman Bahjat		e-mail	emanbahjat@uomosul.edu.iq	
Peer Reviewer Name	Sahbaa yonis		e-mail	Sahbaayounis@uomosul.edu.iq	
Scientific Committee Approval Date	02/06/2023		Version Number	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Analytical chemistry	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. Clarification of how analytical chemistry can make significant contributions to in chemistry science . 2. Identify –volumetric analysis which are useful in chemistry-. 3. This course deals with the basic concept of the most important calibration standardization and blank corrections and this modulare. 4. Learn about the most important scientific terms (Terminology) and their definitions related to this topic. 5. To understand the impact of these Neutralization titration. Precipitation titration --- Oxidation – reduction titration Complex formation reaction in -- volumetric analysis 6. To perform different applications of quantitative analysis and qualitative 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. Discuss the result and involvement of volumetric analysis 2.Define analytical chemistry , quantitative analysis and qualitative analysis 3. Identify the standardization and blank corrections. 4. Explain the methods of expressing concentration and calculation of the equivalent weight . 5 List and Describe the properties of EDTA , titration methods employing EDTA . . 6Identify the Methods of chemical analysis in the pharmaceutical industry.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> What analytical chemistry ? Basic tools of analytical chemistry, the language of analytical chemistry, calibration standardization and blank corrections, quantitative analysis and qualitative analysis , solution ,type of solution , methods of expressing concentration ,calculation of the equivalent weight, volumetric analysis , terms employed in volumetric analysis , requirement of reactions used in volumetric analysis. [*10* hrs] , the types of reaction used in volumetric analysis 1. Neutralization titration, titration curve ,calculation the PH of different solution, Buffer solution , Hydrolysis of salts , Solubility. [*8* hrs] The common ion effect , 2. Precipitation titration , titration curve of Precipitation titration ,3.Oxidation – reduction titration, titration curve of Oxidation – reduction titration , 4. Complex formation reaction, [*10* hrs] Ecology of coccolithophores, coccoliths and sedimentology, functions of coccoliths,

	geologic distribution, effect of global climate change on distribution, evolutionary responses, terminology of calcareous nannofossils. [8 hrs] types of ligands , properties of EDTA , titration methods employing EDTA .Methods of chemical analysis in the pharmaceutical industry [3 hrs] <u>Part B – Practical labs</u> Introduction of analytical chemistry Methods of Expressing Concentration Titration process Requirements of titration process Standard solution and properties , Primary and secondary standard substance EXP1 : Standardization of HCl EXP2 : Determination of NaOH Redox titration Exp3:Determination of Ferrous sulphate by titration with potassium permanganates Complex formation titration EXP4: Determination of water hardness Precipitation titration EXP 5: Mohr method EXP6: Volhard method. [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Develop student skill in studying analytical chemistry and using different methods in determining the concentration of substance

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	105	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	95	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
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 #4, #5
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6,
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #2, #3 and #4
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #2
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	What analytical chemistry ? Basic tools of analytical chemistry
Week 2	the language of analytical chemistry, calibration standardization and blank corrections,
Week 3	quantitative analysis and qualitative analysis , solution ,type of solution , methods of expressing concentration
Week 4	calculation of the equivalent weight, volumetric analysis , terms employed in volumetric analysis , requirement of reactions used in volumetric analysis
Week 5	. the types of reaction used in volumetric analysis 1. Neutralization titration, titration curve
Week 6	,calculation the PH of different solution, Buffer solution

Week 7	Hydrolysis of salts , Solubility, The common ion effect ,
Week 8	2. Precipitation titration ,
Week 9	titration curve of Precipitation titration
Week 10	3.Oxidation – reduction titration
Week 11	titration curve of Oxidation – reduction titration
Week 12	4. Complex formation reaction
Week 13	types of ligands , properties of EDTA
Week 14	titration methods employing EDTA
Week 15	Methods of chemical analysis in the pharmaceutical industry.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1:. Introduction of analytical chemistry
Week 2	Lab 2: Methods of Expressing Concentration
Week 3	Lab 3: Titration process Requirements of titration process
Week 4	Lab 4: Standard solution and properties , Primary and secondary standard substance
Week 5	Lab 5: Standardization of HCl
Week 6	Lab 6: Determination of NaOH
Week 7	Lab 7:. Redox titration
Week 8	Lab 8:Determination of Ferrous sulphate by titration with potassium permanganates Complex formation titration
Week 9	Lab9. Determination of water hardness Precipitation titration
Week10	Lab 10: Mohr method
Week 11	Lab 11:Volhard method
Week 12	Lab 12: Requirements of titration process

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Vogel text book of quantitative chemical analysis ,5thEd. (1989)	Yes
Recommended Texts	Vogel text book of quantitative chemical analysis ,5thEd. (1989)	Yes
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					
Module Title	Anatomy			Module Delivery	
Module Type	Core			☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	MPH-35120				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	3		Semester of Delivery	5	
Administering Department	Medical physics		College	**College of Science**	
Module Leader	Sumaya Adnan Salih		e-mail	sumaya.adnan@uomosul.edu.iq	
Module Leader's Acad. Title	Lecturer		Module Leader's Qualification	Ph.D.	
Module Tutor	Raghad Riyadh		e-mail	raghad.riyadh@uomosul.edu.iq	
Peer Reviewer Name	none		e-mail	none	
Scientific Committee Approval Date	/06/2023		Version Number	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	MPH-23111	Semester	3
Co-requisites module	None	Semester	None

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	The course aims to provide the student with a complete understanding of the basics of human anatomy and anatomical nomenclature; also, to provide adequate information about the complete structure of cells, tissues, organs and systems in the human body. The course aims to inform the student with the normal structure and appearance of the different anatomical regions of the human body to be able to understand the basic aspects of medical physics related to the functions of the human body parts. Also, helps the student to identify the normal and abnormal human body structure and shapes that help in understanding the principle of examination by medical imaging techniques in the diagnosis of human disorders. In addition to, helps the student to use the knowledge in the anatomical structure and physiological function to understand the images obtained by the different radiographic imaging techniques, such as X-rays or tomography diagnostic imaging; so that the student will become a competent medical physicist member and active aid in the specialist staff of the medical facilities.
Module Learning Outcomes	CLO-1 The student will learn the anatomical nomenclature of the anatomical sites. CLO-2 The student will learn how to identify and describe the structure and the function of different human systems CLO-3 The student will learn how to recognize the relative position of organs in cross-section CLO-4 The student will be able identify the normal and diseased human parts CLO-5 The student will be able to well use the medical devices. CLO-6The student will have an idea on the different human disorders. CLO-7 The student can characterize the systems that regulate function. CLO-8 The student can discuss major areas of disease in terms of their effect on anatomy and physiology.
Indicative Contents	<u>Part A – Theoretical lectures</u> Introduction to anatomical nomenclature, cell structure, tissue and organization (3 hr). Gastrointestinal tract (8hr). Respiratory system (5hr). Skeletal system (12hr). Nervous system (7hr). Urinary system (4hr). Reproductive system (4hr). Cardiovascular system (4hr). Lymphatic system (4hr). Endocrine system (4hr). <u>Part B – Practical labs</u> Examination of figures, models and image of different imaging techniques of the: gastrointestinal tract (4hr), respiratory system (2hr), skeletal system (4hr), nervous system (4hr), urinary system (2hr), reproductive system (2hr), cardiovascular system (2hr), lymphatic system (2hr), and endocrine system (2hr).

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Increase students' perceptions about this science and its items using different tools and experiments through lectures, labs, and interactive tutorials and by types of practical activities.

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
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	125		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	5	10%(10)	2, 4,5,10,12	CLO-1,2,3, 6,8
	Assignments	2	10%(10)		CLO- 5,7,8
	Projects / Lab.	6	10%(10)		All
	Report	0			
Summative assessment	Midterm Exam	2hr	10%(10)	7	CLO- 4,5,6,7,8
	Final Exam	3hr	50%(50)	16	All
Total assessment			100%(100)		

ملاحظة: في حالة كون المادة لا تحتوي على جانب عملي تضاف الدرجة الخاصة بها الى أي محور اخر يختاره استاذ المادة من تفصيلات الدرجة اعلاه

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction and anatomical nomenclature, prefixes, suffixes, cell structure, tissue and organization
Week 2	Gastrointestinal tract (Part I).
Week 3	Gastrointestinal tract (Part II).
Week 4	Gastrointestinal tract (Part III).
Week 5	Respiratory system.
Week 6	Skeletal system (Part I).
Week 7	Skeletal system (Part II).
Week 8	Skeletal system (Part III)
Week 9	Nervous system (Part I).
Week 10	Nervous system (Part II).
Week 11	Urinary system.
Week 12	Reproductive system.
Week 13	Cardiovascular system.
Week 14	Lymphatic system.
Week 15	Endocrine system.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Gastrointestinal tract (Part I)
Week 2	Gastrointestinal tract (Part II)
Week 3	Gastrointestinal tract (Part III)
Week 4	Respiratory system
Week 5	Skeletal system (Part I)
Week 6	Skeletal system (Part II)
Week 7	Nervous system (part I and II)
Week 8	Urinary system
Week 9	Reproductive system
Week10	Cardiovascular system
Week 11	Lymphatic system
Week 12	endocrine system

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Essential of anatomy and physiology By: Valerie C. Scanlon and Tina Sanders	No
Recommended Texts	Atlas of Human Anatomy By: Frank H Netter	No
Websites	https://www.perlego.com/book/917771/color-atlas-of-human-anatomy-vol-2-internal-organs-pdf	

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	اللغة العربية Arabic Languge			Module Delivery	
Module Type	S			☒ Theory ☐ Lecture ☐Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOM-101				
ECTS Credits	2.00				
SWL (hr/sem)	50				
Module Level		1	Semester of Delivery		2
Administering Department		Medical physics	College	Science	
Module Leader	د. ايناس عطوان		e-mail		
Module Leader's Acad. Title		lecturer	Module Leader's Qualification		Ph.D.
Module Tutor			e-mail	Enassatwam@uomosul.edu.iq	
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date			Version Number		

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	تعريف الطلاب بأساسيات اللغة الإنجليزية. كذلك كسر حاجز الخجل وزيادة ثقتهم داخل وخارج الفصل. هناك فرصة كبيرة لإشراكهم في مناقشات قصيرة حيث يمكنهم الكتابة أو التعبير عن أنفسهم شفهيًا. بالإضافة إلى ما سبق ، ستعمل الدورة على تحسين مهارات القراءة والكتابة والاستماع والتحدث كطلاب ، وتقوية ملكة الطلاب الأدبية لتذوق أساليب اللغة وإدراك مواطن الجمال فيها
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- خلق وعي كامل بالاستخدام الصحيح لقواعد اللغة العربية في الكتابة والمحادثة. 2- إدراك أهمية اللغة العربية داخل وخارج الحياة الجامعية. 3- سيحسن الطلاب قدرتهم على التحدث باللغة العربية من حيث الطلاقة والاستيعاب. 4- سيقوم الطلاب بمراجعة الأشكال النحوية للغة العربية واستخدام هذه الأشكال في سياقات تواصلية محددة ، والتي تشمل: الأنشطة الصفية ، والواجبات المنزلية ، وقراءة النصوص ، والكتابة. 5- سيعزز الطلاب قدرتهم على كتابة فقرات قصيرة وملخصات باستخدام نهج العملية.
Indicative Contents المحتويات الإرشادية	مقدمة عن الاتصال بشكل عام واللغة العربية بشكل خاص ، مع مقدمة عن فئات الكلمات (أجزاء الكلام) في اللغة العربية [4 ساعات]. شرح كل جزء من الكلام في اللغة العربية مثل الأسماء والضمائر والأفعال والصفات والظروف وحروف الجر وحروف العطف والاقتران [16 ساعة]. المهارات الأساسية في تعلم اللغة الإنجليزية: القراءة والكتابة يتم تقديمها بشكل تدريجي خلال الأسابيع الماضية [6 ساعات]. الجزء الأخير مخصص لبعض جلسات تصحيح الأخطاء وردود الفعل [2 ساعة]. -جعل الطلبة على دراية بالعلاقة بين أساليب التعلم وأساليب التدريس. -تشجيع الطلبة على "توسيع" أساليبهم.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. المحاضرة المصحوبة بالشرح والتحليل. 2. الحلقة النقاشية. 3. التقارير والبحوث. 4. عرض المادة عبر شرائح (بوربوينت) . 5. الاسئلة والاجوبة. 6. المشاركة الصفية .

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	34	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	15.
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	16	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	0.5
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	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	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	**الكلام وأقسامه**
Week 2	**علامات الاسم**
Week 3	**علامات الفعل**
Week 4	**قواعد كتابة العدد**
Week 5	**قواعد كتابة العدد**
Week 6	**أنوع المفاعيل**
Week 7	**المبتدأ والخبر**
Week 8	**همزة القطع وهمزة الوصل**
Week 9	**الهمزة المتوسطة وهمزة السطر**
Week 10	**الفرق بين الضاد والضاء**
Week 11	**الفرق بين التاء المربوطة والتاء المفتوحة**
Week 12	**زيادة الحرف وحذفه**
Week 13	**زيادة الحرف وحذفه**
Week 14	**الأفعال الناقصة ، الحروف المشبه بالفعل**
Week 15	**اختبار**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	لا يوجد
Week 1	
Week 2	
Week 3	
Week 4	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	شرح ابن عقيل على الفية ابن مالك ، المرشد في الاملاء ، محمد شاكر سعيد	Yes Yes
Recommended Texts	الاسلوب ، احمد الشايب ، طرق تعليم التعبير ، محمد عبد القادر أحمد	Yes Yes
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	**Atomic Physics**			Module Delivery	
Module Type	**Core**			☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	**MPH-23010**				
ECTS Credits	6				
SWL (hr/sem)	**150**				
Module Level	2		Semester of Delivery	3	
Administering Department	Medical physics		College	Science	
Module Leader	Qusay Kh. Al-Dulamey		e-mail	qusaykhatab@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification	MSc.	
Module Tutor	Shaimaa Talal Atalla		e-mail	shaimaa.talal@uomosul.edu.iq	
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date	/06/2023		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	Atomic physics is intended to be used with two - semester courses for student who have already had basic physics and calculus courses .Relativity and quantum ideas are considered first to provide a framework for understanding the physics of atoms and nuclei . The theory of atom is then developed with emphasis on quantum - mechanical notions . Next comes a discussion of the properties of aggregates of atoms , which includes a look at statistical mechanics . Finally atomic nuclei and elementary particles are examined .
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The balance in this course learns more toward ideas than toward experimental methods and practical applications , because I believe that the beginning student is better served by conceptual framework than by a mass of details . Whenever possible , important subjects are introduced on an elementary level , which enables even relatively unprepared students to understand what is going on from the start and also encourages the development of physical intuition in readers in whom the mathematics (rather modest) inspires no terror. Because the ideas of modern physics represented totally new directions in thought when first proposed rather than extensions of previous knowledge , the story of development is exceptionally interesting .
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> 1 Special relativity, Michelson and Morley experiment , time dilation ,length contraction , twin paradox ,relativistic momentum , relativistic mass , relativistic energy . 2 Particle nature of waves , x- ray , photoelectric effect , x- ray diffraction , Compton effect ,pair production. 3 Wave nature of particles ,wave function , uncertainty principles 4 Atomic structure , atomic spectrum , Bohr atom , energy levels

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	For this course of modern physics the treatment of special relativity , quantum mechanics , and elementary particles received major revisions . There is more material on aspects of astrophysics that nicely illustrate important elements of modern physics , which for this reason are discussed where relevant in the text

	rather than being concentrated in single chapter.

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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Special relativity, Michelson and Morley experiment
Week 2	time dilation ,length contraction , twin paradox
Week 3	Particle nature of waves
Week 4	x- ray , photoelectric effect , x- ray diffraction.

Week 5	Compton effect ,pair production
Week 6	Wave nature of particles
Week 7	wave functions
Week 8	uncertainty principles
Week 9	Atomic structure
Week 10	Atomic spectrum
Week 11	Bohr atom
Week 12	Energy levels
Week 13	De Broglie waves
Week 14	Phase and Group Velocities
Week 15	Applying the Uncertainty principles

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Concepts of Modern Physics (Second Edition) Arthur Beiser Concepts of Modern Physics (Sixth Edition) Arthur Beiser	Yes Yes
Recommended Texts	مفاهيم في الفيزياء الحديثة : ترجمة د. منعم مشكور .	Yes
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	**Behavior and sensing from microbes to human**			Module Delivery	
Module Type	E			☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	**MPH-48041**				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level	4		Semester of Delivery	8	
Administering Department	Type Dept. Code		College	Type College Code	
Module Leader	Mahmood Zeki Al-Hasso		e-mail	mahmoodalhasso@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification	Ph.D.	
Module Tutor	Jasim		e-mail		
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date			Version Number		

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. Clarification of how microbes are important in our bodies. 2. Illustration and comparison of microbial and human sensing tools and the structures involved in their behavior. 3. Clarification of the vital roles the microbiota have in our health and sickness. 4. Learn about the most important genetic disorders and diseases and the potential role of microbiota in their development and progression. 5. To understand and learn about the future aspects of microbiota in diagnosis and prevention of human disorders and diseases.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the importance of microbes and microbiota in our lives. 2. Evaluate and Define various microbial sensing mechanisms with their potential role in human diseases and genetic disorders. 3. Analyze how microbial behavior and occurrence affect the human body and cause illnesses. 4. Discuss the pathogenesis of some diseases in the body and how the microbiota Participate in it. 5. Understand the positive and negative roles imposed by different microbial groups in the environment and the human body . 6. Create a better understanding about the sensing and behavior development from microbes to human beings.
Indicative Contents المحتويات الإرشادية	Theoretical lectures Introduction to microbial world and behavior, General cellular structure, Cell wall and plasma membrane [3 hrs] Sensing mechanisms in microbial world, Microbial Taxses [6 hrs] Microbial behavior against stimuli , Microbial behavior in pathogenesis and disease development, Sensing in human beings , Nervous system and human behavior [12 hrs] Microbiota in the human body, Microbiota in Ecosystems , Role of microbiota in human health [12 hrs] Relationships between microbiota and human diseases , Role of microbiota in human genetic disorders [12 hrs] Revision problem classes [3 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about microbial sensing and behavior and the potential role to human health. Introducing the students to the sensing mechanisms employed by bacteria especially in the human body. Educate the students about the role microbiota have inside our bodies and in the environment and its relationship to medically important diseases and genetic disorders. This will be achieved through lectures and interactive tutorials.

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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
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)	2,4,5	LO #4 and #5
	Assignments	2	10% (10)	5 and 10	LO #2, #3 , #4 and #5
	Projects	1	10% (10)	Continuous	All
	Report	1	10% (10)		All
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #2 , #3, #5
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction

Week 2	General cellular structure
Week 3	Cell wall and plasma membrane
Week 4	Sensing mechanisms in microbial world
Week 5	Microbial Taxses
Week 6	Microbial behavior against stimuli
Week 7	Microbial behavior in pathogenesis and disease development
Week 8	Sensing in human beings
Week 9	Nervous system and human behavior
Week 10	Microbiota in the human body
Week 11	Microbiota in Ecosystems
Week 12	Role of microbiota in human health
Week 13	Relationships between microbiota and human diseases
Week 14	Role of microbiota in human genetic disorders
Week 15	Future prospective

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	
Week10	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?

Required Texts	Madigan et al., Brock's Biology of Microorganisms (2019).	Yes
Recommended Texts	Wielly et al., Microbiology, 11th. ed. (2020).	Yes
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					
Module Title	**Biochemistry**			Module Delivery	
Module Type	**Core**			☒ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	**MPH-36126**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	3		Semester of Delivery	6	
Administering Department	Medical physics		College	Sciences	
Module Leader	Mahmoud Ahmed mohammed Fakhri		e-mail	drmahmoudahmed@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification	Ph.D.	
Module Tutor			e-mail		
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date	05/06/2023		Version Number	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	MPH-23111	Semester	3
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	This module aims to provide the student with an overview of metabolic pathways and an understanding of the ways in which metabolic processes are regulated. The associated practical work aims to give hands-on experience of enzyme assays at the laboratory bench. Associated data handling aims to provide tuition in handling calculations essential for basic enzyme analysis.
Module Learning Outcomes	1. Enabling students to take up the metabolism. 2. Explain the importance of the subject or article by linking them to the academic program (medical physics) 3. Teaching students the terminology related to metabolism. 4. Explain to students how to convert biomolecules into energy for the purpose of storage or use for certain functions, and how to build the biomolecules needed by the body of energy stored or energy from food. 5. Explain the students methods of regulatation the catabolism and anabolism in the cell and what the materials organized and methods and their role in this organization , and what levels of life regulation of energy. In addition to enabling students to calculate the resulting energy from catabolism of biomolecules or building necessary of biomolecules. 6. To enable the student to know the metabolic pathways related to each type of biomolecules and to know the type of defect or disease resulting from a defect in metabolic pathway. 7. Enabling the student to know the location of each metabolic path worse at the cell or body level and what is its purpose, and when activates metabolic pathway and when become inactive .
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures Bioenergetics and the role of ATP (2h). The structure and function of enzymes , Control of enzyme activity and hormonal control of metabolism(2h). Overview of metabolism and the profession of metabolic fuels, regulation of metabolism (4h). Metabolism of carbohydrates(10h). Metabolism of lipids (6h).Catabolism of proteins, peptides and amino acids(4h).Metabolism of purine and pyrimidine nucleotides(4h) Part B – Practical labs Experiments related to the effect of acid-base balance(2h), precipitation and denaturation of protein, dialysis(4h), study of enzyme kinetics(4h), measurement of protein and glucose in blood serum(4h), measurement of enzyme activity using spectrophotometers(4h)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents . In addition to the use of different tools and experiments in biochemistry through observations and measuring. This will be achieved through lectures, labs, and interactive tutorials and by types of practical activities.

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
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	125		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	10% (10)	3 ,6,9, 12	1,3,4,5,6
	Assignments	2	10% (10)	4 , 10	2, 4, 5
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	4,8,11
Summative assessment	Midterm Exam	2hr	10% (10)	7	1-7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Bioenergetics and the role of ATP
Week 2	The structure and function of enzymes , Control of enzyme activity and hormonal control of metabolism
Week 3	Overview of metabolism and the profession of metabolic fuels, regulation of metabolism(part1)
Week 4	Overview of metabolism and the profession of metabolic fuels, regulation of metabolism(part2)
Week 5	Metabolism of carbohydrates(glycolysis)
Week 6	Metabolism of carbohydrates (HMPS), (Krebs cycle)
Week 7	Metabolism of carbohydrates (electrontransport),
Week 8	Metabolism of carbohydrates(glycogenesis) , (glycogenolysis)
Week 9	Metabolism of carbohydrates (gluconeogenesis)
Week 10	Metabolism of Lipid (lipolysis), (B- oxidation of FA) ,
Week 11	Calculate the Energy for catabolism of lipid
Week 12	Metabolism of Lipid (Anabolism of FA), (Ketone bodies)
Week 13	Metabol. of protein(proteolysis) ,(glucose-alanine cycle) , (Urea cycle)
Week 14	Metabolism of nucleotides (salvage pathway & De novo synthesis), (uric acid)
Week 15	Metabolism of nucleotides (uric acid)

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Acid-base equilibria
Week 2	Lab 2: precipitation of protein(part 1)
Week 3	Lab 3: precipitation of protein(part 2)
Week 4	Lab 4: Dialysis
Week 5	Lab 5: Enzyme kinetics (part 1)
Week 6	Lab 6: Enzyme kinetics (part 2)
Week 7	Lab 7: determination of glucose in serum
Week 8	Lab 8: determination of protein in serum
Week 9	Lab9: Measure the enzyme activity using a spectrophotometer (part 1)
Week 10	Measure the enzyme activity using a spectrophotometer (part 2)

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1-Lehninger Principles of Biochemistry (8th Edition) 2016 Authors: David L. Nelson, Michael M. Cox 2-Textbook of Biochemistry for Medical Students, by DM. Vasudevan (Author), Sreekumari S. (Author), Kannan Vaidyanathan (Author). Publisher, Jaypee Brothers Medical Pub; 8th edition (July 31, 2016)	Yes Yes
Recommended Texts	Harper's Illustrated Biochemistry (31th Edition) 2016 Authors: Peter J. Kennelly, Robert Murray, Victor Rodwell, David Bender, Kathleen M. Botham, P. Anthony Weil	Yes
Websites	https://www.sciencedirect.com/book/9780123838643/human-biochemistry	

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	Bioelectronics			Module Delivery	
Module Type	**Core**			☒ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	MPH-24115				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	2		Semester of Delivery	4	
Administering Department	Medical physics		College	Sciences	
Module Leader	Mahmoud Ahmed mohammed Fakhri		e-mail	drmahmoudahmed@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification	Ph.D.	
Module Tutor	Eman Muwafaq Ramadthan		e-mail	emanbahjat@uomosul.edu.iq	
Peer Reviewer Name	Sahbaa yonis		e-mail	Sahbaayounis@uomosul.edu.iq	
Scientific Committee Approval Date	05/06/2023		Version Number	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	MPH-1102	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	Bioelectronics, as introduced in this course, involves the application of electronic engineering principles to biology, medicine, and the health sciences. An important aspect of bioelectronics is the development of a communication interface between biological materials (cells, tissue and organs) and electronic components. This course introduces the biochemical, biophysical and physiological concepts that are of relevance to bioelectronics, it also provides instruction in the basic science and engineering concepts required to understand the design and application of biosensors. Biosensors are defined as self-contained integrated devices capable of providing analytical information, using a biological recognition element in conjunction with a secondary transduction element. Different biosensor systems are explored, ranging from electrochemical devices, through to optical or thermal systems. Instruction is also given in the general principles of sampling and analysis, statistical presentation and manipulation of data acquired by biosensors. Finally this course examines the methods used to interface sensors for biological and biomedical applications with electronics. One focus will be on transducers, meaning devices which convert information from one form of energy to another. In this course the final form for the information will be an electrical signal but the transducers themselves could be optical, mechanical, etc., and operate in a number of different ways (eg., capacitive, potentiometric, photonic). This introductory course provides background that will be of particular use for the Semester 2 lab-on-chip technologies course.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Demonstrate knowledge of the industrial and socioeconomic context of bioelectronics and biosensor development and their markets. Understand the basic physico-chemical properties of proteins and DNA, and the physiological properties of membranes, cells, tissues and some organs, together with an appreciation of the relationship between structure and function. Understand the distinction between the passive and active electrical properties of membranes, along with the origins of electrical signals emanating from the brain (electroencephalography) and heart (electrocardiogram). Design and use bioelectrodes, and understand the concept of transduction and methods of extracting information from bioelectronic-sensors and electrochemical biosensors. Understand the basic principles of biosensing in terms of biological, chemical and optical/photonic responses. Demonstrate knowledge of the general principles of sampling and analysis, statistical presentation and manipulation of data generated by biosensors. Demonstrate familiarity with the literature on bioelectronics and biosensors, including up to date knowledge of the state of the art and the direction of future developments. Understand and integrate knowledge from other engineering disciplines, particularly EEE and biomedical engineering. Analyse sensor outputs through the use of analogue circuit concepts. Understand typical electronic instrumentation for biosensors and important concepts such as

	calibration and references.
Indicative Contents المحتويات الإرشادية	<u>Part A – Theoretical lectures</u> Introduction to bioelectronic , Electric properties of moleculaes. Inter mol. Forces. Polarization, type of it. Introduction to biosensors and biosenser components. Bioreceptors, immobilization of bioreceptors. Transduuction methods and example devices. Application. nanosensor <u>Part B – Practical labs:</u> Study the many biosensor instruments : such as glucose, oxymeter, nanodrop....etc . This is include: principles , components, meterals, and methods for work

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents . In addition to the use of different tools and experiments in distinguishing the bioelectronics through observations and measuring. This will be achieved through lectures, labs, and interactive tutorials and by types of practical activities.

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	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
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	4	10% (10)	3,6,,9,13	CLO-1, CLO-2 , CLO-5, CLO-9 , CLO-12
	Assignments	2	10% (10)	7 and 12	CLO-4, CLO-6
	Projects / Lab.	6	10% (10)	Continuous	All
	Report	0			
Summative assessment	Midterm Exam	2hr	10% (10)	7	CLO-1, CLO-2, CLO-3, CLO-4 and CLO-6
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

ملاحظة: في حالة كون المادة لا تحتوي على جانب عملي تضاف الدرجة الخاصة بها الى أي محور اخر يختاره استاذ المادة من تفصيلات الدرجة اعلاه

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Overview of Biosensors and Fundamental elements of biosensor devices
Week 2	Introduction to the Fieldof Biosensors andBioelectronics - Engineering sensor proteins
Week 3	Electrochemical Biosensors and Different types of Biosensors
Week 4	Electrochemical principles
Week 5	Amperometric biosensors and charge transfer pathways in enzymes
Week 6	Biopotential Biosensor
Week 7	Optical Biosensors
Week 8	Electrochemical Biosensors
Week 9	ntroduction to Bioelectronics - Neurons and other electrically active cells
Week 10	Recording and stimulation of electrically active cells Foreign body response
Week 11	Implantable electronic medical devices -Cardiac pacemaker
Week 12	Cochlear implants -Deep brain and spinal cord stimulators
Week 13	Brain-Computer Interfaces,Ethical and regulatory issues
Week 14	Wearable devices, Wearable electrophysiology devices

Week 15	Wearable biosensors , Power, processing and communication , Emerging trends

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: pHmeter instrument
Week 2	Lab 2 glucose biosenser
Week 3	Lab 3: O2 biosenser
Week 4	Lab 4: blood pressure instrument
Week 5	Lab 5: cholesterol biosesnsor
Week 6	Lab 6: nano drop instrument
Week 7	Lab 7:
Week 8	Lab 8:.
Week 9	Lab9:
Week10	Lab 10:
Week 11	Lab 11:
Week 12	Lab 12:

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Introduction to Bioelectronics: Materials, Devices, and Applications, Edited by Eleni Stavrinidou; Christopher M. Proctor, 2022 Bioelectronics , Edited by I. Willner, E. Katz (2005)	Yes Yes
Recommended Texts	INTRODUCTORY BIOELECTRONICS (FOR ENGINEERS AND PHYSICAL SCIENTISTS) by Ronald Pethig and Stewart Smith, 2013	yes
Websites	https://supadu-ebooks.s3.amazonaws.com/jenny-stanford-sg/9781003056003/9781003056003fm.pdf	

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	**General Biology I**			Module Delivery	
Module Type	**c**			☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	MPH-1103				
ECTS Credits	**8**				
SWL (hr/sem)	**200**				
Module Level	1		Semester of Delivery	1	
Administering Department	Medical physics		College	Science	
Module Leader	Rana Tariq Yahya		e-mail	drranaaltaee@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification	Ph.D.	
Module Tutor	---		e-mail	------	
Peer Reviewer Name	Name		e-mail	E-mail	
Scientific Committee Approval Date	/06/2023		Version Number	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	General Biology	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	1. Clarification of how biology can make significant contributions to a other science in life. 2. Identify cell , organisms- which are useful in life. 3. This course deals with the basic concept of the most important organisms aspects of this module. 4. Learn about the most important scientific terms (cell) and their definitions related to this topic. 5. To understand the impact of these types of cells in level of organisms. 6. To perform different medical biology applications.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. CLO-1. Create a list with description, the level of organisms CLO-2. Evaluate definition for the various term of prokaryotic and eukaryotic with -the differences between them. CLO-3. Analyzed the general mean of biology, and -organisms- and importance in life. CLO-4. Apply the molecular composition of cells CLO-5.Understand the meaning of water, pH scale , buffer , acidity and basicity. CLO-6. Remember the organic compounds of the cells and list types of nucleic acids and their molecular structure and their function . .
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> Introduction, biology, life (3hrs), living organism characteristics, organisms groups(3hrs) , level of biological organization, classification of life[*4* hrs] ,The cell, cell theory , cell diversity (3hrs), cell size, cell shape, structural organization of cells (3hrs) , types of cells, eukaryotic organisms and prokaryotic, comparison between prokaryotic and eukaryotic cells, similarities and differences [*4* hrs] Tolls of cell biology, microscopy, types of microscope, light microscope (3 hrs) , electron microscope, types of electron microscope, cell fractionation (3hrs) , tissue culture, types of it, instrument and equipment necessary for tissue culture, techniques used in tissue culture(4 hrs), Molecular composition of cells (2hrs), water, properties of water, function of

	water in the body (3 hrs), acids and bases, PH scale, buffer(3 hrs). Organic compounds of cells, carbohydrates (3 hrs) , lipids, fats and oils, phospholipids, steroids (3 hrs) , proteins, structure, roles of proteins, types of proteins(3 hrs), nucleic acids, types, structure, functions(3 hrs) Revision problem classes [3 hrs] <u>Part B – Practical labs</u> Requirements and instruments of biology lab, Components of microscope, practical experiments to examine many slides under microscope (10 hrs). Structure of cell, animals and plant cells , major and secondary components of them , cellular organelles, Plant cell cytoplasmic organelles , Plant cell living organelles (12 hrs). Tissues, types of tissues, animals and plant tissues, classification of tissues, origin of tissues, position of tissues, function of tissues(12 hrs).

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents it includes that help in stratigraphic, paleoecologic, and paleoclimatic analysis. In addition to the use of different microscopes in distinguishing the types of microfossils through observations of the external and internal structures and their diagnosis. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods for microfossils and 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	105	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	95	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
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	20% (10)	6 and 11	CLO-1, CLO-2 and CLO-10
	Assignments	0			
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	CLO-5, CLO-8
Summative assessment	Midterm Exam	2hr	10% (10)	8	CLO-1 ,CLO-2 and CLO-3
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction, biology, life.
Week 2	Classification of life.
Week 3	Living organism characteristics, organisms groups , level of biological organization.
Week 4	The cell, cell theory , cell diversity, cell size, cell shape.
Week 5	Structural organization of cells.
Week 6	Types of cells, eukaryotic organisms and prokaryotic, comparison between prokaryotic and eukaryotic cells, similarities and differences
Week 7	Tolls of cell biology, microscopy, types of microscope, light microscope, electron microscope, types of electron microscope.
Week 8	Electron microscope, types of electron microscope.

Week 9	Cell fractionation, tissue culture, types of it, instrument and equipment necessary for tissue culture, techniques used in tissue culture.
Week 10	Molecular composition of cells, water, properties of water, function of water in the body,
Week 11	Acids and bases, PH scale, buffer
Week 12	Organic compounds of cells : carbohydrates.
Week 13	Lipids, fats and oils, phospholipids, steroids.
Week 14	Proteins, structure, roles of proteins, types of proteins,
Week 15	Nucleic acids, types, structure, functions

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Requirements and instruments of biology lab.
Week 2	Lab 2: Components of microscope, practical experiments to examine many slides under microscope.
Week 3	Lab 3: Structure of cell, animals and plant cells.
Week 4	Lab 4: Major and secondary components of them.
Week 5	Lab 5:Cellular organelles, Plant cell cytoplasmic organelles.
Week 6	Lab 6: Plant cell living organelles.
Week 7	Lab 7: Tissues.
Week 8	Lab 8: Types of tissues
Week 9	Lab9: Animals and plant tissues,
Week10	Lab 10: Classification of tissues.
Week 11	Lab 11: Origin of tissues.
Week 12	Lab 12: Position of tissues, function of tissues.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Alberts, B, Heald, R. *et al*.(2022). Molecular Biology of the Cell. 6th Edition.	No
Recommended Texts	Kannan, K and **Nirmala**, K.(2011). A Text Book Of Biotechnology.	No
Websites	Betts, J Gordon. (2023)."1.2 Structural Organization of the Human Body - Anatomy and Physiology".. Ross, Michael H .; Pawlina, Wojciech (2016). Histology : a text and atlas : with correlated cell and molecular biology (7th ed.).	

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	C			☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	**MPH-1216**				
ECTS Credits	6.00				
SWL (hr/sem)	150				
Module Level			Semester of Delivery		
Administering Department	Type Dept. Code		College	Type College Code	
Module Leader	Mahmood Zeki AL-Hasso		e-mail	mahmoodalhasso@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification	Ph.D.	
Module Tutor			e-mail		
Peer Reviewer Name	Name		e-mail	E-mail	
Scientific Committee Approval Date	02/06/2023		Version Number	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	MPH-1103	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. Clarification of how living cell and organisms can work and function smoothly. 2. Identify the cell structure and components. 3. Clarification the functions of each component of the living cell and how different cells, organs, and systems work together as a whole organism. 4. Learn about the most important scientific terms (Terminology) and their definitions related to this topic. 5. To understand the impact of Biology in medical physics study and application.
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 the components of living cell. 2. Evaluate and Define the various biological terms with their importance. 3. Analyze how living cells, and living organisms work and remember their importance in medical biology and medical physics. 4. Discuss the structure and functions of cellular organelles and their involvement in cellular function and the biology of living organisms including human being. 5. Understand the cellular reproduction and how cell and organisms reproduce.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures Introduction, organisms groups , Classification of living organisms (Three domains classification; Eukarya, Animals, Chordates, Vertebrates, , Mammals, … *Homo sapiens* human being) . [*6* hrs] Cell biology and cell organization: structure and functions (cell wall, cytoplasmic membrane, cytoskeleton, cytoplasm, nucleus and nucleolus, mitochondria, Golgi apparatus, endoplasmic reticulum, lysosome…etc.). [*10* hrs] Cell cycle and cell division: Mitosis and Meiosis [8 hrs] Cellular Genetics: (DNA and RNA: structure and function). Central dogma of molecular biology (replication, transcription, translation, mutation). [6 hrs] Cellular development and differentiation: types of human body tissues and systems, sensory organs, Cellular communication and coordination. [6 hrs] Revision problem classes [3 hrs] Part B – Practical labs Structure of living cells, components of living cells, prokaryotic cells, eukaryotic cells, cellular organelles, structure and functions, cell division, mitosis and meiosis , phases and importance [18 hrs]

	Types of human tissues and specialized cells, organs and human systems in brief (components and functions) [18 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about the science of Biology. Introducing the students to biological aspects of living organisms and the structure of living cells. In addition to the use of different microscopes in distinguishing the types of living cells (prokaryotes and eukaryotes) through observations of the external and internal structures and their components. Learning about the cellular organization and coordination of different systems and organs of living organisms, particularly the human being. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods.

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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction, organisms groups
Week 2	Classification of living organisms (Three domains classification
Week 3	Eukarya, Animals, Chordates , ,Vertebrates , Mammals, … *Homo sapiens* human being
Week 4	Cell biology and cell organization
Week 5	structure and functions (cell wall, cytoplasmic membrane, cytoskeleton
Week 6	cytoplasm, nucleus and nucleolus
Week 7	mitochondria, Golgi apparatus, endoplasmic reticulum, lysosome…etc.).
Week 8	Cell cycle and cell division
Week 9	Mitosis
Week 10	Meiosis
Week 11	Cellular Genetics: (DNA and RNA: structure and function).
Week 12	Central dogma of molecular biology (replication, transcription, translation, mutation).
Week 13	Cellular development and differentiation: types of human body tissues and systems
Week 14	sensory organs
Week 15	Cellular communication and coordination

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Structure of living cells and, and in brief (components and functions)
Week 2	Lab 2: components of living cells
Week 3	Lab 3: prokaryotic cells, eukaryotic cells
Week 4	Lab 4: cellular organelles, structure and functions
Week 5	Lab 5: cell division, mitosis
Week 6	Lab 6: Meiosis phases and importance
Week 7	Lab 7: Types of human tissues
Week 8	Lab 8: specialized cells
Week 9	Lab9: organs
Week10	Lab 10: human systems

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Kendall Hunt, **BSCS Biology: A Human Approach Student Edition**. 5th ed., (2016). McGraw-Hill Education (Author), **BSCS Biology: A Molecular Approach, Student Edition.** 9th ed., (2006).	Yes Yes
Recommended Texts	Urry *et al.*, **Campbell Biology (Campbell Biology Series).** 11th **ed.,** (2016).	Yes
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	**Biomaterials**			Module Delivery	
Module Type	**Core**			☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	**MPH-48040**				
ECTS Credits	**5.00**				
SWL (hr/sem)	**125**				
Module Level	4		Semester of Delivery	8	
Administering Department	Medical physics		College	Sciences	
Module Leader	Marwan Zuhair Elias		e-mail	marwanzt@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification	Ph.D.	
Module Tutor	Ayman abduljabar ahmed		e-mail	ayman.abd@uomosul.edu.iq	
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date	/06/2023		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	Clarification of how biomaterials can make significant contributions to a wide range of medical problems and in medical physics sciences. The aim of this course is to introduce the students to main topics of biomaterials. The course will cover introduction to biomaterials, biological material, biocompatibility, use of biomaterials. biomaterials in organs, materials for ,use in the body, polymers, metals, composite materials, ceramics, biodegradable materials, biodegradable hydrogel, biodegradable polymeric biomaterials, Toxicology, Healing, Mechanical properties of biomaterials, traditional engineering materials, biological soft tissue materials, thermal properties of biomaterials, chemical properties of biomaterials, bio ceramics, hard tissues, application in biomedical field, metals and alloys, stainless steel, titanium and its alloys, excellent corrosion resistance. At the end of the course, students will have a broad knowledge of the basic concepts, techniques and applications of biomaterials. This will be achieved through theoretical lectures, tutorials and homework
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	CLO-1: Define the basics of biomaterials . CLO-2: Identify relation between biocompatibility and biomaterials. CLO-3: Learn about the types of biomaterials. CLO-4: Summarized the most important characteristics of each types of biomaterials. CLO-5: Explain the physical and chemical properties of biomaterials. CLO-6: Discuss the differences between traditional engineering materials and biological materials. CLO-7: Recognize toxicity of biomaterials. CLO-8: Explain the advantages and disadvantages of biomaterials and its applications in medical physics sciences.
Indicative Contents المحتويات الإرشادية	<u>Part A – Theoretical lectures</u> introduction to biomaterials, biological material, biocompatibility[3hr], use of biomaterials. biomaterials in organs, materials for use in the body[3hr], polymers, metals[3hr],composite materials, ceramics[3hr], biodegradable materials, biodegradable hydrogel, biodegradable polymeric biomaterials[3hr], Toxicology, Healing [3hr], Mechanical properties of biomaterials[3hr], traditional engineering materials, biological soft tissue materials[3hr], thermal properties of biomaterials[3hr], chemical

	properties of biomaterials[3hr], bio ceramics[3hr], hard tissues, application in biomedical field[3hr], metals and alloys[3hr], stainless steel, titanium and its alloys[3hr], excellent corrosion resistance[3hr] Part B – Practical labs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents . In addition to the use of different tools in distinguishing the types of biomaterials and its applications in medical sciences. This will be achieved through lectures, labs, and interactive tutorials.

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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	76	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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	5	20% (10)	1,2,5	CLO-1, CLO-2 , CLO-5, CLO-9 , CLO-12
	Assignments	2	10% (10)	7 and 12	CLO-4, CLO-6
	Projects / Lab.	6	10% (10)	Continuous	All
	Report	0			
Summative	Midterm Exam	2hr	10% (10)	7	CLO-1, CLO-2, CLO-3,

assessment					CLO-4 and CLO-5
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

ملاحظة: في حالة كون المادة لا تحتوي على جانب عملي تضاف الدرجة الخاصة بها الى أي محور اخر يختاره استاذ المادة من تفصيلات الدرجة اعلاه

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	introduction to biomaterials, biological material.
Week 2	biocompatibility, use of biomaterials.
Week 3	biomaterials in organs, materials for use in the body
Week 4	polymers, metals
Week 5	composite materials, ceramics.
Week 6	biodegradable materials, biodegradable hydrogel.
Week 7	biodegradable polymeric biomaterials.
Week 8	Toxicology, Healing
Week 9	Mechanical properties of biomaterials[.
Week 10	traditional engineering materials, biological soft tissue materials.
Week 11	thermal properties of biomaterials, chemical properties of biomaterials.
Week 12	bio ceramics, hard tissues.
Week 13	application in biomedical field.
Week 14	metals and alloys, stainless steel, titanium and its alloys.
Week 15	excellent corrosion resistance

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	
Week10	
Week 11	
Week 12	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	**Biomaterials** by Joyce Y. Wong (Author), joseph D. Bronzino(Author)	Yes
Recommended Texts	**Nanobiomaterials** Development and application Dong kee yi (Author), GEORGIA C. PAPAEFTHYMIOU(Author)	yes
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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	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	Biophysics			Module Delivery	
Module Type	**Core**			☒ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	**MPH-2308**				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	2		Semester of Delivery	3	
Administering Department	Medical physics		College	Sciences	
Module Leader	Mahmoud Ahmed mohammed Fakhri		e-mail	drmahmoudahmed@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification	Ph.D.	
Module Tutor	Huda Maswd mohammed		e-mail	Huda.phy@uomosul.edu.iq	
Peer Reviewer Name	Name		e-mail	E-mail	
Scientific Committee Approval Date	05/06/2023		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	Biophysics is the scientific field concerned with studying the methods and theories of physics to understand how vital systems work, study how different parts of the cell move and their functions, and study complex systems in our bodies and their complexity such as the brain, blood circulation, digestive system, and more.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	One of the most important outputs of biophysics explains to the student a wide range of topics such as how neurons communicate with each other and how plant cells convert into energy, as well as an explanation of how and the possibility of healthy cells in DNA turning into cancerous cells in the event of some changes occurring to them and other problems and topics other biological.
Indicative Contents المحتويات الإرشادية	This course introduces the use of Chemical, physical methods in the study of biological systems: Scope of Biophysics, Fundamentals of Biophysics, interaction of light With matter, Chemical Forces, Diffusion and Brownian motion, Viscosity, Light Scattering Small - Molecule Solutes: hydrophiles, hydrophobes, large Hydrophobic Solutes and Surfacec, Aqueous Environment of the Cell, State of Water in bio-structures & its significance, phsico Chemical Techniques to Study Biophsics (Introduction, Physical Aspects, of Hearing) (The Ear, Elementary acoustics, Theories of hearing), Optical defects of the eye, Neural aspects of Vision, Chemical equilibriums in biological systems, Bioenergy

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents . In addition to the use of different tools and experiments in biophysics through observations and measuring. This will be achieved through lectures, labs, and interactive tutorials and by types of practical activities.

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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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	3	10% (10)	4 ,10,15	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	4 , 10	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	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الأسبوعي النظري

	Material Covered
Week 1	Scope of Biophysics, Fundamentals of Biophysics.
Week 2	Interaction of light With matter.
Week 3	Chemical Forces.
Week 4	Discussion and Quiz
Week 5	Diffusion and Brownian motion, Viscosity.
Week 6	Light Scattering Small - Molecule Solutes: hydrophiles, hydrophobes, large Hydrophobic Solutes and Surfacec.
Week 7	Aqueous Environment of the Cell, State of Water in bio-structures & its significance.
Week 8	phsico Chemical Techniques to Study Biophsics (Introduction, Physical Aspects, of Hearing).
Week 9	The Ear, Elementary acoustics, Theories of hearing.
Week 10	Discussion and Quiz
Week 11	Optical defects of the eye.
Week 12	Neural aspects of Vision.
Week 13	Chemical equilibriums in biological systems.
Week 14	Bioenergy.
Week 15	Discussion and Quiz

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Determining solution concentrations using a refractometer and a polarimeter
Week 2	Measuring of focal length and properties os converging lenses
Week 3	Determining solution concentrations using an absorption spectrophotometer
Week 4	Measurement of the blood flow velocity
Week 5	Electrocardiography
Week 6	Hearing testing
Week 7	Principles of dosimetry
Week 8	Methods of detection of ioning radiation
Week 9	
Week10	
Week 11	
Week 12	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Biophysics, by Vasantha Pattabhi and N. Gautham, KLUWER ACADEMIC PUBLISHERS, 2002 Biophysics laboratory exercies, by Anna Kostrzewska, 2005	Yes yes
Recommended Texts	Biophysics ,by William C. Parke, 2020	yes
Websites	https://www.cambridge.org/core/books/biophysics/A4B3B5AF4B09F9C7A94C3E58C200DD48	

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					
Module Title	**Biostatic**			Module Delivery	
Module Type	**S**			☒ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	**MPH-35121**				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level	3		Semester of Delivery	5	
Administering Department	Medical physics		College	Sciences	
Module Leader	Mahmoud Ahmed mohammed Fakhri		e-mail	drmahmoudahmed@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification	Ph.D.	
Module Tutor			e-mail		
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date	05/06/2023		Version Number	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	MPH-1215	Semester	2
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	The purpose of the course is to teach fundamental concepts and techniques of descriptive and inferential statistics with applications in health care, medicine, public health, and epidemiology. Basic statistics, including probability, descriptive statistics, inference for means and proportions, and regression methods are presented. The analytic methods and applications will be linked to topics including health promotion, epidemiology, and program evaluation

Module Learning Outcomes	**Theoretical:** 1. Calculate descriptive statistics related to public health. 2. Graph descriptive statistics. 3. Evaluate the utility of bivariate analysis methods given a data set. 4. Calculate bivariate analyses. 5. Interpret the results of bivariate analyses. 6. Calculate multivariate analyses to determine association among variables. 7. Interpret the results of multivariate analyses. 8. Evaluate analysis results by testing hypotheses. **Practical labs** 1. Students' familiarity with the tool box of statistical software. 2. Capacitating students in analyzing complex information with the help of statistical 3. software – Statistical Package for Social Sciences (SPSS). 4. A strong theoretical and empirical foundation in statistical analysis
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures 1) Biostatics, a core science in Public Health. Nolwenn Le Meur:1h 2) Descriptive statistics a. data type and two way tables. Nolwenn Le Meur b. central tendency and graph. Nolwenn Le Meur: c. dispersion and graph. Nolwenn Le Meur: d. descriptive statistics in spatial analysis: e. Inference and confidence intervals of means, Pascal Crepey f. Inference and confidence intervals of proportions, Pascal Crepey 3) Inferential statistics a. Tests: comparisons of frequency, Pascal Crepey b. Tests: comparisons of means, Pascal Crepey c. Analysis of variance, Pascal Crepey 4) Introduction to regression model a. Simple linear regression, Pascal Crepey b. Residual analysis, Pascal Crepey c. Multiple linear regression, Nolwenn Le Meur d. Principles of health surveillance, Pascal Crepey 5) Introduction planning and conducting a statistical analysis a. Critical reading presentation, Nolwenn Le Meur b. Sample design and power analysis. Nolwenn Le Meur c. Case Study I: Scabies epidemic, Nolwenn Le Meur d. Case study II: Binge drinking survey, Nolwenn Le Meur 6) Field survey a. Preparation & Conduct. Emmanuelle Leray & Metis faculties in total (+complement in the ISB module for data analysis) b. Results (group presentations). Emmanuelle Leray & Metis faculties c. Questionnaire surveys: articulating qualit

	Part B – Practical labs Introduction to SPSS ((SPSS Environment: data editor, output viewer, syntax editor – Data view window – SPSS Syntax – Data creation – Importing data – Variable types in SPSS and Defining variables – Creating a Codebook in SPSS)). Working with Data ((Computing Variables - Recoding (Transforming) Variables: Recoding Categorical String Variables using Automatic Recode - Rank Cases - Sorting Data - Grouping or Splitting Data)). Exploring Data ((Descriptive Statistics for Continuous Variables - The Explore procedure-Frequencies Procedure –Descriptives -Compare Means-Frequencies for Categorical Data)). Analysing Data ((Inferential Statistics for Association: Pearson Correlation, Chi-square Test of Independence – Inferential Statistics for Comparing Means: One Sample t Test, PairedSamples T Test, Independent Samples T Test, One-Way ANOVA)).

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents . In addition to the use of different tools and experiments in biochemistry through observations and measuring. This will be achieved through lectures, labs, and interactive tutorials and by types of practical activities.

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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	21	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.5
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	4	10% (10)	3 ,6,9, 12	1,3,4,5,6
	Assignments	2	10% (10)	4 , 10	2, 4, 5
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	4,8,11
Summative assessment	Midterm Exam	2hr	10% (10)	7	1-7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	INTRODUCTON TO BIOSTATISTICS
Week 2	PRESENTATION OF BIOLOGICAL DATA
Week 3	PROBABILITYAND STATISTICS
Week 4	NORMAL DISTRIBUTION
Week 5	BIONOMIAL AND POISSON DISTRIBUTION
Week 6	STANDRAD ERROR AND CONFIDENCE INTERVAL
Week 7	HYPOTHESIS TESTING
Week 8	THE t- DISTRIBUTION
Week 9	Mid-term revision and examination
Week 10	THE CHI-SQUARE DISTRIBUTION
Week 11	ANALYSIS OF VARIANCE
Week 12	SIMPLE LINEAR REGRESSION
Week 13	SIMPLE LINEAR CORRELATION
Week 14	NON-PARAMETRIC STATISTICS
Week 15	COMPUTER PROGRAM AND REVISION FOR EXAMINATION

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to Statistical Computing in SPSS
Week 2	Lab 2: Management of Research Data in SPSS
Week 3	Lab 3: Statistical Graphics
Week 4	Lab 4: Computation of Descriptive Statistics
Week 5	Lab 5: Test of normality, One Sample t test, One sample Wilcoxon test, independent samples t test, Mann Whitney U test.
Week 6	Lab 6: Paired samples t test, Wilcoxon signed rank test, One Way ANOVA, Kruskal Wallis H test.
Week 7	Lab 7: Repeated Measures ANOVA, Friedman Test, Linear Mixed model
Week 8	Lab 8: McNamar's test, Cochran Q test, Chi-square test, Fisher exact test
Week 9	Lab9: Computation of Diagnostic accuracy, ROC Curve, Kappa agreement (Unadjusted and adjusted)
Week 10	Lab 10 : Computation of Correlation coefficient (Pearson, Spearman) and Linear Regression model
Week 11	Lab11: Binary logistic regression analysis (Univariate / Multivariate)
Week 12	Lab 12: Computation of Sample size / Power using Online and Offline available software's.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1- Chernick M. R. and Friis R.H. (2003). Introductory Biostatistics for the health sciences. JOHN-WILEY AND SONS INC. New Jersey 2- IBM 2016, IBM Knowledge Center: SPSS Statistics, IBM, viewed 18 May 2016	Yes
Recommended Texts	1- Cox D.R. (1990) Planning of experiments. WILEY INTERNATIONAL EDITION. 2. Cramer D. (1997). Basic statistics for social research. London: ROUTLEDGE. 3- Using IBM SPSS statistics for research methods and social science statistics, William E. Wagner, Fifth edition published in 2015 by SAGE Publications, Inc.	Yes yes
Websites	http://www.biostathandbook.com/HandbookBioStatThird.pdf https://www.ibm.com/support/knowledgecenter/SSLVMB/welcome	

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	**Biotechnology**			Module Delivery	
Module Type	**E**			☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	**MPH-47035**				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	4		Semester of Delivery	7	
Administering Department	Medical physics		College	Science	
Module Leader	Rana Tariq Yahya		e-mail	drranaaltaee@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification	Ph.D.	
Module Tutor	---		e-mail	------	
Peer Reviewer Name	Name		e-mail	E-mail	
Scientific Committee Approval Date	/06/2023		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 ***يتم كتابة اهم الأهداف التي تغطيها هذه المادة الدراسية بشكل جمل او فقرات توضح المواضيع التي سيتم التطرق اليها و دراستها و معالجتها)***	1. Clarification of how biotechnology can make significant contributions to a other science in life. 2. Identify biotechnology , classification of biotechnology, branches of biotechnology. 3. This course deals with the basic concept of the most important application aspects of this module. 4. Learn about the most important scientific terms (medicine biotechnology) and their definitions related to this topic. 5. To understand the impact of these types of curing disease by gene therapy. 6. To perform different genetic engineering and gene cloning to transform the desirable gen to cure any disease .
Module Learning Outcomes مخرجات التعلم للمادة الدراسية ***يتم كتابة اهم المُخرجات او الناتج و الكم العلمي الذي يتم استخدامه للتدريس في هذه المادة على شكل أسئلة أساسية تخص منهاج المادة بأكمله و يجب ان لا تقل هذه المُخرجات من ناحية العدد عن 6 مُخرجات و يفضل ان تكون بعدد أسابيع الدراسة.***	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. CLO-1. Create a list with description, the level of biotechnology CLO-2. Evaluate definition for the various term of biotechnology and its classification . CLO-3. Analyzed the general mean of medicine biotechnology.. CLO-4. Apply the definition of gene therapy to cure the disease. CLO-5.Understand the meaning of gene cloning, genetic engineering, BT-toxin and insulin plasmid. CLO-6. Remember the tools of recombinant DNA to cure any disease. .
Indicative Contents المحتويات الإرشادية ***يتم كتابة اهم العناوين الرئيسية للمواضيع بشكل متسلسل و التي تشمل كافة الفقرات التي تحتويها مع إدراج عدد الساعات المطلوبة لتنفيذ كل فقرة.***	Indicative content includes the following. <u>Part A – Theoretical lectures</u> Introduction, biotechnology, history of biotechnology types of biotechnology (4hrs), classification of biotechnology, branches of biotechnology (6hrs). ,General application of biotechnology[*4* hrs], biotechnology in agriculture , biotechnology in medicine and heath care[3 hrs]. Gene therapy, types of gene therapy, somatic and germ line gene therapy, (4 hrs), Biotechnology energy and biofuel(2hrs), Biotechnology in production enzymes and biochemical(3hrs), biotechnology in treatment of environment from pollution(3 hrs). Principle of biotechnology(3 hrs) , Genetic engineering (3 hrs) , gene cloning(3 hrs), steps of gene cloning(3 hrs).

	Tools of recombinant DNA, steps to create recombinant DNA(3 hrs), methods of curing disease by recombinant DNA(4 hrs). Revision problem classes [3 hrs] Part B – Practical labs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies *يتم كتابة ملخص الاستراتيجية الرئيسية التي سيتم تبنيها في تقديم هذه المادة*	Expanding students' perceptions about this science and its contents it includes that help in stratigraphic, paleoecologic, and paleoclimatic analysis. In addition to the use of different microscopes in distinguishing the types of microfossils through observations of the external and internal structures and their diagnosis. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods for microfossils and 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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
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	Quizzes	2	20% (10)	6 and 11	CLO-1, CLO-2 and

assessment					CLO-10
	Assignments	0			
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	CLO-5, CLO-8
Summative assessment	Midterm Exam	2hr	10% (10)	8	CLO-1 ,CLO-2 and CLO-3
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction, biotechnology, history of biotechnology types of biotechnology classification of biotechnology, branches of biotechnology.
Week 2	General application of biotechnology, biotechnology in agriculture.
Week 3	biotechnology in medicine and heath care.
Week 4	Gene therapy, types of gene therapy.
Week 5	Somatic and germ line gene therapy
Week 6	Biotechnology energy and biofuel.
Week 7	Biotechnology in production enzymes.
Week 8	biotechnology in treatment of environment from pollution.
Week 9	Principle of biotechnology.
Week 10	Genetic engineering.
Week 11	Gene cloning
Week 12	Steps of gene cloning.
Week 13	Tools of recombinant DNA.
Week 14	Steps to create recombinant DNA.
Week 15	Methods of curing disease by recombinant DNA.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1:
Week 2	Lab 2:
Week 3	Lab 3:
Week 4	Lab 4:
Week 5	Lab 5:
Week 6	Lab 6:
Week 7	Lab 7: .
Week 8	Lab 8:
Week 9	Lab9:
Week10	Lab 10:
Week 11	Lab 11:
Week 12	Lab 12:

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Griffiths F.(2003) Introduction to genetic analysis.	No
Recommended Texts	Kannan, K and **Nirmala**, K.(2011). A Text Book Of Biotechnology.	No
Websites	Danso, Dominik; Chow, Jennifer; Streit, Wolfgang R. (2019). "Plastics: Environmental and Biotechnological Perspectives on Microbial Degradation". Applied and Environmental Microbiology.	

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	Cellular and genetic disorders			Module Delivery	
Module Type	E			☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	MPH-36030				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level	3		Semester of Delivery	6	
Administering Department	Medical Physics		College	Sciences	
Module Leader	Jasim M. Y. Ahmed Al-Bayati		e-mail	jasim.yaseen@uomosul.edu.iq	
Module Leader's Acad. Title	Lecturer		Module Leader's Qualification	M. Sc.	
Module Tutor			e-mail		
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date			Version Number		

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	The study of Cellular and genetic disorders is an important field in the medical and biological science, this course shows how can contribute to solving a wide range of scientific problems in the field of medical physics. This course also deals with clarifying the basic concept of medical and biological instruments and identifying the relationships and applications in medicine and biological field. In addition to understanding the role of this instruments in developing methods and adding new applications to medical physics. At the end of the course, students will have a broad knowledge of the basic medical concepts, techniques, and applications of this instruments. This will be achieved through theoretical lectures, lessons, scientific visits, and other extracurricular activities.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	CLO-1: Definition and the concepts of Cellular and genetic disorders. CLO-2: Identify the relationship between cytogenetic and disorders. CLO-3: provides knowledge and a deep understanding of the basics, interactions and mechanisms. This helps develop new models and theories that explain this disorders. CLO-4: Understanding interactions and pathways that lead to developing these disorders. CLO-5: Understanding the basics to developing an effective treatments to prevent of these diseases. CLO-6: Understanding diagnostic tests for disorders and other disease. CLO-7: Identify modern technologies that enable to study, detection and analyze all about medical fields. CLO-8: enhancing the scientific understanding of this instruments and its role in maintaining health and fighting disease.
Indicative Contents المحتويات الإرشادية	Theoretical lectures Introduction to cellular genetics, and what basic science of genetics. [3 hrs], The laws of genetics. [3hrs], What is the genetic disorders. [3 hrs]. The cell cycle: Mitosis. [3hr]. Meiosis. [3 hr]. Mutations: types of mutations [3hr]. Variations and polymorphism. [3hr]. Symptoms and causes, Molecular diagnosis and tests. [3hr]. Management and treatments, Prevention. [3hr]. Types or genetic classification of genetic disorders: Single gene (Monogenic) inheritance genetic disorder. [3h]. Chromosomal abnormalities. [3hr]. Multifactorial (complex) abnormalities. [3hr]. Mitochonderial abnormalities. [3hr]. Genetic disease of somatic cells. [3hr]. Disease due to incompatibility of genes. [3hr].

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents, through lectures, labs, interactive tutorials, and by types of practical activities.

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
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	2	10% (10)	1,2,5	CLO-1, CLO-2 , CLO-5, CLO-9 , CLO-12
	Assignments	2	10% (10)	7 and 12	CLO-4, CLO-6
	Projects	1	10% (10)		All
	Report	1	10% (10)		All
Summative assessment	Midterm Exam	2hr	10% (10)	7	CLO-1, CLO-2, CLO-3, CLO-4 and CLO-5
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

ملاحظة: في حالة كون المادة لا تحتوي على جانب عملي تضاف الدرجة الخاصة بها الى أي محور اخر يختاره استاذ المادة من تفصيلات الدرجة اعلاه

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction to cellular genetics, and what basic science of genetics.
Week 2	The laws of genetics.
Week 3	What is the genetic disorders.
Week 4	The cell cycle: Mitosis.
Week 5	Meiosis.
Week 6	Mutations: types of mutations
Week 7	Variations and polymorphism.
Week 8	Symptoms and causes, Molecular diagnosis and tests.
Week 9	Management and treatments, Prevention.
Week 10	Types or genetic classification of genetic disorders: Single gene (Monogenic) inheritance genetic disorder.
Week 11	Chromosomal abnormalities.
Week 12	Multifactorial (complex) abnormalities.
Week 13	Mitochonderial abnormalities.
Week 14	Genetic disease of somatic cells.
Week 15	Disease due to incompatibility of genes.

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	
Week10	
Week 11	

Week 12	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Notes on Cytogenetics and Techniques in Medical Genetics. Dr. Arpan Haldar. First Edition: Copyright© 2020\ Sara Book Publication, Ahmedabad ABC OF CLINICAL GENETICS. Helen M Kingston. Third edition: BMJ Books 2002: BMJ Books is an imprint of the BMJ Publishing Group	NO
Recommended Texts	Genetic Disorders. John W. Bachman Cytogenetics and the evolution of medical genetics Malcolm A. Ferguson-Smith, MBChB, FRCPath, FRS Genet Med 2008:10(8):553–559	No
Websites	https://www.curemito.org/aboutmito?gclid=EAIaIQobChMI2ICfrIPx_wIVUpRoCR3dMgOiEAAYASAAEgI_1PD_BwE	

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	**Computer Science**			Module Delivery	
Module Type	**B**			☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	**UOM-103**				
ECTS Credits	3				
SWL (hr/sem)	75				
Module Level	1		Semester of Delivery	1	
Administering Department	Type Dept. Code		College	Type College Code	
Module Leader	Husam Waleed Yaseen		e-mail	husam.waleed@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Lecturer		Module Leader's Qualification	M.S.	
Module Tutor	Husam Waleed		e-mail	husam.waleed@uomosul.edu.iq	
Peer Reviewer Name	Name		e-mail	E-mail	
Scientific Committee Approval Date	13/06/2023		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 develop problem solving skills and understanding of Microsoft Word. 2. This course deals with the basic concept of Word. 3. To understand how writing and printing on computer. 4. To perform different application with word such as MATLAB.
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 Word works in simple way. 2. List the various terms associated with computer. 3. Summarize what is meant by a basic Word element. 4. Discuss the student's interaction with the computer 5. Description of the functions of the Word. 6. Learn about the features of the Word program through the existing ribbons. 7. Learn about all possible operations in this program
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> Introduction of Microsoft Office, The Elements of the Word Screen- Quick Access Toolbar, Window, Ribbon, Status bar [10 hour], Skills in writing of Microsoft Word program, File Tab, Saving and Closing a New Document. HOME TAB, Clipboard group, Font group, Paragraph group, add numbers or bullets to paragraphs, [10 hour] Insert tab, Pages group, add a cover page, insert a blank page, Illustrations group, Symbols group, insert tab, Tables group, Select in Table, Insert cell, Page. [18 hour]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expand students' perceptions of this science and its contents that are included in the Word program, which could add information to students about its use mechanism. And how to deal with files and format them or reformulate them within the commands in this program and diagnose them. This will be achieved through lectures, laboratories, interactive tutorials.

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	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	27	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

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 #4, #7
	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, #6 and #7
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction in Microsoft Word
Week 2	Lab 2: Skills in writing of Microsoft Word program.
Week 3	Lab 3: File Tab
Week 4	Lab 4: Home Tab
Week 5	Lab 5: Font group
Week 6	Lab 6: Hinge line.
Week 7	Lab 7: Description of Bullets and Numbering, Midterm Exam
Week 8	Lab 8: Insert tab - Pages group
Week 9	Lab9: Description of Symbols group.
Week10	Lab 10: Insert tab - Tables group
Week 11	Lab 11: Header and Footer.
Week 12	Lab 12: Insert tables
Week 13	Lab 13: Design list
Week 14	Lab 14: View list
Week 15	Lab 15: Layout list
Week 16	Final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Mustansiriyah University, Computer Center, Word 2019	Yes
Recommended Texts	©2010 Torben Larg Frandsen and Ventus Aps ISBN 978-87-7681-655-1	Yes
Websites	Online Microsoft Word Help and Learning o https://support.office.com/en-us/word • "Welcome to Word" Document Template o MW has a built-in introductory document. To open, first open MW, then click on the 'Welcome to Word' template under 'New	

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	**Crimes of Baath Party**			Module Delivery	
Module Type	**B**			☒ Theory ☒ Lecture ☐Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	**U0M-201**				
ECTS Credits	2				
SWL (hr/sem)	50				
Module Level	2		Semester of Delivery	3	
Administering Department	Medical Physics		College	Science	
Module Leader	صلاح عفدو		e-mail		
Module Leader's Acad. Title	Teaching Assistant		Module Leader's Qualification	MA	
Module Tutor			e-mail		
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date	/06/2023		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	
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	34	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	1.5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	16	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	0.5
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	3	15% (15)	2, 5, and 9	LO #2, #5, #8
	Assignments	2	10% (10)	4 and 8	LO #4 and #8
	Projects / Lab.				
	Report	3	15% (15)	3, 6 and 7	LO #3, #6 and #7
Summative assessment	Midterm Exam	2hr	10% (10)	7	ALL
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الأسبوعي النظري

	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	
Week 8	
Week 9	
Week 10	
Week 11	
Week 12	
Week 13	
Week 14	
Week 15	

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	
Week10	
Week 11	
Week 12	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts		
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	Digital Electronics			Module Delivery	
Module Type	**Core**			☒Theory ☒Lecture ☒Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	**MPH-47134**				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	4		Semester of Delivery	7	
Administering Department	Type Dept. Code		College	Type College Code	
Module Leader	Khalid Qasim Kheder		e-mail	khalid.alshawi@uomosul.edu.iq	
Module Leader's Acad. Title	Lecturer		Module Leader's Qualification	Ph.D.	
Module Tutor			e-mail		
Peer Reviewer Name	Name		e-mail	E-mail	
Scientific Committee Approval Date	11/06/2023		Version Number	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	MPH-36129	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. Explain the basic differences between digital and analog quantities Show how voltage levels are used to represent digital quantities Describe various parameters of a pulse waveform such as rise time, fall time, pulse width, frequency, period, and duty cycle ■ Explain the basic logic functions of NOT, AND, and OR ■ Describe several types of logic operations and explain their application in an example system ■ Describe programmable logic, discuss the various types, and describe how PLDs are programmed ■ Identify fixed-function digital integrated circuits according to their complexity and the type of circuit packaging ■ Identify pin numbers on integrated circuit packages 2. Review the decimal number system ■ Count in the binary number system ■ Convert from decimal to binary and from binary to decimal ■ Apply arithmetic operations to binary numbers ■ Determine the 1's and 2's complements of a binary number ■ Express signed binary numbers in sign-magnitude, 1's complement, 2's complement, and floating-point format ■ Carry out arithmetic operations with signed binary numbers ■ Convert between the binary and hexadecimal number systems ■ Add numbers in hexadecimal form ■ Convert between the binary and octal number systems ■ Express decimal numbers in binary coded decimal (BCD) form 3. ■ Describe the operation of the inverter, the AND gate, and the OR gate ■ Describe the operation of the NAND gate and the NOR gate ■ Express the operation of NOT, AND, OR, NAND, and NOR gates with Boolean algebra ■ Describe the operation of the exclusive-OR and exclusive-NOR gates 4. ■ Analyze basic combinational logic circuits, such as AND-OR, AND-OR-Invert, exclusive-OR, and exclusive-NOR ■ Use AND-OR and AND-OR-Invert circuits to implement sum-of-products (SOP) and product-of sums (POS) expressions ■ Write the Boolean output expression for any combinational logic circuit ■ Develop a truth table from the output expression for a combinational logic circuit ■ Use the Karnaugh map to expand an output expression containing terms with missing variables into a full SOP form 5. ■ Distinguish between half-adders and full-adders ■ Use full-adders to implement multibit parallel binary adders ■ Explain the differences between ripple carry and look-ahead carry parallel adders ■ Use the magnitude comparator to determine the relationship between two binary numbers and use cascaded comparators to handle the comparison of larger numbers ■ Implement a basic binary decoder ■ Use BCD-to-7-segment decoders in display systems ■ Apply a decimal-to-BCD priority encoder in a simple keyboard application
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**The student should be able to:** 1. . Define analog ◆ Define digital ◆ Explain the difference between digital and analog quantities ◆ State the advantages of digital over analog ◆ Give examples of how digital and analog quantities are used in electronics 2. Also should be able to ◆ List three basic logic functions ◆ Define the NOT function ◆ Define the AND function ◆ Define the OR function 3. Explain why the decimal number system is a weighted system ◆ Explain how powers of ten are used in the decimal system ◆ Determine the weight of

	each digit in a decimal number 4. List the hexadecimal characters ◆ Count in hexadecimal ◆ Convert from binary to hexadecimal ◆ Convert from hexadecimal to binary ◆ Convert from hexadecimal to decimal ◆ Convert from decimal to hexadecimal ◆ Add hexadecimal numbers ◆ Determine the 2's complement of a hexadecimal number ◆ Subtract hexadecimal numbers 5. ◆ Identify negation and polarity indicators ◆ Identify an inverter by either its distinctive shape symbol or its rectangular outline symbol ◆ Produce the truth table for an inverter ◆ Describe the logical operation of an inverter 6. ◆ Define variable ◆ Define literal ◆ Identify a sum term ◆ Evaluate a sum term ◆ Identify a product term ◆ Evaluate a product term ◆ Explain Boolean addition ◆ Explain Boolean multiplication 7. ◆ Analyze and apply AND-OR circuits ◆ Analyze and apply AND-OR-Invert circuits ◆ Analyze and apply exclusive-OR gates ◆ Analyze and apply exclusive-NOR gates 8. ◆ Describe the function of a half-adder ◆ Draw a half-adder logic diagram ◆ Describe the function of the full-adder ◆ Draw a full-adder logic diagram using half-adders ◆ Implement a full-adder using AND-OR logic 9. Define decoder ◆ Design a logic circuit to decode any combination of bits ◆ Describe the 74HC154 binary-to-decimal decoder ◆ Expand decoders to accommodate larger numbers of bits in a code ◆ Describe the 74HC42 BCD-to-decimal decoder ◆ Describe the 74HC47 BCD-to-7-segment decoder ◆ Discuss zero suppression in 7-segment displays ◆ Use VHDL to describe various types of decoders ◆ Apply decoders to specific applications
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures: The term digital is derived from the way operations are performed, by counting digits. For many years, applications of digital electronics were confined to computer systems. Today, digital technology is applied in a wide range of areas in addition to computers. Such applications as television, communications systems, radar, navigation and guidance systems, military systems, medical instrumentation, industrial process control, and consumer electronics use digital techniques. Over the years digital technology has progressed from vacuum-tube circuits The binary number system and digital codes are fundamental to computers and to digital electronics in general. In this chapter, the binary number system and its relationship to other number systems such as decimal, hexadecimal, and octal are presented. Arithmetic operations with binary numbers are covered to provide a basis for understanding how computers and many other types of digital systems work. Also, digital codes such as binary coded decimal (BCD), the Gray code, and the ASCII are covered. The parity method for detecting errors in codes is introduced. The TI-36X calculator is used to illustrate certain operations [*8* hrs] Several types of combinational logic functions are introduced including adders, comparators, decoders, encoders, code converters, multiplexers (data selectors), DE multiplexers, and parity generators/checkers. VHDL implementation of each logic function is provided, and examples of fixed-function IC devices are included. Each

	device introduced may also be available in other logic families. [*10* hrs] the laws, rules, and theorems of Boolean algebra and their application to digital circuits. You will learn how to define a given circuit with a Boolean expression and then evaluate its operation. You will also learn how to simplify logic circuits using the methods of Boolean algebra, Karnaugh maps, and the Quine-McCluskey method. Boolean expressions using the hardware description language VHDL are also cover [8 hrs] Revision problem classes [3 hrs] Part B – Practical labs Eight experiments are included in this manual to provide through coverage of basic digital principles. They begin with a series of experiments on the principles of basic logic gates and their application in digital electronics and follow with the last experiment of flip-flops. Many types of IC logic families have been explained in the relevant sections and pin connections of many TTL have been given at the end of the laboratory manual book. [18 hrs] Each experiment is divided into four sections: 1-) Purpose, 2-) Theory, 3-) Experimental Procedure, and 4-) Discussion and Conclusions about the experiment. The theory section gives required brief information about the experiment's subject. Although the theoretical background for the experiment is provided at the theory section through each experiment, the necessary further information should be obtained during the theoretical consideration of this course and from many auxiliary books that are available in our library. The discussion and conclusion part should include the necessary interested questions about the experiment and related subjects to understand very well the experiment and its related subjects and also for the evaluation and the significance of the results of the experiment [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Students will learn factual material through lectures and guided reading. Tutorials will be used to apply the basic principles. Laboratory work that will be done in a co-requisite separate course will be used to demonstrate concepts and show differences between theory and reality. Lecture notes will be given to students prior to all lectures. That would help the learners to clarify their doubts during lecture time and make it more interactive. Problem sheets are given out to students and after time, the problems are discussed in class. Some of the problems will be handed in and then marked by peers to give Interactive lecturing style, with opportunities for questions, and requirement to work on simple problems, Peer marking of tutorial questions for formative feedback. Tutorial classes where students can ask questions and be lead through solutions as required formative feedback to fellow students

	Expanding students' Using visual aids and the latest technology to understand electronic circuits, using a computer and simulating all experiments and logical circuits to help students understand the subject. Using the method of discussion among everyone in solving related questions, and all students are required to participate and explain the subject to their peers, and this highlights the student's self-confidence, in addition to knowing his mistakes and avoiding them in the future

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	5.2
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	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	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Digital and Analog Quantities Binary Digits, logic Levels, digital waveforms
Week 2	Basic Logic Functions, Combinational and Sequential Logic Functions

Week 3	Decimal Numbers ,Binary Numbers
Week 4	Decimal-to-Binary Conversion ,Binary Arithmetic
Week 5	Complements of Binary Numbers, Hexadecimal Numbers ,Octal Numbers
Week 6	Binary Coded Decimal (BCD) ,Digital Codes
Week 7	The Inverter, The AND gate, The OR Gate
Week 8	The NAND Gate, The NOR Gate ,The Exclusive-OR and Exclusive-NOR Gates
Week 9	Boolean Operations and Expressions, Laws and Rules of Boolean Algebra
Week 10	DE Morgan's Theorems, Boolean Analysis of Logic Circuits, Logic Simp. Using B. Algebra
Week 11	Standard Forms of Boolean Expressions, Boolean Expressions and Truth Tables
Week 12	The Karnaugh Map ,Karnaugh Map SOP Minimization
Week 13	Basic Combinational Logic Circuits, Implementing Combinational Logic
Week 14	The Universal Property of NAND and NOR gates , pulse Waveform Operation
Week 15	Half and Full Adders, parallel Binary Adders ,decoders - encoders –Comparators,muiliplexer

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: The basic logic gates (AND ,OR, NOT)
Week 2	Lab 2: The university gates (NAND ,NOR)
Week 3	Lab 3: And-OR-INVERTER Logic circuit
Week 4	Lab 4: Ex-OR ,Ex-NOR gates
Week 5	Lab 5: Conversion binary system to Gray code
Week 6	Lab 6: Conversion Gray code to binary system
Week 7	Lab 7: Half-Adder ,Full-Adder, design logic circuit
Week 8	Lab 8:. 4-bit parallel Adder
Week 9	Lab 9: Decoder ,Binary decoded decimal(BCD)

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Digital Fundamentals ELEVENTH EDITION Thomas L. Floyd	Yes
Recommended Texts	Digital Electronics Principles, Devices and Applications Anil K. Maini Defense Research and Development Organization (DRDO), India	Yes
Websites	https://www.javatpoint.com/digital-electronics	

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	Electricity and magnetism			Module Delivery	
Module Type	**Core**			☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	MPH-1101				
ECTS Credits	8				
SWL (hr/sem)	**200**				
Module Level	1		Semester of Delivery	1	
Administering Department	Medical physics		College	Sciences	
Module Leader	Marwan Zuhair Elias		e-mail	marwanzt@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification	Ph.D.	
Module Tutor	Shaimaa Talal Atalla		e-mail	shaimaa.talal@uomosul.edu.iq	
Peer Reviewer Name	Nadia Adel Saeed		e-mail	nadia.alhamdaney@uomosul.edu.iq	
Scientific Committee Approval Date	/06/2023		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	Clarification of how electricity and magnetism can make significant contributions to a wide range of scientific problems in medical physics sciences. This course deals with the basic concept of electricity and magnetism . Learn about the relations of electricity with magnetism and the medical applications of such relation.To understand and comprehend the impact of electricity and magnetism on medical physics sciences .To perform different electricity and magnetism applications. At the end of the course the students will have broad knowledgeOf the basic concepts , technique and application of electricity and magnetism. This will be achieved through, theoretical lectures, tutorials and laboratory
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	CLO-1: Define the basics of electricity and magnetism . CLO-2: Identify relation between charge and matter, coulombs law, The electric field and how to measure it, Motion of the electron normally to the electric field, Gauss law for measuring the flux of electric field and its application. CLO-3: Learn about the relation between the electric field and electric potential, Application for calculation of the electric field. CLO-4: Summarized the capacitors and its connections in parallel and in series, the effects of adding a dielectric between the plates, Stored energy in capacitor. CLO-5: Explain the electric current and dc circuits. CLO-6: Discuss the magnetic field, Magnetic flux, Motion of charged particles in magnetic field. CLO-7: Recognize the force on a current carrying conductor. CLO-8: Explain ampere Law, Electromagnetic induction and faradays law and its applications in medical physics sciences.
Indicative Contents المحتويات الإرشادية	Part A – Theoretical lectures Introduction The relation between charge and matter, coulombs law, The electric field , Motion of the electron normally to the electric field. [5 hrs], Gauss law , the flux of electric field and its application. [3 hrs],The electric potential, The relation between the electric field and electric potential. [3 hrs]. Application for calculation of the electric field[3hr]. Capacitors in parallel and in series and Capacitors with dielectric placed between the plates [2hr]. Stored energy in capacitor, electric current and dc circuits, Ohms law[2hr]. The magnetic field, Magnetic flux, Motion of charged particles in magnetic field[2hr]. Motion of charged particles in magnetic field, Force

	on a current carrying conductor[3hr]. Torque on a current loop, Magnetic field in current carrying conductor, Force between parallel current carrying conductor[4hr]. ,Ampere Law, Electromagnetic induction and faradays law[3h]. Part B – Practical labs 1. investigation Ohm's law and find the unknown resistance[2hr] Electromotive force and the internal resistance of a battery using the graph method[2hr] . Calculation of equivalent resistance for series and parallel connections frequency of main electric power line using Sonometer[2hr] . Finding the resistance of a voltmeter using the curve graph method[3hr]. Find the electromotive force and internal resistance of an electric cell [2hr]. Methods for measuring and checking fixed electrical resistances inside a circuit[2hr]. Finding unknown resistance value using Test on bridge[2hr]. Determine the value of resistivity of a wire using testosterone bridge[2hr]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents . In addition to the use of different tools and experiments in distinguishing the electric and magnetic through observations and measuring. This will be achieved through lectures, labs, and interactive tutorials and by types of practical activities.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	95	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	105	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	7
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	5	10% (10)	1,2,5	CLO-1, CLO-2 , CLO-5, CLO-9 , CLO-12
	Assignments	2	10% (10)	7 and 12	CLO-4, CLO-6
	Projects / Lab.	6	10% (10)	Continuous	All
	Report	0			
Summative assessment	Midterm Exam	2hr	10% (10)	7	CLO-1, CLO-2, CLO-3, CLO-4 and CLO-5
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

ملاحظة: في حالة كون المادة لا تحتوي على جانب عملي تضاف الدرجة الخاصة بها الى أي محور اخر يختاره استاذ المادة من تفصيلات الدرجة اعلاه

Delivery Plan (Weekly Syllabus)
المنهاج الأسبوعي النظري

	Material Covered
Week 1	The relation between charge and matter.
Week 2	coulombs law, The electric field.
Week 3	Motion of the electron normally to the electric field.
Week 4	Gauss law and its application.
Week 5	Calculating the flux of electric field.
Week 6	The electric potential and the relation between the electric field and electric potential.
Week 7	Capacitors in parallel and in series.
Week 8	Capacitors with dielectric placed between the plates, Stored energy in capacitor.
Week 9	electric current and dc circuits, Ohms law.
Week 10	The magnetic field, Magnetic flux.
Week 11	Motion of charged particles in magnetic field.
Week 12	Force on a current carrying conductor.
Week 13	Torque on a current loop, Magnetic field in current carrying conductor.
Week 14	Force between parallel current carrying conductor, Ampere Law.
Week 15	Electromagnetic induction and faradays law.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: investigation Ohm's law and find the unknown resistance Electromotive force and the internal resistance of a battery using the graph method .
Week 2	Lab 2: Calculation of equivalent resistance for series and parallel connections Frequency of main electric power Line using Sonemetere .
Week 3	Lab 3: Finding the resistance of a voltmeter using the curve graph method.
Week 4	Lab 4: Find the electromotive force and internal resistance of an electric cell
Week 5	Lab 5: Methods for measuring and checking fixed electrical resistances inside a circuit.
Week 6	Lab 6: Finding unknown resistance value using Test on bridge .
Week 7	Lab 7: Determine the value of resistivity of a wire using testosterone bridge
Week 8	Lab 8:.
Week 9	Lab9:
Week10	Lab 10:
Week 11	Lab 11:
Week 12	Lab 12:

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	**Electricity and Magnetism 3rd Edition** by Edward M. Purcell (Author), David J. Morin (Author)	Yes
	Introduction to Electricity, Magnetism, and Circuits Samuel J. Ling; Jeff Sanny; William Moebs; and Daryl Janzen.	Yes
Recommended Texts	**Electricity and Magnetism 3rd Edition** Cambridge University Press (2013), 830 pages. Edward Purcell and David Morin. Intended audience: Honors college freshmen, or upper-level college.	No
Websites	https://www.amazon.com/Electricity-Magnetism-Edward-M-	

	Purcell/dp/1107014026/ref=sr_1_1?keywords=purcell+morin+electricity&qid=1570586591&s=books&sr=1-1

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
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	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
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Electromagnetic waves**			Module Delivery	
Module Type	**Core**			☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	MPH-23112				
ECTS Credits	5.00				
SWL (hr/sem)	125				
Module Level	2		Semester of Delivery	3	
Administering Department	Medical physics		College	Type College Code	
Module Leader	Aymen A. Ahmed		e-mail	Aymen.abd@uomosul.edu.iq	
Module Leader's Acad. Title	Lecturer		Module Leader's Qualification	Ph.D.	
Module Tutor	Aymen A. Ahmed		e-mail	Aymen.abd@uomosul.edu.iq	
Peer Reviewer Name	Name		e-mail	E-mail	
Scientific Committee Approval Date	02/06/2023		Version Number	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	MPH-1101	Semester	1
Co-requisites module		Semester	

1

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Modeling and analysis: The module aims to provide a comprehensive understanding of electromagnetic fields and their behavior within a particular system or device. It allows engineers and scientists to create mathematical models and simulations to study the behavior of electromagnetic waves, currents, and fields. 2. Design optimization: The electromagnetic module can assist in optimizing the design of electromagnetic devices, such as antennas, sensors, motors, transformers, and circuits. By simulating the electromagnetic behavior, engineers can refine the design parameters and improve the efficiency, performance, and reliability of these devices. 3. Electromagnetic compatibility (EMC): The module helps in assessing electromagnetic compatibility issues, ensuring that different electronic systems can operate without interfering with each other. It analyzes electromagnetic interference (EMI) and electromagnetic susceptibility (EMS) to identify potential problems and propose solutions for reducing interference and improving system reliability. 4. Signal integrity analysis: In the field of high-speed electronics, the electromagnetic module aids in analyzing signal integrity issues that can arise due to electromagnetic effects, such as crosstalk, reflections, and transmission line effects. By simulating the behavior of signals in complex electronic circuits, engineers can optimize the design to minimize signal degradation and improve performance. 5. Antenna design and analysis: Electromagnetic modules are often used for designing and analyzing antennas, including their radiation patterns, impedance matching, and gain. The aim is to optimize the antenna's performance for specific applications, such as wireless communication, radar systems, and satellite communication. 6. Material characterization: Electromagnetic modules can also be used to characterize the electromagnetic properties of materials, such as conductivity, permittivity, and permeability. This information is crucial for designing electromagnetic devices and understanding their interactions with different materials. 7. Overall, the aim of an electromagnetic module is to provide engineers and scientists with powerful tools for understanding, analyzing, and optimizing electromagnetic phenomena in various systems and devices.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understanding of electromagnetic theory: By studying an electromagnetic module, learners can develop a solid understanding of the fundamental principles and theories governing electromagnetic fields, including Maxwell's equations, electromagnetic wave propagation, and the behavior of electric and magnetic fields. 2. Proficiency in electromagnetic modeling and simulation: Learners can gain practical skills in using electromagnetic simulation software or tools within the module. They can learn how to create accurate mathematical models, set up simulations, and analyze the results to predict and understand the behavior of electromagnetic fields and devices. 3. Ability to design and optimize electromagnetic devices: With knowledge gained from the module, learners can acquire the skills necessary to design

	and optimize electromagnetic devices, such as antennas, circuits, motors, transformers, and sensors. They can learn techniques for improving device performance, efficiency, and reliability through simulation and analysis. 4. Familiarity with electromagnetic compatibility (EMC) principles: The module can provide learners with knowledge about EMC principles and techniques. They can understand how electromagnetic interference (EMI) can affect electronic systems and learn methods to mitigate EMI issues to ensure electromagnetic compatibility. 5. Insight into signal integrity analysis: Learners can develop an understanding of signal integrity issues in high-speed electronics and the impact of electromagnetic effects on signal quality. They can learn techniques to analyze and minimize signal degradation, crosstalk, reflections, and other phenomena that affect signal integrity. 6. Knowledge of antenna design and analysis: The module can equip learners with the skills needed to design and analyze antennas for various applications. They can understand antenna characteristics, such as radiation patterns, impedance matching, and gain, and learn techniques to optimize antenna performance. 7. Understanding of material properties and characterization: Learners can gain knowledge about the electromagnetic properties of different materials, such as conductivity, permittivity, and permeability. They can learn techniques to characterize materials and use this information to design electromagnetic devices and understand their interactions with different materials. 8. Problem-solving and critical thinking skills: Through the module, learners can develop problem-solving and critical thinking skills by applying electromagnetic theories and concepts to analyze and solve real-world engineering problems. They can learn to think analytically, make informed decisions, and troubleshoot issues related to electromagnetic phenomena. 9. Overall, studying an electromagnetic module can provide learners with a strong foundation in electromagnetic theory, practical skills in modeling and simulation, and the ability to design and optimize electromagnetic devices. It equips them with valuable knowledge and skills that are applicable in various fields, including electrical engineering, telecommunications, electronics, and related industries.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1- Vector Analysis for Electromagnetic Theory <u>A- Scalars and Vectors:</u> Introduction to scalars and vectors: Differentiating between scalar quantities (e.g., temperature, mass) and vector quantities (e.g., displacement, velocity) and their representation. Scalar and vector quantities in electromagnetic theory: Identifying scalar and vector quantities used in electromagnetic theory, such as electric field, magnetic field, and electric potential. Addition, subtraction, and multiplication of vectors: Understanding the operations involved in adding, subtracting, and multiplying vectors, including scalar

	multiplication and vector dot product. B- Vector Operations: Dot product and its applications: Defining the dot product of vectors, calculating dot products, and understanding its applications in finding the angle between vectors, determining work done, and calculating projections. Cross product and its applications: Defining the cross product of vectors, calculating cross products, and understanding its applications in finding the magnitude and direction of the resulting vector, calculating torque, and determining areas and volumes. Triple product and its applications: Exploring triple products, including the scalar triple product and vector triple product, and their applications in geometry and physics. Vector identities and properties: Introducing vector identities and properties, such as the distributive, associative, and commutative properties, as well as the triple scalar product and triple vector product identities. C- Coordinate Systems and Transformations: Cartesian coordinate system: Reviewing the Cartesian coordinate system and its representation of vectors using components. Cylindrical coordinate system: Introducing the cylindrical coordinate system and understanding how to express vectors in terms of cylindrical coordinates. Spherical coordinate system: Exploring the spherical coordinate system and learning how to express vectors in terms of spherical coordinates. Transformations between coordinate systems: Understanding the transformations between different coordinate systems, including conversions between Cartesian, cylindrical, and spherical coordinates. D- Gradient, Divergence, and Curl: Gradient operator and its properties: Defining the gradient operator and its properties, such as linearity and directional derivatives. Divergence operator and its applications in electromagnetic theory: Defining the divergence operator and its applications in analyzing the behavior of vector fields, such as electric and magnetic fields, and understanding the concept of flux. Curl operator and its applications in electromagnetic theory: Defining the curl operator and its applications in analyzing the rotation and circulation of vector fields, such as electromagnetic fields, and understanding the concept of circulation. Vector identities involving gradient, divergence, and curl: Introducing vector identities that involve gradient, divergence, and curl operators, such as the gradient theorem, divergence theorem, and curl theorem. E- Vector Fields: Electric field and magnetic field as vector fields: Exploring the concept of vector fields, specifically electric field and magnetic field, and understanding their behavior and properties. Line integrals of vector fields: Introducing line integrals and understanding their

	applications in evaluating the work done by a vector field along a curve. Surface integrals of vector fields: Defining surface integrals and understanding their applications in calculating flux through a surface defined by a vector field. Volume integrals of vector fields: Introducing volume integrals and understanding their applications in calculating the total effect of a vector field within a region of space. <u>F- Stokes' Theorem and Gauss's Divergence Theorem:</u> Statement and derivation of Stokes' theorem: Understanding the statement and derivation of Stokes' theorem, which relates the line integral of a vector field to the surface integral of its curl. Application of Stokes' theorem in electromagnetic theory: Applying Stokes' theorem to evaluate line integrals and surface integrals in electromagnetic theory 2- Introduction to Electromagnetic Theory: Electric and magnetic fields: Understanding the concept of electric and magnetic fields, their properties, and how they are represented mathematically. Coulomb's law and Gauss's law: Exploring the fundamental laws that describe the behavior of electric fields, including the inverse square law and electric flux. Ampere's law and Faraday's law: Examining the laws that relate magnetic fields to electric currents and changing magnetic fields to induced electric fields. Maxwell's equations: Introducing the set of equations that unify and summarize the behavior of electric and magnetic fields. Electrostatics: Electric field and potential: Studying the concepts of electric field intensity, electric potential, and their relationship. Conductors and dielectrics: Understanding the behavior of electric fields in conductive and dielectric materials. Capacitance and capacitance matrices: Analyzing the concept of capacitance, calculating capacitance values, and exploring the use of capacitance matrices in circuit analysis. Boundary value problems: Solving boundary value problems related to electric fields in different configurations. Magnetostatics: Magnetic field and magnetic flux: Understanding the magnetic field and magnetic flux density, as well as their properties and calculations. Biot-Savart law: Examining the law that relates a current element to the magnetic field it produces. Magnetic materials and magnetization: Exploring the behavior of magnetic materials, including ferromagnetic, paramagnetic, and diamagnetic materials. Inductance and inductance matrices: Studying the concept of inductance, calculating inductance values, and analyzing inductance matrices in circuit analysis.

	Magnetic boundary conditions: Understanding the conditions that govern the behavior of magnetic fields at interfaces and boundaries.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Conceptual Understanding: Start by providing an overview of electromagnetic theory, emphasizing its applications in stratigraphic,. Help students understand how electromagnetic principles and methods are used to analyze and interpret data in these areas. Use real-world examples and case studies to illustrate the relevance and significance of electromagnetic techniques. Visualization Tools: Utilize visual aids, diagrams, and interactive software to help students visualize electromagnetic phenomena and processes. Demonstrate the behavior of electromagnetic waves, electromagnetic induction, and other related concepts using animations or simulations. This will aid in reinforcing the understanding of abstract concepts and facilitate knowledge retention. Problem-Solving Practice: Include problem-solving activities and assignments that require students to apply electromagnetic theory to practical scenarios. Present them with real or simulated data and challenge them to analyze and interpret the information using appropriate electromagnetic techniques. This will develop their problem-solving skills and reinforce their understanding of the subject matter. Supplemental Resources: Recommend supplementary resources such as textbooks, research articles, and online resources that provide additional information on electromagnetic theory and its applications. Encourage students to explore these resources to gain a deeper understanding of the subject matter. Provide a curated list of recommended readings and online tools to support their learning. Assessment and Feedback: Regularly assess students' understanding through quizzes, tests, or projects that evaluate their application of electromagnetic concepts. Provide constructive feedback to guide their learning and address any misconceptions. Consider incorporating formative assessments to gauge understanding before major evaluations, allowing for timely intervention and support. Collaboration and Discussion: Foster collaboration among students by organizing group discussions, case studies, or problem-solving sessions. Encourage them to share their perspectives, ideas, and experiences related to electromagnetic analysis. This collaborative environment promotes active learning, critical thinking, and knowledge sharing.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
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	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Vector Analysis
Week 2	Applications on Vector analysis
Week 3	Coordinate Systems and Transformations:
Week 4	Gradient, Divergence, and Curl:
Week 5	Vector and scalar Fields:
Week 6	Stokes' Theorem and Gauss's Divergence Theorem.
Week 7	Discussion
Week 8	Quiz
Week 9	Introduction to Electromagnetic Theory:

Week 10	Discussion
Week 11	Quiz
Week 12	Electrostatics
Week 13	Magnetostatics
Week 14	Quiz
Week 15	Discussion

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	
Week10	
Week 11	
Week 12	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1-Engineering Electromagnetics, EIGHTH EDITION, William H. Hayt, Jr. and John A. Buck, The McGraw-Hill Companies, Inc., 2010. 2-Elements Of Electromagnetics, Seventh Edition, Matthew N. O. Sadiku, Oxford University Press, 2018.	Yes Yes
Recommended Texts	1-"Introduction to Electrodynamics" by David J. Griffiths This book provides a comprehensive introduction to electromagnetic theory, covering topics such as electrostatics,	Yes

	magnetostatics, electromagnetic waves, and electromagnetic radiation. It also includes numerous examples, illustrations, and exercises to reinforce understanding. 2-"Electromagnetic Fields and Waves" by Paul Lorrain, Dale R. Corson, and François Lorrain This book offers a detailed treatment of electromagnetic theory, covering topics such as vector analysis, electrostatics, magnetostatics, electromagnetic waves, and transmission lines. It includes numerous examples, exercises, and applications in various areas of physics and engineering. 3-"Classical Electromagnetism" by Jerrold Franklin This textbook provides a comprehensive and rigorous introduction to classical electromagnetism. It covers topics such as electrostatics, magnetostatics, electromagnetic waves, and electromagnetic radiation. The book also includes numerous worked examples and exercises. 3- "A Student's Guide to Maxwell's Equations" by Daniel Fleisch This book focuses specifically on Maxwell's equations, which form the foundation of electromagnetic theory. It provides a clear and intuitive explanation of the equations, their physical meaning, and their applications. The book includes numerous illustrations and examples to aid understanding. 4- "Electromagnetic Theory and Computation: A Topological Approach" by Paul W. Gross and P. Robert Kotiuga This book provides a unique perspective on electromagnetic theory, emphasizing the topological aspects of the subject. It covers topics such as vector calculus, electrostatics, magnetostatics, electromagnetic waves, and the principles of electromagnetic computation. 5-"Electromagnetic Waves and Radiating Systems" by Edward C. Jordan and Keith G. Balmain This book offers a comprehensive treatment of electromagnetic theory and its applications. It covers topics such as wave propagation, transmission lines, antennas, and electromagnetic radiation. The book includes numerous examples, illustrations, and exercises.	No No No No No No
Websites	1- Khan Academy (https://www.khanacademy.org/science/physics/electric-charge-electric-force-and-voltage) 2- Khan Academy offers a comprehensive collection of video lessons, practice exercises,	

	and quizzes on various topics related to electromagnetic theory. It covers concepts such as electric charge, electric force, voltage, electric fields, and more. HyperPhysics (http://hyperphysics.phy-astr.gsu.edu/hbase/hframe.html) HyperPhysics is an online resource that provides a wide range of information on physics topics, including electromagnetic theory. It offers clear explanations, diagrams, and interactive simulations to help visualize and understand electromagnetic concepts. MIT OpenCourseWare (https://ocw.mit.edu/courses/physics/) 3- MIT OpenCourseWare provides free access to lecture notes, problem sets, and other educational materials from MIT's physics courses. You can find courses specifically focused on electromagnetism, such as "Physics II: Electricity and Magnetism." Physics Classroom (https://www.physicsclassroom.com/) 4- The Physics Classroom offers interactive tutorials, conceptual explanations, and practice problems on various physics topics, including electromagnetism. It covers concepts such as electric fields, electric potential, circuits, magnetism, and electromagnetic waves. University of Colorado Boulder Physics Simulations (https://phet.colorado.edu/) 5- The University of Colorado Boulder offers a collection of interactive simulations on its PhET website. These simulations allow you to explore electromagnetic concepts, including electric fields, circuits, and electromagnetic waves, providing a hands-on learning experience. All About Circuits (https://www.allaboutcircuits.com/) 6- All About Circuits is a comprehensive online resource dedicated to electronics and electrical engineering. It covers various topics related to circuits, including electromagnetism, with detailed explanations, tutorials, and circuit analysis tools. Electromagnetic Field Theory Fundamentals (http://emft.ee.psu.edu/) 7- Electromagnetic Field Theory Fundamentals is a website developed by Pennsylvania State University. It provides lecture notes, examples, and interactive demonstrations on electromagnetic theory topics such as Maxwell's equations, wave propagation, and transmission lines.

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
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	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	**English Language**			Module Delivery	
Module Type	**B**			☒ Theory ☒ Lecture ☐Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	**U0M-102**				
ECTS Credits	2				
SWL (hr/sem)	50				
Module Level			Semester of Delivery		2
Administering Department	Medical Physics		College	Science	
Module Leader	Younis Hamad Ahmed		e-mail	younis.h81@uomosul.edu.iq	
Module Leader's Acad. Title	Teaching Assistant		Module Leader's Qualification		MA
Module Tutor			e-mail		
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date	/06/2023		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	Familiarizing students with the basics of the English language. Also, breaking the barrier of shyness and increasing their confidence inside and outside the classroom. There is a big chance to get them engaged in short discussions where they can write or verbally express themselves. In addition to these above, the course will improve their reading, writing, listening and speaking skills as students where English language is the main medium of communication throughout their courses.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Creating full awareness of correct usage of English grammar in writing and speaking. 2- Realizing the importance of the English language inside and outside of university life. 3- Students will improve their speaking ability in English both in terms of fluency and comprehensibility. 4- Students will review the grammatical forms of English and the use of these forms in specific communicative contexts, which include: class activities, homework assignments, reading of texts and writing. 5- Increasing their reading speed and comprehension of academic articles. 6- Students will improve their reading fluency skills through extensive reading. 7- Students will enlarge their vocabulary by keeping a vocabulary journal. 8- Students will strengthen their ability to write short paragraphs and summaries using the process approach.
Indicative Contents المحتويات الإرشادية	<u>Part A – Theoretical lectures</u> Introduction about communication in general and especially the English language, with an introduction on the word classes (parts of speech) in the English language [4 hrs]. Explaining every part of speech in the English language such as nouns, pronouns, verbs, adjectives, adverbs, prepositions, conjunctions and interjections [16 hrs]. Moving on to Vocabulary teaching where students will study some strategies and learn new methods of memorizing any set of vocabulary [4 hrs]. Main skills in learning the English language: speaking, listening, reading and writing are also delivered gradually during the last weeks [6 hrs]. The last part is dedicated to some error correction and feedback sessions [2 hrs].

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Encourage Learners to 'Stretch' Their Styles. This is a very important point as learners are not 100 percent one type or another. For example, of the analytical/global learning styles. Analytical learners work more effectively alone and at their own pace. Global learners, on the other hand, work more effectively in groups. 2. Do Not Privilege Any One Style Over Another. The general consensus is that while styles differ, one is not necessarily superior to the other. In other words, learners who prefer to study alone will not necessarily be better learners than those who prefer to learn by listening. According to this view, analytical learners should be given the opportunity to spend more time studying alone than in groups, but they should also be given the chance to work in groups. 3. Be Aware of the Relationship Between Learning Styles and Teaching Styles. The reason is that if your style as a teacher is at odds with the learning styles of some of your students, then the effectiveness of your teaching may be limited. If you have a collaborative teaching style, then the way you run your classroom may not suit authority-oriented learners who want the teacher to tell them what to do. If your teaching style is authoritative, even authoritarian, then you may not be suited to students who value autonomous learning.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	34	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	1.5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	16	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	0.5
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	3	15% (15)	2, 5, and 9	LO #2, #5, #8
	Assignments	2	10% (10)	4 and 8	LO #4 and #8
	Projects / Lab.				
	Report	3	15% (15)	3, 6 and 7	LO #3, #6 and #7
Summative assessment	Midterm Exam	2hr	10% (10)	7	ALL
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الأسبوعي النظري

	Material Covered
Week 1	**An introduction on communication and English language.**
Week 2	**Parts of Speech (word classes).**
Week 3	**Nouns & their types.**
Week 4	**Pronouns in English language.**
Week 5	**Verbs in the English language.**
Week 6	**Adjectives and their types.**
Week 7	**Adverbs and their uses.**
Week 8	**Prepositions in English language.**
Week 9	**Conjunctions in English Sentences.**
Week 10	**Interjections in English Sentences.**
Week 11	**Vocabulary Improving Skills.**
Week 12	**Basic Speaking Skills.**
Week 13	**Basic Reading Skills.**
Week 14	**Basic Writing Skills**
Week 15	**Basic Listening Skills**

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	
Week10	
Week 11	
Week 12	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	**Murphy, R. (1985). *English Grammar In Use*. CUP.**	Yes
Recommended Texts	**Sullivan, N. (2015). *Essential Grammar*. Routledge.**	No
Websites	https://www.pdfdrive.com/essential-grammar-for-todays-writers-students-and-teachers-e165838835.html	

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	Genes and Diseases			Module Delivery	
Module Type	Elective learning activity			☒ Theory ☐ Lecture ☐ **Lab** ☒ Tutorial ☐ Practical ☒ Seminar	
Module Code	MPH-35024				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level	3		Semester of Delivery	5	
Administering Department	Medical Physics		College	Science	
Module Leader	Talal Sabhan Salih		e-mail	talal.salih@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification	Ph.D.	
Module Tutor	Assel AbdulMunam (Ph. D.)		e-mail	aseelallayla@uomosul.edu.iq	
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date	/06/2023		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	The module seeks to understand how genes and diseases can make significant contributions to a wide range of scientific benefits in medical physics sciences. This course deals with the basic concept of genes and related inherit diseases. Learn about the most fundamental concepts of important topics in genes and diseases such as genes disorder, type and causes and related diseases. Moreover, the module tries to understand and comprehend the impact of genes and diseases processes on medical physics science. At the end of this course, students should be able to demonstrate a clear understanding of the facts and basic concepts of genes and diseases which are covered in lectures. This will be achieved through, theoretical lectures, tutorials and seminars.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1: Define the basic concepts of human diseases. 2: Understanding the most differences between communicable and non communicable diseases. 3: Learn about the genetic diseases, types and causes. 4: Learn about genetic disorders and inherited diseases. 5: Define the monogenic diseases and their mechanisms 6: Explain the cystic fibrosis, alpha- and beta-thalassemias diseases. 7: Explain the sickle cell anemia and fragile X syndrome and Huntington's disease. 8: Define the polygenic diseases: complex genetic interactions in disease. 9: Explain breast cancer, Alzheimer's disease, diabetes and obesity. 10: Understanding the chromosomal abnormalities: Down syndrome, Klinefelter syndrome and Cri du chat syndrome 11: Exploring the most up to date bioinformatics tools that are applied in genetic diseases identification. 12: Know about mitochondrial genetic inheritance diseases 13: Know about genetic testing: advancements and applications in disease Diagnosis.
Indicative Contents المحتويات الإرشادية	Theoretical lectures An Introduction to human diseases [3 hrs]. Communicable diseases [4 hrs]. Gene structure and organisation in Eukaryotes and Prokaryotes [3 hrs]. Non communicable diseases [3 hrs]. Genetic diseases: preface, types and causes [2 hrs]. Genetic disorders: an overview of inherited diseases [3 hrs]. Monogenic Diseases: Single Gene Disorders

	and their Mechanisms [5 hrs]. Cystic fibrosis, alpha- and beta-thalassemias diseases [2 hrs]. Sickle cell anemia and fragile X syndrome [3 hrs]. Huntington's disease, and hemochromatosis [2 hrs]. Polygenic Diseases: Complex Genetic Interactions in Disease [3 hrs]. Breast cancer and Alzheimer's disease [3 hrs]. Diabetes and Obesity [2 hrs]. Chromosomal abnormalities: Down syndrome, Klinefelter syndrome and Cri du chat syndrome [3 hrs]. Mitochondrial genetic inheritance diseases [3 hrs]. Genetic Testing: Advancements and Applications in Disease Diagnosis [4 hrs].

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about genes and diseases science and its contents. In addition, in expanding the knowledge of up to date sources of information through doing related lectures and students discussion, tutorials and seminars. This will be achieved through lectures and interactive tutorials and by types of practical activities.

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	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
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	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

ملاحظة: في حالة كون المادة لا تحتوي على جانب عملي تضاف الدرجة الخاصة بها الى أي محور اخر يختاره استاذ المادة من تفصيلات الدرجة اعلاه

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	An Introduction to human diseases.
Week 2	Communicable diseases.
Week 3	Non communicable diseases.
Week 4	Genetic diseases: preface, types and causes.
Week 5	Genetic disorders: an overview of inherited diseases.
Week 6	Monogenic diseases: single gene disorders and their mechanisms
Week 7	Cystic fibrosis, alpha- and beta-thalassemias diseases
Week 8	Sickle cell anemia and fragile X syndrome
Week 9	Huntington's disease, and hemochromatosis
Week 10	Polygenic diseases: complex genetic interactions in disease
Week 11	Breast cancer and Alzheimer's disease
Week 12	Diabetes and Obesity.
Week 13	Chromosomal abnormalities: Down syndrome, Klinefelter syndrome and Cri du chat syndrome
Week 14	Mitochondrial genetic inheritance diseases
Week 15	Genetic testing: advancements and applications in disease diagnosis

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	
Week10	
Week 11	
Week 12	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Jorde, L. B., Carey, J. C., & Bamshad, M. J. (2019). *Medical genetics*. Elsevier Health Sciences. Wright, A., & Hastie, N. (2007). Genes and common diseases: Genetics in modern medicine. Cambridge University Press.	Yes Yes
Recommended Texts	King, R. A., Rotter, J. I., & Motulsky, A. G. (Eds.). (2002). The genetic basis of common diseases. Oxford university press.	No
Websites	https://www.ncbi.nlm.nih.gov/books/NBK22183/	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group	A - Excellent	امتياز	90 - 100	Outstanding Performance

(50 - 100)	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	Health Culture			Module Delivery	
Module Type	**Core**			☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	**MPH-24016**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	2		Semester of Delivery	4	
Administering Department	Type Dept. Code		College	Type College Code	
Module Leader	Sundus Natheer Al-Kallak		e-mail	profdrsundusalkallak@uomosul.edu.iq	
Module Leader's Acad. Title	Professor		Module Leader's Qualification	Ph.D.	
Module Tutor			e-mail		
Peer Reviewer Name	Name		e-mail	E-mail	
Scientific Committee Approval Date	20/06/2023		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 ***يتم كتابة اهم الأهداف التي تغطيها هذه المادة الدراسية بشكل جمل او فقرات توضح المواضيع التي سيتم التطرق اليها و دراستها و معالجتها)***	تحديد مفهوم الثقافة الصحية تحديدا دقيقا. التعرف على سبل تحقيق الثقافة الصحية للمجتمع التعرف على الامراض المعدية وغير المعدية التي تصيب الانسان تصنيف الامراض التي تصيب الانسان التعرف على اهم مجالات صحة البيئة وعلاقتها بصحة الفرد التعرف على العلاقة بين صحة الغذاء مع صحة الفرد التعرف على الاسعافات الاولية الضرورية للاصابات المختلفة التعرف على اهم التقنيات الطبية الحديثة في تشخيص الامراض التعرف على انماط السلوك الصحي الصحيح والخاطئ
Module Learning Outcomes مخرجات التعلم للمادة الدراسية ***يتم كتابة اهم المُخرجات او الناتج و الكَم العلمي الذي يتم استخدامه للتدريس في هذه المادة على شكل أسئلة أساسية تخص منهاج المادة بأكمله و يجب ان لا تقل هذه المُخرجات من ناحية العدد عن 6 مُخرجات و يفضل ان تكون بعدد أسابيع الدراسة.***	ناقش العبارات التالية عدد اهم الخطوات الواجب اتباعها لكل مما يلي ما هي المفاهيم الاساسية لكل مما يلي اختر الاجابة الصحيحة
Indicative Contents المحتويات الإرشادية ***يتم كتابة اهم العناوين الرئيسية للمواضيع بشكل متسلسل و التي تشمل كافة الفقرات التي تحتويها مع إدراج عدد الساعات المطلوبة لتنفيذ كل فقرة.***	الثقافة الصحية مفهومها وسبل تحقيقها المناعة ومقاومة جسم الانسان بالمرض تصنيف الامراض صحة البيئة صحة الغذاء التقنيات الطبية الحديثة في تشخيص الامراض الاسعافات الاولية الضرورية

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies ***يتم كتابة ملخص الاستراتيجية الرئيسية التي***	اغناء الطالب بالمعلومات التي تهتم بمفهوم الثقافة الصحية وكذلك كيفية التعامل مع الامراض التي تصيب الانسان سواء المعدية وكيفية الوقاية منها والامراض غير المعدية وكيفية التأقلم معها اكساب مهارة عن كيفية اجراء الاسعافات الاولية الضرورية اكساب مهارة في كيفية الحفاظ على صحة البيئة

سيتم تبنيها في تقديم هذه المادة	

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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	27	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

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	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	الثقافة الصحية مفهومها وسبل تحقيقها
Week 2	المناعة ومقامة جسم الانسان وتصنيف الامراض التي تصيب الانسا ن
Week 3	امثلة على الامراض التي تصيب الانسان المعدية وغير المعدية

Week 4	صحة البيئة
Week 5	صحة الهواء
Week 6	انعكاس صحة البيئة على صحة الفرد
Week 7	الغذاء داء ام دواء
Week 8	الامراض الناتجة عن الافراط في تناول الغذاء
Week 9	الامراض الناتجة عن سوء التغذية
Week 10	التقنيات الطبية الحديثة في تشخيص الامراض التي تصيب الانسان
Week 11	الاسعافات الاولية مفهومها وشروطها
Week 12	انواع الاسعافات وكيفية اجرائها في حالات الحروق
Week 13	الاسعافات الاولية في حالات الكسور وانواع الكسور
Week 14	الاسعافات الاولية في حالات الاغماء
Week 15	الاسعافات الاولية في حالات الصدمات

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	
Week10	
Week 11	
Week 12	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	كتاب عن الثقافة الصحية / 2004	
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	**Heat and Thermodynamic**			Module Delivery	
Module Type	**Core**			☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	**MPH-24017**				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	2		Semester of Delivery	4	
Administering Department	Type Dept. Code		College	Type College Code	
Module Leader	Khalid Qasim Kheder		e-mail	khalid.alshawi@uomosul.edu.iq	
Module Leader's Acad. Title	lecturer		Module Leader's Qualification	Ph.D.	
Module Tutor			e-mail		
Peer Reviewer Name	Name		e-mail	E-mail	
Scientific Committee Approval Date	07/06/2023		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 aim of studying thermodynamics - as the name indicates - is the branch of physics which is study of the relationship between properties of heat, temperature, energy, and work. Central to that relationship and to the laws of thermodynamics are the concepts of entropy and the Internal Energy Formula. 1. Understand how thermal energy is stored or generated. 2. Knowledge of the main laws on which the science of thermodynamics depends, namely the Zero Law (or the Fourth Law), the First Law, the Second Law, and the Third Law. 3. Studying the relationship between heat and mechanical motion, as in the invention of the steam engine and the gasoline engine, and ways to raise their efficiency. 4. Understanding and studying the generation of electric power from several means such as coal-fired plants, hydroelectric power or nuclear energy, all of these technologies depend on their development in order to raise their efficiency in the science of thermodynamics.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Learn basic facts, key terms, concepts and principles of thermodynamics. 2. Explain the main applications of thermodynamics in solving thermodynamic problems 3. Summarize the most important implications and applications derived from the laws of thermodynamics.
Indicative Contents المحتويات الإرشادية	<u>Introduction to Thermodynamics</u> : Thermodynamics is concerned with the study of energy and its transformations. Introducing the students to the basic concepts and terminology of thermodynamics <u>The laws of thermodynamics</u> The laws of thermodynamics describe the relationships between thermal energy, or heat, and other forms of energy, and how energy affects matter. The Zeroth Law of thermodynamics which The zeroth law states that if two thermodynamic systems are in thermal equilibrium with each other, and also separately in thermal equilibrium with a third system, then the three systems are in thermal equilibrium with each other The First Law of Thermodynamics states that energy cannot be created or destroyed; the total *quantity* of energy in the universe stays the same. The Second Law of Thermodynamics is about the *quality* of energy. It states that as energy is transferred or transformed, more and more of it is wasted. The Second Law also states that there is a natural tendency of any isolated system to degenerate into a more disordered state. <u>Thermodynamic Process</u>

It is the process of the system's transition from one state of equilibrium to another state of equilibrium over a period of time and also means the change in the thermodynamic properties of the system. Therefore, it is said that the system undergoes a thermodynamic process when any of the system properties (variables) change.

Energy

Energy is defined as the ability to accomplish work and includes stored energy and Transit Energy. Stored energy is in several forms: chemical energy, electrical energy, internal energy, and mechanical energy (potential and kinetic). As for the transient energy, it is in two forms: heat and work

Temperature

The temperature of a body is a measures relative hotness or coldness, Heat is a form of energy that is transferred from one body to another due to the difference between the temperature of the two bodies, and when there is no heat exchange between them upon contact, they are said to be in a state of thermal equilibrium

Thermometer :

It is used to measure the temperature and quantify it digitally, and a special device called a thermometer must be built, and there are different types of thermometers.

Equation of state

state equation is a mathematical equation that relates the variables of a thermodynamic system. Experiment in thermodynamics shows that fixing some variables leads to the remaining variables having to take specified values, that is, randomness.

Definition of heat as thermal energy in transmission and its units. Heat capacity and specific heat capacity. Calculation of heat transition.

Carnot's reversible engine

As it is known that thermal machines are used to convert thermal energy into mechanical work. In 1824, the French engineer Carnot was able to make improvements in the efficiency of the thermal machine.

Heat Engine

is a machine that converts thermal energy into mechanical energy through a system that is taken in a cycle of thermodynamic processes so that it absorbs heat from the hot warehouse and expels heat to the cold warehouse and the system makes work On the surrounding .

	Animal energy consumption. The relationship between food, energy, and life.
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Begin by providing an overview of thermodynamics, focusing on basic concepts such as systems, their types and properties, as well as the walls that surround them such as adiabatic walls, isothermal , etc, as well as the type of thermodynamic processes that occur in systems and help students understand these principles for analyzing and interpreting data in these areas, and using real-world examples to illustrate the importance of scientific material. Providing students with the basics and additional topics related to the outputs of thinking and analysis. Asking a group of intellectual questions during the lectures, such as (how, why, when, and what is the reason) for topics. Giving students homework that requires self-explanations using scientific methods. This will be achieved through lectures, laboratories, interactive educational programs, reports and seminars on topics of thermodynamics.

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
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	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	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction to thermodynamic & Fundamental concepts
Week 2	Definition & Temperature scales
Week 3	Kinds of thermometers: Gas& liquid thermometers
Week 4	Kinds of thermometers: Other types of thermometers
Week 5	Discussion and Quiz
Week 6	Equation of state for ideal gas and real gas.
Week 7	First law of thermodynamic
Week 8	Discussion and Quiz
Week 9	Conservation of energy
Week 10	Work
Week 11	Work done in different process.
Week 12	Discussion and Quiz
Week 13	Second law of thermodynamic
Week 14	Application of 2nd law of thermodynamic(heat engine & rifregerater)
Week 15	Discussion and Quiz

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	
Week10	
Week 11	
Week 12	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1. Heat and thermodynamics: an intermediate textbook/ Mark W. Zemansky, Richard H. Dittman. 7th ed.	No
Recommended Texts	Biological Thermodynamics, Donald T. Haynie. 2nd ed.	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	Laser Basics			Module Delivery	
Module Type	Core			☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	MPH-35123				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	3		Semester of Delivery	5	
Administering Department	Medical Physics		College	Science	
Module Leader	Rafid A. Abdullah		e-mail	rafidahmed@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification	Ph.D.	
Module Tutor	Rafid A. Abdullah		e-mail	rafidahmed@uomosul.edu.iq	
Peer Reviewer Name	Nadia Adel Saeed		e-mail	nadia.alhamdaney@uomosul.edu.iq	
Scientific Committee Approval Date	21/06/2023		Version Number		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	MPH-23118	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	- To understand Einstein coefficients and relations, and light amplification. - To identify the laser gain medium and pumping mechanisms. - To understand three-level and four-level laser systems. - To clarify laser rate equations and laser threshold. - To clarify the absorption and gain in homogeneous mediums. - To apply and solve math problems related to optical resonances and laser modes. - To understand laser radiation properties. - To classify the types of laser outputs. - To classify laser types. - To understand Q-switching and tunable operation - To understand the solid-state lasers. - To understand the semiconductor lasers. - To understand the dye and excimer lasers. - To understand the gas lasers.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	- CLO1: Recognize Einstein coefficients and relations, and light amplification. - CLO 2: Explain the laser gain medium and pumping mechanisms. - CLO 3: Discuss three-level and four-level laser systems. - CLO 4: Explain laser rate equations and laser threshold. - CLO 5: Explain the absorption and gain in homogeneous mediums. - CLO 6: Summarized optical resonances and laser modes. - CLO 7: Explain the laser radiation properties. - CLO 8: Discuss the types of laser outputs. - CLO 9: Explain Q-switching and tunable operation. - CLO 10: Summarized solid-state lasers. - CLO 11: Summarized the semiconductor lasers. - CLO 12: Summarized the dye and excimer lasers. - CLO 13: Summarized the gas lasers.
Indicative Contents المحتويات الإرشادية	<u>Part A – Theoretical lectures</u> - Light waves Light can be described by a combination of time-varying propagation of electric (E) and magnetic (B) fields through space. - Interaction of light with matter (Absorption, spontaneous, and stimulated emissions) There are three types of processes involving the interaction of light beams with atoms (matter) that have electrons residing in various energy levels. - Einstein coefficients and relations, and light amplification

	To introduce the probabilities for absorption, spontaneous emission, and stimulated emission phenomena, first investigated by Einstein in 1917. - Population inversion Under normal conditions, there are more electrons in a lower energy state than in a higher energy state. Population inversion is a process of achieving more electrons in the higher energy state than in the lower energy state. - Main requirements of the laser A typical laser device requires main elements. - Laser gain medium A gain medium, also called an active laser medium (or active region), is a material with quantum properties, a collection of atoms or molecules, that allow to amplify laser beams by means of stimulated emission. - Pumping mechanisms Laser pumping is the act of energy transfer from an external source into the gain medium of a laser. - Three-level and four-level laser systems The laser can be operated with the plan of the three-level laser system or four-level laser system. - Laser rate equations - Absorption and gain in homogeneous mediums If an electromagnetic wave traveling through a medium may gain or lose energy depending on the state of excitation of that medium. - Laser threshold In order to 'turn on' the laser, we must begin pumping the amplifier (active medium) via discharge, optically, or other pumping mechanisms. - Optical resonances Optical resonance creates the conditions necessary for stimulated emission to become predominant over spontaneous emission. - Laser modes

	Depending upon the geometry, an optical resonator forms a standing wave for light waves. The standing wave patterns produced in an optical cavity are called modes. And stable mode oscillations that can be sustained in the resonance are put into two categories: longitudinal (or axial) and transverse modes. - Laser radiation properties Laser beam behaves very differently than light from other sources. Laser has certain unique properties compared to ordinary sources of light, though both are electromagnetic radiations. - Types of laser output Lasers operated in Continuous Wave (CW) or pulsed modes. - Q-switching Q-switching, sometimes known as giant pulse formation or Q-spoiling, is a technique by which a laser can be made to produce a pulsed output beam. - Tunable Operation A tunable laser is a laser whose wavelength of operation can be altered in a controlled manner. - Types of lasers According to the laser active media, the major types of lasers are: Solid-state lasers, semiconductor lasers, dye lasers, gas lasers, and excimer lasers. - Solid-state laser (Doped-insulator lasers) A solid-state laser is a laser that uses a gain medium that is solid. - Semiconductor lasers (laser diode) The diode laser is a semiconductor device that directly converts electrical energy into laser light. Semiconductor lasers are the fastest-growing class of lasers. - Dye lasers A dye laser is a laser that uses an organic dye as an active medium, usually as a liquid solution. - Gas lasers In gas lasers, the active medium is in the gaseous state. Most gas lasers use electrical discharge as an exciting mechanism.

	<u>Part B – Practical labs</u> Investigate the laser diffraction from a single slit and demonstrate Young's fringes using a suitable laser. Demonstrating Fresnel's diffraction by laser. Investigation of how laser light can be spread when it is passed through a narrow aperture. Using grating to measure the laser wavelength. The laser beam diverges when it leaves the laser device, so determining the laser divergence is necessary for laser applications. Snell's law is applied to the normal light and this law is also applied to the laser beam which can be proved by laser refraction. There are several methods for determining the laser wavelength, such as measuring the wavelength of the laser with a simple ruler and using a thin wire.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about the laser concept and basic theory and main applications in science and technology, theoretically and experimentally. Different tools and suitable devices will be used in laser laboratory to identify the laser theory concepts explained in the theory class with experiments. This will be achieved through lectures, labs, and interactive tutorials and by types of practical activities. In addition, providing a curated list of recommended readings and online tools to support their learning.

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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	56	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
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	3	10% (10)	3,8,12	CLO1, CLO2 , CLO3, CLO 7 , CLO 8, COL 10, COL 11
	Assignments	2	10% (10)	7 and 13	CLO 5, CLO 9
	Projects / Lab.	6	10% (10)	Continuous	All
	Report	0			
Summative assessment	Midterm Exam	2hr	10% (10)	7	CLO 1, CLO 2, CLO 3, CLO 4 and CLO 5
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Light waves and interaction of light with matter
Week 2	Einstein coefficients and relations, and light amplification
Week 3	Population inversion and main requirements of the laser
Week 4	Laser gain medium and pumping mechanisms
Week 5	Three-level and four-level laser systems
Week 6	Laser rate equations and laser threshold
Week 7	Absorption and gain in homogeneous mediums
Week 8	Optical resonances and Laser modes
Week 9	Laser radiation properties
Week 10	Types of laser output
Week 11	Q-switching and tunable operation

Week 12	Solid state lasers (ruby laser, alexandrite laser and Nd:YAG laser)
Week 13	Semiconductor lasers
Week 14	Dye and excimer lasers
Week 15	Gas lasers (He-Ne laser, CO_2 laser and argon laser)

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Laser diffraction from a single slit
Week 2	Demonstrating Young's fringes
Week 3	Demonstrating Fresnel's diffraction
Week 4	Spreading light (laser) through a narrow aperture
Week 5	Measuring the laser wavelength using grating
Week 6	Determining the laser beam divergence
Week 7	Proving Snell's law by laser refraction
Week 8	Measuring the wavelength of laser with a simple ruler
Week 9	Measuring the wavelength of laser using a thin wire
Week10	Measuring the diameter of a human hair by laser diffraction
Week 11	
Week 12	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	- Orazio Svelto, "Principles of Lasers, Fifth Edition," Springer Science+Business Media, LLC 2010.	Yes
	- "Fundamentals of Light and Lasers, 3rd Edition," OP-TEC University of Central Florida, 2018.	Yes

Recommended Texts	- William M. Steen · and Jyotirmoy Mazumder "Laser Material Processing," 4th Edition, Springer-Verlag London Limited 2010. - Peter W. Millonni and Joseph "Laser Physics," John Wiley & Sons, Inc., 2010.	Yes Yes
Websites	https://shorturl.at/crwR2 https://www.ulsinc.com/learn https://www.rp-photonics.com/lasers.html https://science.howstuffworks.com/laser.htm	

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	**Materials Science and Nanotechnology**			Module Delivery	
Module Type	**Core**			☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	**MPH-48039**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	4		Semester of Delivery	8	
Administering Department	Medical physics		College	College of Science	
Module Leader	Aymen A. Ahmed		e-mail	Aymen.abd@uomosul.edu.iq	
Module Leader's Acad. Title	Lecturer		Module Leader's Qualification	Ph.D.	
Module Tutor			e-mail		
Peer Reviewer Name	Name		e-mail	E-mail	
Scientific Committee Approval Date	02/06/2023		Version Number	3.0	

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. Understand the properties of materials. 2. The arrangement and bonding of atoms in crystalline solids 3. The geometric structure of crystal lattices. 4. X-ray diffraction; Producing, Uses, Applications, Types of X-ray diffraction. 5. Determine positions of atoms contained in the unit cell by Fourier transform technique. 6. Binding force and energy between atoms and molecular. 7. Advantages and dis advantages of defect in crystals.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Differentiate between crystalline and amorphous solids, Arrangements of atoms, Crystal, Lattice; directions and planes, Unit cell, Translation vectors, Crystal systems, Crystal planes and directions, Miller indices, Recognize symmetry elements of molecules and simple crystal structures . 2. Diffraction of waves by crystal, Bragg law, Reciprocal lattice, Reciprocal lattice vectors, Diffraction condition, Identify and describe different experimental of X-rat diffraction (Laue method, Rotating crystal method, Powder method), Electron diffraction, Neutron diffraction, Reciprocal space and Laue equations, Brillouin Zone. 3. Crystal binding, Crystal of inert gases, Van der Waals-London interaction, Repulsive interaction, Cohesive energy, Ionic crystals, Madelung energy and constant, Covalent crystals, Metals, Hydrogen bonds. 4. Analyze the types of crystal defects and its effects on crystals.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1 – Definition of the crystal lattice and unit cell, lattice parameters, Lattice transilation vectors,The seven crystal systems, Conventional and primitive lattices: The 14 Bravais lattices in (2D) and (3D). 2- Miller indices of crystal faces and crystal forms, Area and volume of unit cell, Coordination number, Relation between (r) and (a), Atomic packing factor calculation, Density calculation from lattice parameter. 3- Symmetry and its operations, Interplanar distances and angles relations. 4- Methods for structure investigation: photons, electrons and neutrons, X-ray diffraction production technique, Interaction between X-ray and materials, Bragg's Law, Bragg’s law and crystal structure.

	5- Experimental of diffraction methods and applications (Laue method, Rotating crystal method, Powder method), Electron diffraction, Neutron diffraction., Reciprocal lattice, Structure factors, Fourier synthesis, phase problem. 6- Crystal binding; binding force and energy, Madelung constant in (1D) and (3D), Bonding in element and compounds, Types of bonding; Ionic,Covalent and Metallic bonds, Hydrogen bonding, Van-der-Waals bonding, Van-der-Waals London interaction.Cryastal of inert gas. 7- Crystal imperfections: Point defects,Schotcky and Frenkel point defect concentrations relations. 8- Line defects; Dislocations types, Dislocation motion, Dislocations interactions, Planar defects, Surface defects and Volume defects.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Conceptual Understanding: Materials are of technological interest for their properties - electrical conductivity, strength, magnetization, toughness and numerous other properties for various applications. All of these properties originate with the type of the atoms in the materials, their local configuration, and their arrangement into microstructures. The characterization of materials structure is often best performed by x-ray diffraction (XRD), one can utilize imaging, diffraction, chemistry and electronic structure analysis to characterize important features such as crystal structure, presence of different phases, orientation and character at different scale down to atomic level. This course is tailored to acquaint students the basic of Materials Physics I; materials structure, crystallography, as well as the materials structure analysis methods using X-ray (photons), electrons and neutrons diffraction. Along this way, students will learn some broadly applicable diffraction physics, materials science and matter defects. Problem-Solving Practice: A continuous and comprehensive evaluation of the student competences will be carried out based on their performance in the following activities: 1- Daily class work, including problem solving tests, practical questions, exercises and related activities during the learning process. At the end of each topic, a document will be distributed to the students with a reduced number of basic questions to be worked out by the students. 2- Written test (decided by students) at the end of the course dealing with problems and questions about the course contents. Supplemental Resources: Recommend supplementary resources such as textbooks, research articles, and online resources that provide additional information on and its applications. Encourage students to explore these resources to gain a deeper understanding of the subject matter. Provide a curated list of recommended readings

	and online tools to support their learning. Assessment and Feedback: Regularly assess students' understanding through quizzes, tests, or projects that evaluate their application of crystal structure concepts. Provide constructive feedback to guide their learning and address any misconceptions. Consider incorporating formative assessments to gauge understanding before major evaluations, allowing for timely intervention and support. Collaboration and Discussion: Foster collaboration among students by organizing group discussions, case studies, or problem-solving sessions. Encourage them to share their perspectives, ideas, and experiences related to materials science. This collaborative environment promotes active learning, critical thinking, and knowledge sharing.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	76	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	49	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
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 12	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 14	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	0	0	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	20% (20)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Definition of the crystal lattice and unit cell, lattice parameters, Lattice transilation vectors,The seven crystal systems, Conventional and primitive lattices: The 14 Bravais lattices in (2D) and (3D).
Week 2	Miller indices of crystal faces and crystal forms, Area and volume of unit cell.
Week 3	Coordination number, Relation btween (r) and (a), Atomic packing factor calculation, Density calculation from lattice parameter.
Week 4	Symmetry and it's operations, Interplanar distances and angles relations.
Week 5	Discussion and Quiz
Week 6	Methods for structure investigation: photons, electrons and neutrons, X-ray diffraction production technique, Interaction between X-ray and materials, Bragg's Law, Bragg's law and crystal structure.
Week 7	Experimental of diffraction methods and applications (Laue method, Rotating crystal method, Powder method), Electron diffraction, Neutron diffraction., Reciprocal lattice, Structure factors.
Week 8	Crystal binding; binding force and energy
Week 9	Madelung constant in (1D) and (3D), Bonding in element and compounds.
Week 10	Types of bonding; Ionic,Covalent and Metallic bonds, Hydrogen bonding, Van-der-Waals bonding, Van-der-Waals London Interaction.
Week 11	Cryastal of inert gas.
Week 12	Discussion and Quiz
Week 13	Crystal imperfections: Point defects,Schotcky and Frenkel point defect concentrations relations.
Week 14	Line defects; Dislocations types, Dislocation motion, Dislocations interactions, Planar defects.
Week 15	Surface defects and Volume defects.

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	
Week10	
Week 11	
Week 12	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1- William D. Callister, Jr., Materials Science and Engineering: An Introduction, 9th Edition, John Wiley & Sons, (2005). 2- Charles Kittle, Introduction to solid state physics, 7th Edition, John Wiley & Sons, (2014). 3- Donald R. Askeland, The Science and Engineering of Materials, 3th Edition, Nelson Thomes Ltd., (1996).	Yes Yes No
Recommended Texts	1- S.L. Kakani and Amit Kakani, " Material science", New Age International (P) Ltd., Publishers Published by New Age International (P) Ltd., Publishers. 2- V. Raghavan, "Materials Science and Engineering: A first course", 5th Edition, John Wiley & Sons, (2011).	No 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	**Mathematics I**			Module Delivery	
Module Type	**B**			☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	**SCI-101**				
ECTS Credits	2				
SWL (hr/sem)	50				
Module Level		1	Semester of Delivery		1
Administering Department		Type Dept. Code	College	Type College Code	
Module Leader	**ASMAA SALAH AZIZ**		e-mail	asmaas982@uomosul.edu.iq	
Module Leader's Acad. Title		LECTURER	Module Leader's Qualification		M.Sc.
Module Tutor			e-mail		
Peer Reviewer Name		Name	e-mail	E-mail	
Scientific Committee Approval Date			Version Number	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	N/A	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- Understanding basic concepts: Students should develop a solid understanding of fundamental concepts in calculus, such as limits, continuity, derivatives, and integrals. 2- Calculating derivatives: Students should be able to calculate derivatives using various differentiation techniques, including the power rule, chain rule, product rule, quotient rule, and trigonometric derivatives. 3- Applying differentiation: Students should be able to apply differentiation to solve problems related to rates of change, optimization, curve sketching, related rates, and applied problems in various fields. 4- Understanding the Fundamental Theorem of Calculus: Students should comprehend the Fundamental Theorem of Calculus and be able to use it to evaluate definite integrals and find antiderivatives. 5- Solving differential equations: Students should gain an understanding of basic techniques for solving first-order differential equations and solving separable, linear, and homogeneous differential equations. 6- Multivariable calculus: Depending on the level of the course, students may be introduced to multivariable calculus and learn concepts such as partial derivatives, multiple integrals, and vector calculus.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. study the functions and the domain . 2. evaluation the range of functions and their drawing. 3. A study of the limits and Luptal's rule. 4. A continuity study. 5. Derivability. 6. A study of the derivation of the transcendental exponential ,trigonometric and natural logarithm functions.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> Introduction of real functions with Their Graphs , the Domain and Range of the functions with different techniques for polynomial function , fractional functions. Radical functions (odd and even roots) . [10 hrs] Limit of a Function and Limit Laws, The Precise Definition of a Limit, One-Sided Limits , Limits Involving Infinity, Asymptotes of Graphs [15 hrs] . The Derivative at a Point , The Derivative as a Function , Differentiation Rules , The Derivative as a Rate of Change , The Chain Rule ,Implicit Differentiation [15hrs].

	Indeterminate Forms and L'Hopital's Rule [5hrs] . Derivative with higher power, Partial derivation and its applications [15 hrs] Exponential functions and their Derivatives, Logarithmic functions and their Derivatives, Trigonometric functions and their Derivatives [15hrs]. Part B – Additional and Advanced Exercises. [18 hrs] Introduction of Transcendental Functions with applications [12 hrs] Advanced Exercises and homework's.[40 hrs].

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in the delivery of this unit is to encourage students to participate in the exercises, while improving and expanding their critical thinking skills at the same time. This will be achieved through classes and interactive tutorials and by looking at the types of simple experiments that include some sampling activities that are of interest to the students. Mathematics, including calculus, requires practice to reinforce understanding and develop problem-solving skills. Work through a variety of problems, both from your textbook and supplementary resources. Start with simple problems and gradually increase the difficulty level.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	34	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	1.5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	16	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	0.5
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	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	---		Continuous	All
	Report	---		13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	20% (10)	7	LO #1 - #7
	Final Exam	3hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الأسبوعي النظري

	Material Covered
Week 1	Introduction of real functions and Their Graphs.
Week 2	Finding Domain and Range of the functions with different techniques.
Week 3	Limit of a Function and Limit Laws.
Week 4	Limits Involving Infinity.
Week 5	Indeterminate Forms and L'Hopital's Rule.
Week 6	Continuity with Additional and Advanced Exercises.
Week 7	The Derivative as a Function and Differentiation Rules
Week 8	The Chain Rule ,Implicit derivation .
Week 9	Derivative with higher power
Week 10	Partial derivation and its applications
Week 11	The Law of Cauchy-Riemann - The Law of Laplace
Week 12	Exponential functions and their Derivatives
Week 13	Logarithmic functions and their Derivatives
Week 14	Trigonometric functions and their Derivatives
Week 15	Using the Natural Logartim function to find derivatives of complex functions that are difficult to derive from ordinary laws

Delivery Plan (Weekly Lab. Syllabus) N/A
المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1- **أي. برسل /الجزء الاول /1982 حسبان التفاضل والتكامل مع الهندسة التحليلية /.** 2- George B. Thomas, Jr. Massachusetts '' INSTRUCTOR'S SOLUTIONS MANUAL SINGLE VARIABLE '' 3 - Calculus 11th Thomas	Yes yes Yes
Recommended Texts	1- **د. رمضان محمد جهينة و د.احمد عبد العالي هب الريح التفاضل والتكامل /الجزء الاول /دار الكتاب الجديد المتحدة.** 2 - ROBERT T. SMITH, ROLAND B. MINTON, '' Calculus Fourth Edition'' 2012	Yes No
Websites	https:// **www.wolframalpha.com .**	

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	**Mathematics II**			Module Delivery	
Module Type	**S**			☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	**MPH-1215**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	1		Semester of Delivery	2	
Administering Department	Type Dept. Code		College	Type College Code	
Module Leader	**ASMAA SALAH AZIZ**		e-mail	asmaas982@uomosul.edu.iq	
Module Leader's Acad. Title	LECTURER		Module Leader's Qualification	M.Sc.	
Module Tutor			e-mail		
Peer Reviewer Name	Name		e-mail	E-mail	
Scientific Committee Approval Date			Version Number	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	SCI-1103	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. Giving an introduction to transcendental and hyperbolic functions, topics of integrations and their applications.** **2. The student learns how to solve related mathematical problems through applying the laws given to him.** **3. Applied examples and several issues were taken, which the student stopped solving in the middle school stage.** **4. Developing the concept and new derivation methods and studying many types of functions and their behavior** **5. Developing the concept of integration and finding various ways to integrate complex functions and difficult to integrate in the usual ways.**
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**1- By studying integrations, student can enhance your knowledge of functions, limits, derivatives, and the relationship between them.** **2- Ability to solve Complex Problems: Integrals are used to solve a wide range of problems in various fields, including physics, engineering, economics, and statistics. By learning integration techniques, you develop problem-solving skills and gain the ability to tackle complex real-world problems.** **3- Mastery of Integration Techniques: Integration involves various methods and techniques such as substitution, integration by parts, partial fractions, and trigonometric substitutions. Studying integrations allows you to become proficient in these techniques, enabling the student to handle different types of integrals effectively.** 4- **Preparation for Advanced Mathematics: Integration serves as a foundation for advanced mathematical concepts such as differential equations, Fourier analysis, and complex analysis. By mastering integration techniques, you establish a strong mathematical background that will facilitate your understanding of more advanced topics.**
Indicative Contents المحتويات الإرشادية	<u>Part A – Theoretical lectures</u> Hyperbolic functions ,rules that make a relationships of Hyperbolic functions. The derivative of Hyperbolic functions [6 hrs] Indefinite Integrals and the Substitution Rule [8hrs] , Techniques of Integration [8hrs], Trigonometric Integrals[10hrs] , Trigonometric Substitutions [6hrs], Integration of Rational Functions by Partial Fractions [14hrs], Integral Tables and Computer Algebra Systems [8hrs], Integration containing roots [10hrs], complex analysis[5] .

	Part B – Additional and Advanced Exercises. [18 hrs] Introduction of complex numbers with applications [12 hrs] Advanced Exercises and homework's.[40 hrs].

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**The main strategy that will be adopted in the delivery of this unit is to encourage students to participate in the exercises, while improving and expanding their critical thinking skills at the same time. This will be achieved through classes and interactive tutorials and by looking at the types of simple experiments that include some sampling activities that are of interest to the students.** **Mathematics, including calculus, requires practice to reinforce understanding and develop problem-solving skills. Work through a variety of problems, both from your textbook and supplementary resources. Start with simple problems and gradually increase the difficulty level.**

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	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	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.	---		Continuous	All
	Report	---		13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	20% (10)	7	LO #1 - #7
	Final Exam	3hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الأسبوعي النظري

	Material Covered
Week 1	Hyperbolic functions
Week 2	The derivative of Hyperbolic functions
Week 3	Integration methods
Week 4	Natural logarithms integrations
Week 5	Trigonometric functions integrations
Week 6	The integration of exponential functions
Week 7	Logarithms integrations
Week 8	Integration by part
Week 9	Integration involving $\mathbf{x^2 + bx + c}$
Week 10	Integration by using trigonometric substitution
Week 11	Integration involving $\sqrt{\mathbf{u^2 \mp a^2}}$
Week 12	Integration containing roots
Week 13	Integral method (partial fractions)
Week 14	The complex numbers
Week 15	Advanced Exercises

Delivery Plan (Weekly Lab. Syllabus) N/A المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1- **أي. برسل /الجزء الاول /1982 حسبان التفاضل والتكامل مع الهندسة التحليلية /.** 2- George B. Thomas, Jr. Massachusetts '' INSTRUCTOR'S SOLUTIONS MANUAL SINGLE VARIABLE '' 3 - Calculus 11th Thomas	Yes yes Yes
Recommended Texts	1- **د. رمضان محمد جهينة و د.احمد عبد العالي هب الريح التفاضل والتكامل /الجزء الاول /دار الكتاب الجديد المتحدة.** 2 - ROBERT T. SMITH, ROLAND B. MINTON, '' Calculus Fourth Edition'' 2012	Yes No
Websites	https:// **www.wolframalpha.com .**	

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	**Mechanics**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**MPH-1204**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	1		**Semester of Delivery**	2	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Aymen A. Ahmed		**e-mail**	Aymen.abd@uomosul.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Nadia Adel		**e-mail**	nadia.aadel2018@gmail.com	
Peer Reviewer Name	Shaimaa Talal		**e-mail**	shaimaa.talal.atalla@uomosul.edu.iq	
Scientific Committee Approval Date	02/06/2023		**Version Number**	1.0	

Relation with other Modules العالقة مع المواد الدراسية ألخرى			
Prerequisite module		**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات االرشادية	
Module Objectives أهداف المادة الدراسية	The course aims to develop their analytical, problem-solving, and critical- thinking skills in the context of mechanics. Learning Outcomes: 1. Knowledge and Understanding: Students should be able to demonstrate a deep understanding of the fundamental concepts, laws, and theories of classical mechanics, including Newton's laws of motion, conservation of energy and momentum, and rotational motion. 2. Problem Solving: Students should be able to apply the principles of mechanics to solve a wide range of problems, including kinematics, dynamics, and statics, using mathematical techniques and appropriate physical models. 3. Experimental Skills: Students should be familiar with experimental methods commonly used in mechanics and be able to design and conduct experiments, analyze data, and draw meaningful conclusions. 4. Mathematical Skills: Students should have a strong foundation in mathematical techniques, such as calculus and vector algebra, necessary for the analysis and formulation of mechanics problems. 5. Critical Thinking: Students should be able to critically evaluate physical phenomena, interpret experimental results, and make connections between different concepts in mechanics. 6. Communication: Students should be able to effectively communicate their ideas, methodologies, and findings, both in written form and through oral presentations, using appropriate scientific terminology.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. Week 1: Introduction to Mechanics Knowledge and Understanding: Can you explain Newton's laws of motion and their application to various scenarios? Problem Solving: Can you solve basic kinematics problems involving motion, velocity, and acceleration using appropriate equations? Week 2: Dynamics and Energy 3. Knowledge and Understanding: Can you describe the concepts of work, energy, and conservation laws (energy and momentum) and their significance in mechanics? Problem Solving: Can you apply Newton's laws of motion, work-energy theorem, and conservation principles to solve problems involving forces, motion, and energy? Week 3: Rotational Motion and Oscillations 5. Knowledge and Understanding: Can you explain the principles of rotational motion, including angular velocity, angular acceleration, and moments of inertia? Can you describe the characteristics of simple harmonic motion? 6. Problem Solving: Can you solve problems related to rotational motion and oscillations, such as calculating angular displacement, torque, rotational kinetic energy, and analyzing simple harmonic motion?

Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures Vectors in physics, Scalars versus Vectors, The Components of a Vector, Adding and Subtracting Vectors, Unit Vectors, Position, Displacement, Velocity, and Acceleration Vectors [*8* hrs] Newton's laws of motion, Newton's first law, Newton's second law, Newton's Third Law: Action-Reaction Pairs, The Concept of Force, Hooke's Law. [*10* hrs] Conservative Forces, Potential Energy Kinetic Energy, Work, Spring Force, Power, Conservation of Mechanical Energy,. [*10* hrs] Work Done by Non– Conservative Forces Static and Kinetic Friction, Tension in a Rope. [8 hrs] Static Tension in a Rope [3 hrs] Part B – Practical labs Experiments: 1. Falling ball viscometer [2 hrs], 2. Coefficient of Static Friction between two Surfaces [2 hrs], 3. Spiral spring to verify Hooke's law and to determine the extension per unit mass of the added load [2 hrs], 4. The Simple Pendulum [2 hrs], 5. Finding the specific weight of a group of liquids [2 hrs], 6. Measurement of fluid flow rate by its density [2 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Here is a summary of the main presentation strategy: Introduction: Begin the article with an engaging introduction that highlights the importance of learning outcomes and indicative contents in Mechanics for a first- class university. Describe the indicative contents of the Mechanics course, emphasizing the key topics and concepts that students will cover. Provide examples to illustrate the breadth and depth of the subject matter.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خالل الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خالل الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خالل 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	MLO 1, MLO2
	Assignments	2	10% (10)	2 and 12	MLO3, 4
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	MLO4, 5
Summative assessment	Midterm Exam	2hr	10% (10)	7	All
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج ألسبوعي النظري

	Material Covered
Week 1	Vectors in physics, Scalars versus Vectors, The Components of a Vector
Week 2	Adding and Subtracting Vectors, Unit Vectors, Position, Displacement, Velocity, and Acceleration Vectors.
Week 3	Newton's laws of motion, Newton's first law.
Week 4	Newton's second law, Newton's Third Law: Action-Reaction Pairs.
Week 5	The Concept of Force, Hooke's Law
Week 6	Conservative Forces.
Week 7	Potential Energy Kinetic Energy.
Week 8	Work, Spring Force.
Week 9	Power, Conservation of Mechanical Energy.
Week 10	Work Done by Non– Conservative Forces.
Week 11	Static and Kinetic Friction.
Week 12	Static Tension in a Rope.
Week 13	momentum.

Week 14	rotational motion.
Week 15	energy and waves.

Delivery Plan (Weekly Lab. Syllabus) المنهاج السبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Falling ball viscometer.
Week 2	Lab 2: Coefficient of Static Friction between two Surfaces.
Week 3	Lab 3: Spiral spring to verify Hooke's law and to determine the extension per unit mass of the added load.
Week 4	Lab 4: The Simple Pendulum.
Week 5	Lab 5: Finding the specific weight of a group of liquids.
Week 6	Lab 6: Measurement of fluid flow rate by its density.
Week 7	Lab 7: Velocity of sound.
Week 8	Lab 8:. Angular pendulum.
Week 9	Lab9: Finding the tuning fork frequency.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Gregory A DiLisi, (2009**). Classical Mechanics , Volume 4.	
Recommended Texts	**JoelA.Shapiro**, **(2010)** ClassicalMechanics	
Websites	https://bookauthority.org/books/best-classical-mechanics-books	

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
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Medical Antimicrobials**			Module Delivery	
Module Type	E			☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	**MPH-47035**				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level	4		Semester of Delivery	7	
Administering Department	Type Dept. Code		College	Type College Code	
Module Leader	Mahmood Zeki Al-Hasso		e-mail	mahmoodalhasso@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification	Ph.D.	
Module Tutor	Zeyad T. Al-Rassam		e-mail	dr.zeyadalrassam@uomosul.edu.iq	
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date			Version Number		

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. Clarification of how antimicrobials are important in our lives and how to use them properly. 2. Illustration of the major groups of antimicrobials and their mode of action. 3. Clarification of the origins and classification basis of antimicrobials. 4. Learn about the most important microbial resistance mechanisms and how to prevent their spread in the community and environment. 5. To understand and learn about the vaccination and its role in prevention viral and bacterial diseases.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the importance of chemotherapeutic agents in our lives. 2. Evaluate and Define various groups of antimicrobials and their mode of action in the microbial cell. 3. Analyze how antimicrobials neutralize microbial diseases and treat them in the human body. 4. Discuss the resistance process and problem posed by microbes and how we can reduce its severity and dissemination. 5. Understanding that most vaccines prevent infections (prophylaxis); most drugs treat infections (therapy). 6. Create a better understanding about prevention of diseases, because really effective antiviral therapy has been difficult to achieve, there is great importance attached to producing safe and effective vaccines against viruses.
Indicative Contents المحتويات الإرشادية	<u>Theoretical lectures</u> Introduction, Chemotherapeutic agents and antimicrobials, General terminology [3 hrs] Classification of antimicrobials, Antimicrobials mode of action , Antibiotics and synthetic antimicrobials , Anti-mycobacterial Agents [6 hrs] Antibacterials agents , Antifungal agents , Antimicrobial resistance mechanisms [12 hrs] Prevention and treatment of virus diseases. (introduction), Mechanisms of Antiviral Drugs: Nucleoside Analogues & Polymerase Inhibitors, Neuraminidase Inhibitors & Protease Inhibitors. [12 hrs] Entry Inhibitors & Reverse Transcriptase Inhibitors, Antiviral Resistance. Interferon therapy, Vaccines and vaccination [12 hrs] Revision problem classes [3 hrs]

earning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about the science of Medical Antimicrobials. Introducing the students to antimicrobial aspects of chemotherapeutic agents. Learning about the most medically important medications and antibiotics used to treat microbial diseases. Educate the students about the proper use of antibiotics and how to participate in preventing the spread of antimicrobial resistance. This will be achieved through lectures and interactive tutorials.

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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
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)	2,4,5	LO #4 and #5
	Assignments	2	10% (10)	5 and 10	LO #2, #3 , #4 and #5
	Projects	1	10% (10)	Continuous	All
	Report	1	10% (10)		All
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #2 , #3, #5
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction, Chemotherapeutic agents and antimicrobials
Week 2	General terminology
Week 3	Classification of antimicrobials

Week 4	Antimicrobials mode of action
Week 5	Antibiotics and synthetic antimicrobials
Week 6	Anti-mycobacterial Agents
Week 7	Antibacterials agents
Week 8	Antifungal agents
Week 9	Antimicrobial resistance mechanisms
Week 10	Prevention and treatment of virus diseases Mechanisms of
Week 11	Antiviral Drugs: Nucleoside Analogues & Polymerase Inhibitors, Neuraminidase Inhibitors & Protease Inhibitors.
Week 12	Entry Inhibitors & Reverse Transcriptase Inhibitors
Week 13	Antiviral Resistance.
Week 14	Interferon therapy
Week 15	Vaccines and vaccination

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	
Week10	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Madigan et al., Brock's Biology of Microorganisms (2019).	Yes

Recommended Texts	Wielly et al., Microbiology, 11th. ed. (2020).	Yes
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 Bacteriology**			Module Delivery	
Module Type	Elective learning activity			☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	MPH-35024				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level	3		Semester of Delivery	5	
Administering Department	Type Dept. Code		College	Type College Code	
Module Leader	Mahmood Zeki Al-Hasso		e-mail	mahmoodalhasso@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification	Ph.D.	
Module Tutor	Sumyia Adnan		e-mail	@uomosul.edu.iq	
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date			Version Number		

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. Clarification of how bacteria are important in our ecosystem and our bodies. 2. Illustration of bacterial cell structure and components. 3. Clarification of the basic bacterial virulence factors and their role in the pathogenesis. 4. Learn about the most important bacterial diseases for human and their causative agents and symptoms. 5. To understand and learn about the transmission routs, diagnosis, treatment and prevention of bacterial diseases infecting humans.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the importance of bacteria in our lives. 2. Evaluate and Define various bacterial diseases with their medical importance. 3. Analyze how bacterial diseases affect the human body and cause infection. 4. Discuss the pathogenesis process of infection in the body and how disease develop. 5. Understand the transmission of bacterial diseases and how can we prevent it. 6. Create a better understanding about the medically important bacterial diseases including treatment and prevention aspects.
Indicative Contents المحتويات الإرشادية	Theoretical lectures Introduction to medical bacteriology, bacterial cell structure and function [3 hrs] Various virulence factors of bacteria, Different mode and routs of dissemination and spread of bacterial diseases [6 hrs] Tuberculosis and Pneumonia, Cholera and Diarrhea , Meningitides [12 hrs] Tetanus , Botulism , Diphtheria , Salmonellosis and Shigellosis [12 hrs] Food poisoning , Brucellosis, Leprosy , Plaque [12 hrs] Revision problem classes [3 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about the science of Medical Bacteriology. Introducing the students to biological aspects of Bacteria and their structure and virulence factors. Learning about the most medically important bacterial diseases like tuberculosis, pneumonia, tetanus, diphtheria, ...ets. Educate the students about the prevention control strategies of epidemic diseases and their route of dissemination. This will be achieved through lectures and interactive tutorials.

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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
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)	2,4,5	LO #4 and #5
	Assignments	2	10% (10)	5 and 10	LO #2, #3 , #4 and #5
	Projects	1	10% (10)	Continuous	All
	Report	1	10% (10)		All
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #2 , #3, #5
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction, bacterial cell
Week 2	General bacterial structure

Week 3	Virulence factors of bacteria
Week 4	Mode of dissemination and spread of bacterial diseases
Week 5	Tuberculosis and Pneumonia
Week 6	Cholera and Diarrhea
Week 7	Meningitides
Week 8	Tetanus
Week 9	Botulism
Week 10	Diphtheria
Week 11	Salmonellosis and Shigellosis
Week 12	Food poisoning
Week 13	Brucellosis
Week 14	Leprosy
Week 15	Plaque

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	
Week10	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Madigan et al., Brock's Biology of Microorganisms (2019).	Yes

Recommended Texts	Wielly et al., Microbiology, 11th. ed. (2020).	Yes
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 Bioinformatics			Module Delivery	
Module Type	E			☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☒ Practical ☐ Seminar	
Module Code	MPH-48041				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level	4		Semester of Delivery	8	
Administering Department	Medical Physics		College	Science	
Module Leader	Talal Sabhan Salih		e-mail	talal.salih@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification	Ph.D.	
Module Tutor			e-mail		
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date	/06/2023		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	The module seeks to understand how medical bioinformatics make significant contributions to a wide range of scientific benefits in medical physics sciences. This course deals with the basic concept of medical bioinformatics and related tools and programs. Learn about the most fundamental concepts of important topics in medical bioinformatics such decipher of DNA sequence, gene sequence alignments and medical bioinformatics databases. Moreover, the module tries to understand and comprehend the impact of medical bioinformatics processes on medical physics science. At the end of this course, students should be able to demonstrate a clear understanding of the facts and basic concepts of medical bioinformatics which are covered in lectures. This will be achieved through, theoretical lectures, tutorials and practical training.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1: Define the basic concepts of bioinformatics 2: Understanding the Human Genome Project and bioinformatics. 3: Learn about Hallmarks characteristics and Open Reading Frame (ORF) finding of diseases using bioinformatics. 4: Learn about the role of Bioinformatics in carrying out the analysis of DNA Fingerprints 5: know how to decipher (decode) of the DNA Sequence. 6: Explain the types of sequence alignment and their applications in medicine 7: Explain the Bioinformatics strategies for identifying gene sequences. 8: Define the resources for medical Bioinformatics databases and tools. 9: Explain the sequence alignment using bioinformatics online tools. 10: Learn how to Diagnose of insulin gene and thalassemia gene using bioinformatics tools. 11: Exploring how Bioinformatics methods can be used to detection and screen of tumor DNA in cancer patients.
Indicative Contents المحتويات الإرشادية	Theoretical lectures An introduction to bioinformatics [3 hrs]. Human Genome Project and bioinformatics [4 hrs]. Hallmarks characteristics and Open Reading Frame (ORF) finding of diseases genes using bioinformatics [3 hrs]. Bioinformatics in carrying out the analysis of DNA Fingerprints [3 hrs]. Decipher (decode) of the DNA Sequence [3 hrs]. Types of

	sequence alignment and their applications in medicine [3 hrs]. Bioinformatics strategies for identifying gene sequences [5 hrs]. Resources for medical Bioinformatics databases and tools [3 hrs]. Sequence alignment using bioinformatics online tools [3 hrs]. Basic Local Alignment Search Tool (BLAST) program [3 hrs]. Phylogenomic trees for disease diagnosis using bioinformatics approaches [3 hrs]. Diagnosing genetic diseases using bioinformatics [4 hrs]. Diagnosing of insulin gene and thalassemia gene using bioinformatics tools [3 hrs]. Diagnosing of pathogens using bioinformatics methods [3 hrs]. Bioinformatics methods for detection and screening of tumor DNA in cancer patients [3 hrs].

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about medical bioinformatics science and its contents. In addition, in expanding the knowledge of up to date sources of medical bioinformatics through doing related lectures and students discussion, tutorials and practical training. This will be achieved through lectures and interactive tutorials and by types of practical activities.

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	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
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	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

ملاحظة: في حالة كون المادة لا تحتوي على جانب عملي تضاف الدرجة الخاصة بها الى أي محور اخر يختاره استاذ المادة من تفصيلات الدرجة اعلاه

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	An introduction to bioinformatics.
Week 2	Human Genome Project and bioinformatics.
Week 3	Hallmarks characteristics and Open Reading Frame (ORF) finding of diseases genes using bioinformatics.
Week 4	Bioinformatics in carrying out the analysis of DNA Fingerprints.
Week 5	Decipher (decode) of the DNA Sequence.
Week 6	Types of sequence alignment and their applications in medicine.
Week 7	Bioinformatics strategies for identifying gene sequences.
Week 8	Resources for medical Bioinformatics databases and tools.
Week 9	Sequence alignment using bioinformatics online tools.
Week 10	Basic Local Alignment Search Tool (BLAST) program.
Week 11	Phylogenomic trees for disease diagnosis using bioinformatics approaches.
Week 12	Diagnosing genetic diseases using bioinformatics.
Week 13	Diagnosing of insulin gene and thalassemia gene using bioinformatics tools.
Week 14	Diagnosing of pathogens using bioinformatics methods.
Week 15	Bioinformatics methods for detection and screening of tumor DNA in cancer patients.

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	
Week10	
Week 11	
Week 12	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Husmeier, D., Dybowski, R., & Roberts, S. (Eds.). (2006). *Probabilistic modeling in bioinformatics and medical informatics*. Springer Science & Business Media.	Yes
	Husmeier, D., Dybowski, R., & Roberts, S. (Eds.). (2006). Probabilistic modeling in bioinformatics and medical informatics. Springer Science & Business Media.	Yes
Recommended Texts	Lytras, M. D., & Papadopoulou, P. (Eds.). (2017). Applying big data analytics in bioinformatics and medicine. IGI Global.	No
Websites	https://www.genome.gov/genetics-glossary/Bioinformatics	

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 image processing and analysis			Module Delivery	
Module Type	**Core**			☒ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	**MPH-47131**				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	4		Semester of Delivery	7	
Administering Department	Medical physics		College	Sciences	
Module Leader	Mahmoud Ahmed mohammed Fakhri		e-mail	drmahmoudahmed@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification	Ph.D.	
Module Tutor	Mahmoud Ahmed mohammed Fakhri		e-mail	drmahmoudahmed@uomosul.edu.iq	
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date	012/06/2023		Version Number	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	MPH-24013	Semester	4
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Image processing requires fixed sequences of operations that are performed at each pixel of an image. The image processor performs the first sequence of operations on the image, pixel by pixel. Once this is fully done, it will begin to perform the second operation, and so on. The output value of these operations can be computed at any pixel of the image Image processing is the process of transforming an image into a digital form and performing certain operations to get some useful information from it. The image processing system usually treats all images as 2D signals when applying certain predetermined signal processing methods. **Types of Image Processing :**There are five main types of image processing: 1-Visualization - Find objects that are not visible in the image 2-Recognition - Distinguish or detect objects in the image 3-Sharpening and restoration - Create an enhanced image from the original image 4-Pattern recognition - Measure the various patterns around the objects in the image 5-Retrieval - Browse and search images from a large database of digital images that are similar to the original image **The implementation of image processing techniques has had a massive impact on many tech organizations. Here are some of the most useful benefits of image processing, regardless of the field of operation:** 1. The digital image can be made available in any desired format (improved image, X-Ray, photo negative, etc) 2. It helps to improve images for human interpretation 3. Information can be processed and extracted from images for machine interpretation 4. The pixels in the image can be manipulated to any desired density and contrast 5. Images can be stored and retrieved easily 6. It allows for easy electronic transmission of images to third-party providers
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Upon completing this subject, the student is expected to: 1- Describe the principles of image formation, acquisition and perception 2-Describe the basic theory and algorithms that are widely used in image processing 3- Demonstrate a general knowledge on current technologies and issues that are specific to image processing systems 4- Describe the basic theory and algorithms used in video coding and processing 5- Develop hands-on experience in using computers to process images 6- Define image operations and use the MATLAB Image Processing Toolbox to execute these image operations

	Demonstrate critical thinking about shortcomings of the state of the art in image and video processing This course will enable you to: 7. identify major processes involved in formation of medical images 8. recognize the imaging modality from their visualization 9. classify the various medical image processing algorithms 10. describe fundamental methods of image enhancement 11. enhance medical images using appropriate software 12. visualize all types of medical image data 13. appraise efficacy and drawbacks of several techniques of image segmentation 14. get familiar with the fundamental concepts of texture analysis 15. explain the basic principles of medical image communication 16. get started with ImageJ and self-perform fundamentals of medical image processing
Indicative Contents المحتويات الإرشادية	**Image Acquisition** Image acquisition is the first step in image processing. This step is also known as preprocessing in image processing. It involves retrieving the image from a source, usually a hardware-based source. **Image Enhancement** Image enhancement is the process of bringing out and highlighting certain features of interest in an image that has been obscured. This can involve changing the brightness, contrast, etc. **Image Restoration** Image restoration is the process of improving the appearance of an image. However, unlike image enhancement, image restoration is done using certain mathematical or probabilistic models. **Color Image Processing** Color image processing includes a number of color modeling techniques in a digital domain. This step has gained prominence due to the significant use of digital images over the internet. **Wavelets and Multiresolution Processing** Wavelets are used to represent images in various degrees of resolution. The images are subdivided into wavelets or smaller regions for data compression and for pyramidal representation. **Compression** Compression is a process used to reduce the storage required to save an image or the bandwidth required to transmit it. This is done particularly when the image is for use on the Internet. **Morphological Processing** Morphological processing is a set of processing operations for morphing images based on their shapes. **Segmentation** Segmentation is one of the most difficult steps of image processing. It involves partitioning an image into its constituent parts or objects. **Representation and Description** After an image is segmented into regions in the segmentation process, each region is represented and described in a form suitable for further computer processing. Representation deals with the image's characteristics and regional

	properties. Description deals with extracting quantitative information that helps differentiate one class of objects from the other. **Recognition** Recognition assigns a label to an object based on its description. **Blind Deconvolution in Image Processing**
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents . In addition to the use of different tools and experiments in distinguishing the bioelectronics through observations and measuring. This will be achieved through lectures, labs, and interactive tutorials and by types of practical activities.

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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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	4	10% (10)	3,6,,9,13	CLO-1, CLO-2 , CLO-5, CLO-9 , CLO-12
	Assignments	2	10% (10)	7 and 12	CLO-4, CLO-6
	Projects / Lab.	6	10% (10)	Continuous	All
	Report	0			
Summative assessment	Midterm Exam	2hr	10% (10)	7	CLO-1, CLO-2, CLO-3, CLO-4 and CLO-6
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

ملاحظة: في حالة كون المادة لا تحتوي على جانب عملي تضاف الدرجة الخاصة بها الى أي محور اخر يختاره استاذ المادة من تفصيلات الدرجة أعلاه

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	**Image Acquisition**
Week 2	**Image Enhancement**
Week 3	**Image Restoration**
Week 4	**Color Image Processing**
Week 5	**Wavelets and Multiresolution Processing**
Week 6	**Compression**
Week 7	**Morphological Processing**
Week 8	**Segmentation**
Week 9	**Representation and Description**
Week 10	**Recognition**
Week 11	**Blind Deconvolution in Image Processing**
Week 12	**Importance of Phase in Image Processing**
Week 13	**Ringing Effect in Image Processing**
Week 14	**Applications of Image Processing (Medical Image Retrieval, Traffic Sensing Technologies)**
Week 15	**Applications of Image Processing (Image Reconstruction, Face Detection)**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to image processing and analysis
Week 2	Lab 2 Deterministic Image Processing and Feature Enhancement-I
Week 3	Lab 3: Deterministic Image Processing and Feature Enhancement-II
Week 4	Lab 4: Image Segmentation-I
Week 5	Lab 5: Image Segmentation-II
Week 6	Lab 6: Image Segmentation-IV

Week 7	Lab 7: Image Registration-I
Week 8	Lab 8: Image Registration-II
Week 9	Lab9: Image Registration-II
Week10	Lab 10: Open-source tools for image analysis- I
Week 11	Lab11: Open-source tools for image analysis- II
Week 12	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	HANDBOOK OF MEDICAL IMAGE PROCESSING AND ANALYSIS. EDITED BY ISAAC N. BANKMAN, PhD. ELSEVIER G. Dougherty, Medical Image Processing: Techniques and Applications, Springer, 2013.	Yes Yes
Recommended Texts	Handbook of Medical Image Processing and Analysis . Editor by: Isaac Bankman -2nd Edition - December 19, 2008	yes
Websites	https://www.sciencedirect.com/topics/computer-science/imaging-process	

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-24013				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	2		Semester of Delivery	4	
Administering Department	Medical physics		College	Sciences	
Module Leader	Qusay Khattab Omer		e-mail	qusaykhatab@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification	Ph.D.	
Module Tutor			e-mail		
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date	/06/2023		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	Explain how to use physical techniques in medical imaging that have wide applications in the field and specialization of medical physics. This course deals with the basic concept of medical imaging. Learn about the relationship of physical techniques in the medical field and the mechanism of understanding the work of ideas and physical concepts of this relationship, to know the impact of physical properties, including penetration, reflection and dispersion of these techniques on medical physics sciences, to perform medical imaging applications of all kinds. At the end of the course students will have a broad knowledge of the basic concepts, technique and application of the physical properties of these techniques in medicine. This will be achieved through theoretical lectures and lessons.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	CLO-1: Define the basics of medical imaging . CLO-2: Identify medical imaging refers to several different technologies that are used to view the human body in order to diagnose, monitor, or treat medical conditions. CLO-3: Learn about the relation between the physical properties potential, Application for calculation of the imaging . CLO-4: Summarized the optic properties and its connections in parallel and in series, the effects of PET imaging with CT scan as double technologies to find tumor or cancer depending on metabolism CLO-5: Explain the Doppler effect and using it in medicine applications . CLO-6: Discuss the IMR image ,CT scan, PET imaging, SPECT imaging and the its mechanism's CLO-7: Recognize the DEXA imaging with dual energy . CLO-8: Explain Electric and Magnetic field rather than thermal effect in medical application as medical applications .
Indicative Contents المحتويات الإرشادية	Part A – Theoretical lectures Introduction The basics of medical imaging and the its relation with radiation, Interaction of Gamma Rays and X-Rays with Matter . [5 hrs],application of non-ionizing and ionizing radiation in medical imaging , [3 hrs],The sonar types , Doppler effect with variable frequency, type of Doppler's Bow and Shocking wave, [3 hrs]. CT scan and Application medical imaging , X-ray Traditional [3hr]. PET technology in medical imaging , advantage and side effect[2hr]. The merge between two techniques , PET/CT scan advantage ,mini x-ray [2hr. The application of Electric Field in medical imaging, reasons and results [2hr].DEXA imaging , dose rate preparations , dual energy in medical imaging [3hr]. Single photon emitted as tecniqe in medical imaging , Magnetic field in medical imagining advantage and risks , SPECT application in medical imagining [4hr]. ,Gamma radiation with gamma camera application in medical imaging ,Technology of IMR image advantage, Microwave

	application in medical imagining and risks , Sound , Ultrasound applications [3h].

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expand students' perceptions about this science and its contents. In addition to the use of various tools and experiments in medical imaging through observations and physical concepts in the application. This will be achieved through lectures, laboratories, interactive educational programs and types of practical activities.

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	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
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	5	10% (10)	1,2,5	CLO-1, CLO-2 , CLO-5, CLO-9 , CLO-12
	Assignments	2	10% (10)	7 and 12	CLO-4, CLO-6
	Projects / Lab.	6	10% (10)	Continuous	All
	Report	0			
Summative assessment	Midterm Exam	2hr	10% (10)	7	CLO-1, CLO-2, CLO-3, CLO-4 and CLO-5
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

ملاحظة: في حالة كون المادة لا تحتوي على جانب عملي تضاف الدرجة الخاصة بها الى أي محور اخر يختاره استاذ المادة من تفصيلات الدرجة اعلاه

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction The basics of medical imaging and the its relation with radiation,
Week 2	Interaction of Gamma Rays and X-Rays with Matter .Application of non-ionizing and ionizing radiation in medical imaging ,
Week 3	CT scan and Application medical imaging , X-ray Traditional
Week 4	PET technology in medical imaging , advantage and side effect
Week 5	The merge between two techniques , PET/CT scan advantage ,mini x-ray
Week 6	The application of Electric Field in medical imaging, reasons and results
Week 7	DEXA imaging , dose rate preparations
Week 8	Using dual energy in medical imaging
Week 9	Single photon emitted as technique in medical imaging ,
Week 10	Magnetic field in medical imagining advantage and risks
Week 11	SPECT application in medical imagining
Week 12	Gamma radiation with gamma camera application in medical imaging
Week 13	Technology of IMR image advantage
Week 14	Microwave application in medical imagining and risks
Week 15	Sound , Ultrasound applications , The sonar types , Doppler effect with variable frequency, type of Doppler's Bow and Shocking wave,

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	

Week10	
Week 11	
Week 12	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	**Medical Imaging: Essentials for Physicians** Author(s): Anthony B. Wolbarst PhD,, Patrizio Capasso MD, DSc,, Andrew R. Wyant MD, First published:2 April 2013 Print ISBN:9780470505700 |Online ISBN:9781118480267 |DOI:10.1002/9781118480267	Yes
	Diagnostic radiology physics : a handbook for teachers and students. — Vienna D.R. Dance S. Christofides A.D.A. Maidment I.D. McLean K.H. Ng Technical Editors : International Atomic Energy Agency, 2014. p. ; 24 cm. STI/PUB/1564 ISBN 978–92–131010–1	Yes
Recommended Texts	**The Essential Physics of Medical Imaging, 3rd Edition** **By** Jerrold T. Bushberg, J. Anthony Seibert, Edwin M. Leidholdt Jr. and John M. Boone 2018..	Yes
Websites	https://www.wiley.com/en-sg/Medical+Imaging:+Essentials+for+Physicians-p-9780470505700	

	https://www.google.com/search?q=Diagnostic+radiology+physics+%3A+a+handbook+for+teachers+and+students.+%E2%80%94+Vienna&sxsrf=APwXEdep4q-coGLgaHMG7Q2pFAbcgW8now%3A1687216331430&ei=y-CQZIvxGbbc7_UPpLOo2Aw&ved=0ahUKEwjLguDQutD_AhU27rsIHaQZCssQ4dUDCA8&uact=5&oq=Diagnostic+radiology+physics+%3A+a+handbook+for+teachers+and+students.+%E2%80%94+Vienna&gs_lcp=Cgxnd3Mtd2I6LXNlcnAQAzIHCCMQ6gIQJzIHCCMQ6gIQJzIHCCMQ6gIQJzIHCCMQ6gIQJzIHCCMQ6gIQJzIHCCMQ6gIQJzIHCCMQ6gIQJzIHCCMQ6gIQJ0oECEEYAFCPDViPDWCoFWgBcAB4AIABAIgBAJIBAJgBAKABAaABArABCsABAQ&sclient=gws-wiz-serp

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 Immunology			Module Delivery	
Module Type	Elective learning activity			☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	MPH-35024				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level	3		Semester of Delivery	5	
Administering Department	Medical physics		College	Sciences	
Module Leader	Zeyad Thonnoon Al-Rassam		e-mail	dr.zeyadalrassam@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification	Ph.D.	
Module Tutor	Dalia Abdulelah Rahawi		e-mail	dalsbio121@uomosul.edu.iq	
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date	/06/2023		Version Number		

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	The study of medical immunology is an important field in the medical and biological sciences, this course shows how medical immunology can contribute to solving a wide range of scientific problems in the field of medical physics. This course also deals with clarifying the basic concept of medical immunology and identifying the relationships of immunology with medical applications. In addition to understanding the role of immunology in developing methods and adding new immunological applications to medical physics. At the end of the course, students will have a broad knowledge of the basic medical concepts, techniques, and applications of immunology. This will be achieved through theoretical lectures, lessons, scientific visits, and other extracurricular activities.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	CLO-1: Define the basics of immunology. CLO-2: Identify the relationship between immunology and medical sciences, CLO-3: provides knowledge and a deep understanding of the immune system's interactions and mechanisms. This helps develop new models and theories that explain the immune response and its interaction with pathogens. CLO-4: Understanding immune interactions can help develop targeted drugs that target these pathways and improve their efficacy and safety. CLO-5: Understanding the basics of the immune response supports the development of effective vaccines to prevent infectious diseases. CLO-6: Understanding diagnostic tests for immune disorders and infections of the immune system. CLO-7: Identify modern technologies that enable to study and analyze the immune system CLO-8: enhancing the scientific understanding of the immune system and its role in maintaining health and fighting disease.
Indicative Contents المحتويات الإرشادية	Theoretical lectures Immune system definition, Innate and Adaptive immune mechanisms. [3 hrs], Cells of the Immune System. [3hrs], Phagocytosis. [3 hrs]. Complement [3hr]. inflammation [3 hr]. Lymphocyte: T cell and B cell [3hr]. Immunoglobulins [3hr]. Antibodies Response [3hr]. antigen-antibody interaction [3hr]. Histocompatibility Complex [3h]. Cytokines [3hr]. Hypersensitivities [3hr]. Autoimmune diseases [3hr]. Transplantation (tissue) rejection [3hr]. Immune deficiencies [3hr].

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents, through lectures, labs, interactive tutorials, and by types of practical activities.

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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
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)	1,2,5	CLO-1, CLO-2 , CLO-5, CLO-9 , CLO-12
	Assignments	2	10% (10)	7 and 12	CLO-4, CLO-6
	Projects	1	10% (10)		All
	Report	1	10% (10)		All
Summative assessment	Midterm Exam	2hr	10% (10)	7	CLO-1, CLO-2, CLO-3, CLO-4 and CLO-5
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

ملاحظة: في حالة كون المادة لا تحتوي على جانب عملي تضاف الدرجة الخاصة بها الى أي محور اخر يختاره استاذ المادة من تفصيلات الدرجة اعلاه

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Immune system definition, Innate and Adaptive immune mechanisms.
Week 2	Cells of the Immune System.
Week 3	Phagocytosis.
Week 4	Complement
Week 5	inflammation
Week 6	Lymphocyte: T cell and B cell
Week 7	Immunoglobulins
Week 8	Antibodies Response
Week 9	antigen-antibody interaction
Week 10	Histocompatibility Complex
Week 11	Cytokines
Week 12	Hypersensitivities
Week 13	Autoimmune diseases
Week 14	Transplantation (tissue) rejection
Week 15	Immune deficiencies

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	
Week10	
Week 11	
Week 12	

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**Essentials of Clinical Immunology 6th Edition** by Helen Chapel , Mansel Haeney , Siraj A. Misbah , Neil Snowden . Wiley-Blackwell,2014.	NO
Recommended Texts	**Roitt's Essential Immunology (Essentials) 13th Edition** by Seamus J. Martin , Dennis R. Burton , Ivan M. Roitt, Wiley-Blackwell, 2017	No
Websites	https://www.amazon.com/Essentials-Clinical-Immunology-Wiley-Text/dp/1118472950/ref=sr_1_1?crid=14JINKP5AY42X&keywords=Essentials+of+Clinical+Immunology&qid=1687586202&s=books&sprefix=essentials+of+clinical+immunology%2Cstripbooks-intl-ship%2C664&sr=1-1 https://www.wiley.com/en-ie/Roitt's+Essential+Immunology,+13th+Edition-p-9781118415771	

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

Module Title	Medical instrumentation physics			Module Delivery	
Module Type	C			☒Theory ☒ Lecture ☐ Lab ☒ Tutorial ☒Practical ☐ Seminar	
Module Code	MPH-47032				
ECTS Credits	5.00				
SWL (hr/sem)	125				
Module Level	4		Semester of Delivery	7	
Administering Department	Medical physics		College	Sciences	
Module Leader	Marwan Zuhair		e-mail	marwanzt@uomosul.edu.iq	
Module Leader's Acad. Title	Ass. Prof		Module Leader's Qualification	Ph.D.	
Module Tutor	Huda Masood Mohammed		e-mail	Huda.phy@uomosul.edu.iq	
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date	/06/2023		Version Number		

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

Module Objectives	1. Study the theoretical background, for example bout Ionizing radiation (origin, measurement, interactions with matter), properties of atoms and nucleus, radioactivity, basic terms of acoustics, electromagnetic spectrum…. 2. Study the most important Instruments for measuring physical and chemical variables in vivo. 3. Identify the importance of studding the physical mechanism of working.

	4. This course deals with the basic concept of physical laws that used to interpret the principle of machine's working. 5. Learn about the most important scientific terms (Terminology) and their definitions related to this topic, such as ECG, EEG, EMG. 6. To perform and develop new techniques for diagnosing machine, such as UV and IR therapy. 7. At the end of the course the students will have broad knowledge of the basic physical concepts, technique and applications. This will be achieved through, theoretical lectures, tutorials and laboratory.
Module Learning Outcomes	1. Define the concept and law of physics that used in the machine. 2. Summarize the radiation measurements, diagnostic imaging formation, and Special medical techniques. 3. List and Describe the risks of long exposure to radiation. 4. Discuss the Special radiographic techniques, such as Mammography.
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	- Expanding students' perceptions about radiation science. - In addition to the use of different tools and experiments in distinguishing the radiation interaction with tissue through observations and measuring. This will be achieved through lectures, labs, and interactive tutorials and by types of practical activities.

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
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	125		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	6 and 10	CLO-2, CLO-3 , CLO-5, CLO-9
	Assignments	4	10% (10)	3, 5, 7, 12	CLO-5, CLO-8

	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	1	
Summative assessment	Midterm Exam	2 hr	10% (10)	7	CLO-1, CLO-2, CLO-3, CLO-4 and CLO-5
	Final Exam	4 hr	50% (50)	16	All
Total assessment					

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	What is a Medical Device?
Week 2	Medical Imaging Devices
Week 3	Medical Imaging Devices (in vivo diagnosis)
Week 4	Medical Laboratory Devices (in vitro diagnosis)
Week 5	Physiological Measurement Devices (in vivo diagnosis)
Week 6	Endoscopy
Week 7	X-ray projection imaging
Week 8	Computed Tomography (CT)
Week 9	Ultrasound (USI), Doppler imaging
Week 10	Magnetic resonance imaging (MRI)
Week 11	Radionuclide imaging (nuclear medicine)
Week 12	Thermography
Week 13	Laser
Week 14	Radiotherapy Devices
Week 15	Physical therapy Devices

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	
Week10	
Week 11	
Week 12	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts		
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					
Module Title	Medical laboratory analysis			Module Delivery	
Module Type	E			☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	MPH-36030				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level	3		Semester of Delivery	6	
Administering Department	Medical physics		College	Sciences	
Module Leader	Dr.Enaam Ahmed Hamza		e-mail	Dr.enaam.hamza@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification	Ph.D.	
Module Tutor	Nor Mazin Abdul -Rahman		e-mail		
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date	/06/2023		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	
Module Objectives	1. Clarification of how Medical laboratory analysis can make significant contributions to medical physics 2. This course deals with the basic concept of the laboratory analysis 3. Learn about the most important classification of Medical laboratory analysis 4. To understand the relationship between biochemistry and other sience 5. Emphasizing the importance of maintaining a healthy body and preventing disease caused by imbalance in the function of the human body This will be achieved through, theoretical lectures, tutorials .
Module Learning Outcomes	1. teach students how to diagnostic test basics, collecting &transporting ,specimens 2. Discuss the Hyperglycemia and Hypoglycemia 3. Explain Diabetes Mellitus 4. Dyslipidemia 5. Blood urea, Blood creatinine, Creatinine clearance, Uric acid 6 . Liver function Tests (Serum Bilirubin, Serum Phosphate, Serum Calcium) 6. teach students how to examine Kidney function Tests (Serum cholesterol, Serum Triglycerides). 7. Explain the Microbiological tests: culture and sensitivity tests, Staining methods
Indicative Contents	Diagnostic test basics, collecting &transporting ,specimens Blood, urine, stool specimen collection General urine examination, urine specimen collection Hyperglycemia and Hypoglycemia Diabetes Mellitus Dyslipidemia [*12* hrs] Blood urea, Blood creatinine, Creatinine clearance, Uric acid Liver function Tests (Serum Bilirubin, Serum Phosphate, Serum Calcium)

	Kidney function Tests (Serum cholesterol, Serum Triglycerides) [12 hrs] Immunology : C-reactive protein test, Rheumatic factor test, Typhoid .fever test(Widal test), Pregnancy Test, ELISA Test, Blood Grouping. Hematological tests: RBC count, Hb, PCV, WBC count [12 hrs] Microbiological tests: culture and sensitivity tests, Staining methods Vitamins: classification, function and disease associated with vitamins. Minerals and ions: Requirement, function and biological importance of Calcium, Iron, Iodine, Zinc, Phosphorus, Copper, Sodium and Potassium Tumor markers. [16 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents help to understand Medical physics science. This will be achieved through lectures and interactive tutorials and by types of practical diagnostic methods for microfossils and 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	52	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	48	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	3	20 % (10)	2,5	CLO-1, CLO-2 _ CLO-4, CLO-5
	Assignments	2	10% (10)	7 and 12	CLO-4, CLO-6
	Projects / Lab.				
	Report	1	10% (10)	10	CLO -3, 8 and -10
Summative assessment	Midterm Exam	2hr	10% (10)	7	CLO-1, CLO-2, CLO-3, CLO-4 CLO-5 and CLO-6
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

ملاحظة: في حالة كون المادة لا تحتوي على جانب عملي تضاف الدرجة الخاصة بها الى أي محور اخر يختاره استاذ المادة من تفصيلات الدرجة اعلاه

Delivery Plan (Weekly Syllabus)
المنهاج الأسبوعي النظري

	Material Covered
Week 1	Diagnostic test basics, collecting &transporting ,specimens
Week 2	Blood, urine, stool specimen collection General urine examination, urine specimen collection
Week 3	Hyperglycemia and Hypoglycemia
Week 4	Diabetes Mellitus
Week 5	Dyslipidemia
Week 6	Blood urea, Blood creatinine, Creatinine clearance, Uric acid
Week 7	Liver function Tests (Serum Bilirubin, Serum Phosphate, Serum Calcium)
Week 8	Kidney function Tests (Serum cholesterol, Serum Triglycerides)
Week 9	Immunology : C-reactive protein test, Rheumatic factor test, Typhoid .fever test(Widal test), Pregnancy Test, ELISA Test, Blood Grouping.
Week 10	Hematological tests: RBC count, Hb, PCV, WBC count
Week 11	Microbiological tests: culture and sensitivity tests, Staining methods

Week 12	Vitamins: classification, function and disease associated with vitamins. Minerals and ions: Requirement, function and biological importance of Calcium, Iron, Iodine, Zinc, Phosphorus, Copper, Sodium and Potassium
Week 13	Tumor markers.
Week 14	
Week 15	

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	
Week10	
Week 11	
Week 12	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Clinical Chemistry & Metabolic Medicine ,Crook 2012. -Tietz Clinical Chemistry& Molecular Diagnostics, 2012.	
Recommended Texts	Clinical Chemistry, by William Marshall and Stephan Bangert, Edinburgh: Mosby, 5th edition, 2004, ISBN 0-7234-3328-3	

Websites	All that related with medical laboratory analysis

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 Laboratory Instruments			Module Delivery	
Module Type	E			☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	MPH-47035				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level	4		Semester of Delivery	7	
Administering Department	Medical physics		College	Sciences	
Module Leader	Jasim M. Y. Ahmed Al-Bayati		e-mail	jasim.yaseen@uomosul.edu.iq	
Module Leader's Acad. Title	Lecturer		Module Leader's Qualification	M. Sc.	
Module Tutor			e-mail		
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date			Version Number		

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	The study of medical and biological instruments is an important field in the medical and biological science, this course shows how medical and biological instruments can contribute to solving a wide range of scientific problems in the field of medical physics. This course also deals with clarifying the basic concept of medical and biological instruments and identifying the relationships and applications in medicine and biological field. In addition to understanding the role of this instruments in developing methods and adding new applications to medical physics. At the end of the course, students will have a broad knowledge of the basic medical concepts, techniques, and applications of this instruments. This will be achieved through theoretical lectures, lessons, scientific visits, and other extracurricular activities.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	CLO-1: Define the concepts of the biological and medical instruments. CLO-2: Identify the relationship between this instruments and medical sciences, CLO-3: provides knowledge and a deep understanding of the basics, interactions and mechanisms. This helps develop new models and theories that explain this instruments response and its interaction with pathogenic and nonpathogenic samples. CLO-4: Understanding interactions that could help to develop drugs that target these pathways and improve their efficacy and safety. CLO-5: Understanding the basics of the response supports the development of effective treatments to prevent infectious diseases. CLO-6: Understanding diagnostic tests for disorders and infectious disease. CLO-7: Identify modern technologies that enable to study, detection and analyze all about medical fields. CLO-8: enhancing the scientific understanding of this instruments and its role in maintaining health and fighting disease.
Indicative Contents المحتويات الإرشادية	Theoretical lectures Introduction and definition. [3 hrs], Detection techniques : The Microscope : Light microscope. [3hrs], Electronic microscope [3 hrs]. Complement [3hr]. pH – Meter [3 hr]. Spectrophotometer [3hr]. Separation techniques : centrifugation technique [3hr]. Chromatography technique [3hr]. HPLC [3hr]. GC [3h]. Electrophoresis technique: Horizontal [3hr]. Vertical [3hr]. Electroporation and electrostimulation [3hr]. Polymerase chain reaction PCR [3hr]. Applications of PCR [3hr].

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents, through lectures, labs, interactive tutorials, and by types of practical activities.

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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
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)	1,2,5	CLO-1, CLO-2 , CLO-5, CLO-9 , CLO-12
	Assignments	2	10% (10)	7 and 12	CLO-4, CLO-6
	Projects	1	10% (10)		All
	Report	1	10% (10)		All
Summative assessment	Midterm Exam	2hr	10% (10)	7	CLO-1, CLO-2, CLO-3, CLO-4 and CLO-5
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

ملاحظة: في حالة كون المادة لا تحتوي على جانب عملي تضاف الدرجة الخاصة بها الى أي محور اخر يختاره استاذ المادة من تفصيلات الدرجة اعلاه

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction to medical instruments and biotechniques.
Week 2	Detection techniques : The Microscope : Light microscope.
Week 3	Electronic microscope
Week 4	Complement
Week 5	pH – Meter
Week 6	Spectrophotometer
Week 7	Separation techniques : centrifugation technique
Week 8	Chromatography technique
Week 9	HPLC
Week 10	GC
Week 11	Electrophoresis technique: Horizontal
Week 12	Vertical
Week 13	Electroporation and electrostimulation
Week 14	Polymerase chain reaction PCR
Week 15	Applications of PCR

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	
Week10	
Week 11	
Week 12	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	**Genetics** From Genes to Genomes Seventh edition by Michael L. Goldberg, Janice A. Fischer, Leroy Hood, Leland H. Hartwell, Published by McGraw Hill LLC, 1325 Avenue of the Americas, New York, NY 10121. Copyright ©2021. Introduction to Cell biology , Biotechnology , Biotechniques	NO
Recommended Texts	"Electroporation dynamics in biological cells subjected to ultrafast electrical pulses: A numerical simulation study". Joshi, R.; Schoenbach, K. (2000). Physical Review	No
Websites	https://alleninstitute.org/materials-library/?gclid=EAIaIQobChMIwNyp-9rw_wIVDJhRCh1qPgucEAAYASAAEgLs0vD_BwE	

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	Medical Laser Applications			Module Delivery	
Module Type	Core			☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	MPH-36128				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	3		Semester of Delivery	6	
Administering Department	Medical Physics		College	Science	
Module Leader	Rafid A. Abdullah		e-mail	rafidahmed@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification	Ph.D.	
Module Tutor	Rafid A. Abdullah		e-mail	rafidahmed@uomosul.edu.iq	
Peer Reviewer Name	Nadia Adel Saeed		e-mail	nadia.alhamdaney@uomosul.edu.iq	
Scientific Committee Approval Date	/06/2023		Version Number		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	MPH-35123	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	- To understand laser-tissue interaction. - To classify the medical lasers. - To identify the relation between absorption and laser spectrum wavelengths - To understand the advantages and disadvantages of laser therapies. - To clarify laser surgery in dermatology. - To clarify the laser eye surgery - To clarify the laser application in dentistry. - To understand general laser medical applications. - To learn how to use laser safety eyewear. - To understand and know the laser hazards and caution labels.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	CLO 1: Explain laser-tissue interaction. CLO2: Identify the relation between different types of medical applications and laser wavelengths and other laser parameters. CLO 3: Learn the principle works of laser scalpel and optical tweezer. CLO 4: Summarized the medical applications of lasers in dermatology. CLO 5: Summarized the medical applications of lasers in eye surgery. CLO 6: Summarized the laser dental applications. COL 7: Summarized the general laser medical applications. CLO 8: Explain how can cancer be treated by laser. CLO 9: Discuss the effects of LLL on human blood. CLO 10: Discuss the effect of LLL on human blood cells. CLO 11: Recognize laser safety eyewear. CLO 12: Recognize the laser hazards and laser caution labels.
Indicative Contents المحتويات الإرشادية	<u>Part A – Theoretical lectures</u> - *Laser-tissue interaction* Different types of lasers react differently with tissue. Laser-tissue interaction depends on several factors. Two laws are frequently applied; they describe the effect of either the thickness or concentration on absorption, respectively. They are commonly called Lambert's law and Beer's law. - *Relation between absorption and laser spectrum wavelengths* - *Effect of laser on tissue* When the laser is absorbed, it delivers energy to tissue. There are three major categories of interaction.

	- Advantages and disadvantages of laser therapy. In general, lasers are more precise than standard surgical tools but also there are some disadvantages of laser therapy. - *Laser scalpel* A laser scalpel is a type of surgery that uses a laser (in contrast to using a scalpel) to cut tissue. - *Laser tweezers (optical tweezers)* Optical tweezers (originally called single-beam gradient force traps) are scientific instruments that use a highly focused laser beam. - *Cancer treatment with lasers* Lasers can be used to shrink or destroy tumors (cancer) or precancerous growths. - *Laser surgery in the dermatology* The laser beam can gently vaporize and/or ablate the skin tissues to treat many skin conditions. Laser therapy is used to treat varied skin conditions. - *Laser hair removal* Laser hair removal is a procedure to remove unwanted body hair. It's non-invasive, which means it doesn't require any cuts to your skin. - *Cooling devices in laser therapy* Cooling devices and methods are now integrated into most laser systems to protect the epidermis, reducing pain and erythema and improving the efficacy of laser. *- Laser eye surgery* Laser vision surgery is a popular treatment for vision problems. It reduces or eliminates the need for eyeglasses or contact lenses. - *Laser procedures for refractive surgery:* - LASIK (laser in-situ keratomileusis) - PRK (photorefractive keratectomy) - LASEK (laser epithelial keratomileusis) - LTK (laser thermal keratoplasty) - *Treatment of proliferative diabetic retinopathy* Photocoagulation uses light to create a thermal burn in retinal tissue.

	- *Laser in dentistry* Lasers have been used in dentistry since 1994 to treat a number of dental problems such as tooth decay and gum disease. - *General applications of laser in medicine* - *Laser safety* Laser safety is the safe design, use and implementation of lasers to minimize the risk of laser accidents, especially those involving eye injuries. - *Laser safety eyewear* All eyewear must be labeled with wavelength range which are protected for and optical density. - *Laser safety standard and hazard evaluation by laser users* All users of lasers with exposed beams should understand the hazards associated with the laser they use Evaluate the control of hazards every time they operate the lasers. <u>Part B – Practical labs</u> Investigation of the work principle of optical microscope which is used widely in medical applications of laser. A complete Blood Count (CBC) is taken where it is used for analyzing the effect of laser with low intensity (LLL) on the human tissue and blood. Laser safety eyewear is an extremely important tool that should ware by laser users. The effect of LLL on the red and white blood of humans will be investigated and analyzed using CBC. Laser hair and tattoo removal will also be considered. Laser vision correction, with the LASIK, femtolaser, and SMILE will be investigated. Finally, explaining laser treatment for diabetic retinopathy.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about the medical applications of laser and its contents, theoretically and experimentally. Different tools and suitable devices will be used in laser laboratory to identify the medical laser therapy concepts explained in the theory class with experiments. This will be achieved through lectures, labs, and interactive tutorials and by types of practical activities. In addition, providing a curated list of recommended readings and online tools to support their learning.

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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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	3	10% (10)	3,8,12	CLO1, CLO2 , CLO3, CLO 7 , CLO 8, COL 10, COL 11
	Assignments	2	10% (10)	7 and 13	CLO 5, CLO 9
	Projects / Lab.	6	10% (10)	Continuous	All
	Report	0			
Summative assessment	Midterm Exam	2hr	10% (10)	7	CLO 1, CLO 2, CLO 3, CLO 4 and CLO 5
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري

	Material Covered
Week 1	Laser-tissue interaction
Week 2	Effect of laser on tissue
Week 3	Laser scalpel and laser tweezers (optical tweezers)
Week 4	Laser surgery in the dermatology
Week 5	Cancer treatment with lasers
Week 6	Laser surgery in the dermatology
Week 7	Laser hair removal and cooling devices in laser therapy
Week 8	Laser eye surgery
Week 9	Laser procedures for refractive surgery
Week 10	Treatment of proliferative diabetic retinopathy
Week 11	Laser in dentistry
Week 12	General applications of laser in medicine
Week 13	Laser safety
Week 14	Laser safety eyewear
Week 15	Laser safety standard and hazard evaluation by laser users

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Optical microscope work principle and medical applications.
Week 2	Complete Blood Count (CBC) for laser applications.
Week 3	Laser safety eyewear.
Week 4	Low-Level Laser (LLL) induced modification on human blood morphology.
Week 5	Effect of Low-Level Laser (LLL) on the human red blood cells.
Week 6	Effect of Low-Level Laser (LLL) on the human white blood cells.
Week 7	Remove hair by laser.
Week 8	Remove tattoo by laser.
Week 9	Applications of lasers in human skin lesions.
Week10	Laser vision correction, LASIK and femtolaser.

Week 11	Laser vision correction, SMILE.
Week 12	Laser treatment for diabetic retinopathy.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Qian Peng et al, "Lasers in medicine," IOP Publishing, 2008. Michael R. Hamblin et al, "Low-Level Light Therapy: Photobiomodulation," SPIE Press Bellingham, Washington USA, 2018. Stephan Wieneke and Christoph Gerhard, "Lasers in Medical Diagnosis and Therapy," IOP Publishing, 2018.	Yes yes No
Recommended Texts	- Orazio Svelto, "Principles of Lasers, Fifth Edition," Springer Science+Business Media, LLC 2010. "Laser Safety Manual," University of Florida, 2021. - Refractive Surgery Subspecialty Day 2022, The Annual Meeting of the International Society of Refractive Surgery (ISRS), resented by: The American Academy of Ophthalmology, Friday, Sept. 30, 2022	yes yes yes
Websites	http://www.ehs.ufl.edu/Rad/laser/ https://shorturl.at/aoxy1 https://www.ipgphotonics.com/en/applications/medical	

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 Parasitology			Module Delivery	
Module Type	Elective learning activity			☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	MPH-35024				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level	3		Semester of Delivery	5	
Administering Department	Medical physics		College	Sciences	
Module Leader	Sundus Natheer Al-Kallak		e-mail	profdrsundusalkallak@uomosul.edu.iq	
Module Leader's Acad. Title	Professor		Module Leader's Qualification	Ph.D.	
Module Tutor			e-mail		
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date	24/06/2023		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	Understand the concept of parasitism and parasite Identify the types of medical parasites Calcification of medical parasites Learn about the types of hosts Learn how parasites are transmitted to humans Types of parasites that infect human body systems Diagnosis of parasites Clinical symptoms of parasitic diseases Treating parasitic diseases Methods of prevention of parasitic diseases Method of diagnosis of parasites disease
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	CLO-1: Define the parasitism . CLO-2: Identify relation between parasites and human . CLO-3: Learn about the relation between the parasites . CLO-4: Summarized the Clinical symptoms of parasitic diseases CLO-5: Explain the life cycle of parasites . . CLO-6: explain the parasites prevention . CLO-7: learn about the treatment of parasites disease . Clo8- learn about the diagnosis of parasites disease .
Indicative Contents المحتويات الإرشادية	1.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	

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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
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	5	10% (10)	1,2,5	CLO-1, CLO-2 , CLO-5, CLO-9 , CLO-12
	Assignments	2	10% (10)	7 and 12	CLO-4, CLO-6
	Projects / Lab.	6	10% (10)	Continuous	All
	Report	0			
Summative assessment	Midterm Exam	2hr	10% (10)	7	CLO-1, CLO-2, CLO-3, CLO-4 and CLO-5
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

ملاحظة: في حالة كون المادة لا تحتوي على جانب عملي تضاف الدرجة الخاصة بها الى أي محور اخر يختاره استاذ المادة من تفصيلات الدرجة اعلاه

Delivery Plan (Weekly Syllabus)
المنهاج الأسبوعي النظري

	Material Covered
Week 1	Understand the concept of parasitism and parasite . .
Week 2	Identify the types of medical parasites
Week 3	Calcification of medical parasites
Week 4	Learn how parasites are transmitted to humans
Week 5	Diagnosis of parasites Clinical symptoms of parasitic diseases
Week 6	Treating parasitic diseases Methods of prevention of parasitic diseases Method of diagnosis of parasites disease
Week 7	Protozoa parasites disease
Week 8	Protozoa parasites disease

Week 9	Types of Protozoa parasites disease
Week 10	Digestive parasites disease
Week 11	Urinary parasites disease
Week 12	Blood parasites disease
Week 13	Skin parasites disease
Week 14	Parasitic reproductive system diseases
Week 15	diagnosis of parasites disease .

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Protozoa parasites disease
	.
Week 2	Protozoa parasites disease
Week 3	Types of Protozoa parasites disease
Week 4	Digestive parasites disease
Week 5	Urinary parasites disease
Week 6	Blood parasites disease
Week 7	Skin parasites disease
Week 8	Parasitic reproductive system diseases
Week 9	diagnosis of parasites disease
Week10	
Week 11	
Week 12	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Paniker 's Textbook of **Medical Parasitology**	Yes 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 physics 2			Module Delivery	
Module Type	**Core**			☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	MPH-48137				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	4		Semester of Delivery	8	
Administering Department	Medical physics 1		College	Sciences	
Module Leader	Qusay Khattab Omer		e-mail	qusaykhatab@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification	Ph.D.	
Module Tutor	Dr. Rafid A. Abdullah		e-mail	rafidahmed@uomosul.edu.iq	
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date	/06/2023		Version Number	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى

Prerequisite module	MPH-35019	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	Medical physicists having special expertise in methods for determining absorbed dose collaborate with the treating physician and the nuclear medicine technologist. If a patient undergoes a dosimetry study prior to radiopharmaceutical therapy, the patient may receive a small "dosimetry" amount of the therapeutic radiopharmaceutical prior to actual treatment. The nuclear medicine technologist will then collect three or more nuclear medicine images at different times after the dosimetry administration. In some cases, only one image will be collected. The treatment team may collect blood, urine, and stool samples. The medical physicist then uses the dosimetry measurements to calculate an appropriate treatment for the therapy, based on the patient's unique biodistribution and clearance patterns from the body. In this way, dosimetry ensures that the patient receives a personalized, safe, and effective treatment. .
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	CLO-1: INTRODUCTION, PROPERTIES OF DOSIMETERS CLO-2 IONIZATION CHAMBER DOSIMETRY SYSTEMS,, CLO-3: FILM DOSIMETRY, Radiographic film, Radiochromic film, CLO-4: LUMINESCENCE DOSIMETRY, Thermoluminescence, Thermoluminescent dosimeter systems, Optically stimulated luminescence systems,,. CLO-5: SEMICONDUCTOR DOSIMETRY, Silicon diode dosimetry systems,, CLO-6 OTHER DOSIMETRY SYSTEMS, Alanine/electron paramagnetic resonance dosimetry system, Plastic scintillator dosimetry system, Diamond dosimeters, Gel dosimetry systems,, PRIMARY STANDARDS, Primary standard for air kerma in air, Primary standards for absorbed dose to water, Ionometric standard for absorbed dose to water, SUMMARY OF SOME COMMONLY USED DOSIMETRIC SYSTEMS, CLO-7: **Part II: Dosimetry of laser emission,** Tissue optics,Laser dosimetry concept,Laser output power,Laser parameters related to dosimetry Laser dose for human tissues,Calculating of laser dose,Dosimetry for low-level laser therapy (LLLT), CLO-8: Laser dose for different conditions related to LLLT,Laser dose and eye class protected

Indicative Contents المحتويات الإرشادية	Part A – Theoretical lectures INTRODUCTION, ,PROPERTIES OF DOSIMETERS ,Accuracy and precision,, Type A standard uncertainties, Type B standard uncertainties, , Combined and expanded uncertainties, Linearity, Dose rate dependence,, Energy dependence, Directional dependence, Spatial resolution and physical size,, Readout convenience,, Convenience of use [5 hrs], IONIZATION CHAMBER DOSIMETRY SYSTEMS,, Chambers and electrometers,, Cylindrical (thimble type) ionization chambers,, Parallel-plate (plane-parallel) ionization chambers,, Brachytherapy chambers,, Extrapolation chambers, [*3* hrs], FILM DOSIMETRY, Radiographic film, Radiochromic film, [*3* hrs] LUMINESCENCE DOSIMETRY, Thermoluminescence, Thermoluminescent dosimeter systems, Optically stimulated luminescence systems, [3hr] SEMICONDUCTOR DOSIMETRY, Silicon diode dosimetry systems [2hr] MOSFET dosimetry systems, OTHER DOSIMETRY SYSTEMS, Alanine/electron paramagnetic resonance dosimetry system, Plastic scintillator dosimetry system, Diamond dosimeters, Gel dosimetry systems. [2hr]. PRIMARY STANDARDS, Primary standard for air kerma in air, Primary standards for absorbed dose to water, Ionometric standard for absorbed dose to water,[4hr] SUMMARY OF SOME COMMONLY USED DOSIMETRIC SYSTEMS, [3h].
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expand students' perceptions about this science and its contents. In addition to the use of various tools and experiments in medical physics through observations and physical concepts in the application. This will be achieved through lectures, laboratories, interactive educational programs and types of practical activities.

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	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
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	5	10% (10)	1,2,5	CLO-1, CLO-2 , CLO-5, CLO-9 , CLO-12
	Assignments	2	10% (10)	7 and 12	CLO-4, CLO-6
	Projects / Lab.	6	10% (10)	Continuous	All
	Report	0			
Summative assessment	Midterm Exam	2hr	10% (10)	7	CLO-1, CLO-2, CLO-3, CLO-4 and CLO-5
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

ملاحظة: في حالة كون المادة لا تحتوي على جانب عملي تضاف الدرجة الخاصة بها الى أي محور اخر يختاره استاذ المادة من تفصيلات الدرجة اعلاه

Delivery Plan (Weekly Syllabus)
المنهاج الأسبوعي النظري

	Material Covered
Week 1	INTRODUCTION, PROPERTIES OF DOSIMETERS , Accuracy and precision,, Type A standard uncertainties, Type B standard uncertainties, PRIMARY STANDARDS, Primary standard for air kerma in air,
Week 2	Combined and expanded uncertainties, Linearity, Dose rate dependence,, Energy dependence, Directional dependence, Spatial resolution and physical size, Readout convenience,, Convenience of use
Week 3	IONIZATION CHAMBER DOSIMETRY SYSTEMS,, Chambers and electrometers, SEMICONDUCTOR DOSIMETRY, Silicon diode dosimetry systems,
Week 4	Cylindrical (thimble type) ionization chambers, MOSFET dosimetry systems
Week 5	Brachytherapy chambers,, Extrapolation chambers, OTHER DOSIMETRY SYSTEMS, Alanine/electron paramagnetic resonance dosimetry system,
Week 6	FILM DOSIMETRY, Radiographic film, Radiochromic film, Plastic scintillator dosimetry system, Diamond dosimeters, Gel dosimetry systems, Thermoluminescent dosimeter systems, Optically stimulated luminescence systems
Week 7	LUMINESCENCE DOSIMETRY, Thermoluminescence, Primary standards for absorbed dose to water, Ionometric standard for absorbed dose to water, SUMMARY OF SOME
Week 8	COMMONLY USED DOSIMETRIC SYSTEMS,
Week 9	**Part II: Dosimetry of laser emission**

Week 10	Tissue optics
Week 11	Laser dosimetry concept
Week 12	Laser output power
Week 13	Laser parameters related to dosimetry, Dosimetry for low-level laser therapy (LLLT) , Laser dose for different conditions related to LLLT
Week 14	Laser dose for human tissues, Calculating of laser dose
Week 15	Laser dose and eye class protected

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	
Week10	
Week 11	
Week 12	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Radiation Dosimetry Source International Atomic Energy Agency	Yes

	Company J. IZEWSKA Division of Human Health, International Atomic Energy Agency, Vienna G. RAJAN Medical Physics and Safety Section, Bhabha Atomic Research Centre, Mumbai, Maharashtra, India INTERNAL RADIATION DOSIMETRY Otto G. Rabbe Medical physics publishing Madison, Wisconsin	Yes
Recommended Texts	CONCEPTS OF RADIATION DOSIMETRY KENNETH R. KASE AND WALTER R. NELSON STANFORD LINEAR ACCELERATOR CENTER STANFORD UNIVERSITY Stanford, California 94305 PREPARED FOR THE U. S. ATOMIC ENERGY	Yes
Websites	https://www-naweb.iaea.org/NAHU/DMRP/documents/Chapter3.pdf https://semmelweis.hu/sugarvedelem/files/2016/04/internal_radiation.pdf https://www.slac.stanford.edu/pubs/slacreports/reports09/slac-r-153.pdf	

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-35019				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	3		Semester of Delivery	5	
Administering Department	Medical physics		College	Sciences	
Module Leader	Qusay Khattab Omer		e-mail	qusaykhatab@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification	Ph.D.	
Module Tutor	Dr. Mahmoud Ahmed Mohammed		e-mail	drmahmoudahmed@uomosul.edu.iq	
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date	/06/2023		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	Introduction to medical physics, Nature and effects of ionizing radiation on biomolecules structures, living cells and tissues. Genetic effects and methods of radiation protection. Radiobiological implications of diagnostic and therapeutic radiation , Medical physics principles underlying medical imaging and discusses the interaction of different kinds of radiation with biological matter.. Modalities covered: x-rays, computed tomography, nuclear medicine, ultra-sound, and magnetic resonance imaging. and positron emission tomography . Topics include signal generation, detection and the associated mathematics to produce medically useful images, and factors affecting resolution and sensitivity. Relevant radiotherapy methods include the gamma knife, brachytherapy, and proton-beam therapy. Important & Principles of biomedical applications - C.T.scan – ultra .sonography. NMR .
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	CLO-1: Introduction to medical physics. CLO-2: Nature and effects of ionizing radiation on biomolecules structures CLO-3: living cells and tissues. Genetic effects and methods of radiation protection, Application for calculation of the imaging . CLO-4: nuclear medicine, ultra-sound,. CLO-5: Modalities covered: x-rays, computed tomography, CLO-6 Relevant radiotherapy methods include the gamma knife, CLO-7: brachytherapy, and proton-beam therapy. CLO-8: Important & Principles of biomedical applications - C.T.scan – ultra .sonography. NMR and the and. NMR
Indicative Contents المحتويات الإرشادية	Part A – Theoretical lectures Adescription of medical physics Ionizing radiation's nature and effects on live cells, tissues, and biomolecule structures.. [5 hrs], radiation protection techniques and its effects on genetics [*3* hrs], . The interaction of various types of radiation with biological matter is discussed, as well as the radiobiological implications of diagnostic and therapeutic radiation [*3* hrs] medical physics principles underpinning medical imaging. X-rays, computed tomography, nuclear medicine, ultrasound [3hr] magnetic resonance imaging are among the modalities covered. positron emission tomography, among others. [2hr] Signal creation, detection, the mathematics required to produce images with medical value, and factors affecting resolution and sensitivity are some of the topics covered. [2hr]. Gamma knife, brachytherapy. [3hr] proton-beam therapy are pertinent radiation techniques [4hr] Important & Principles of Ultrasonography and CT Scanning in Biomedicine and NMR [3h].

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expand students' perceptions about this science and its contents. In addition to the use of various tools and experiments in medical physics through observations and physical concepts in the application. This will be achieved through lectures, laboratories, interactive educational programs and types of practical activities.

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
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	125		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	5	10% (10)	1,2,5	CLO-1, CLO-2 , CLO-5, CLO-9 , CLO-12
	Assignments	2	10% (10)	7 and 12	CLO-4, CLO-6
	Projects / Lab.	6	10% (10)	Continuous	All
	Report	0			
Summative assessment	Midterm Exam	2hr	10% (10)	7	CLO-1, CLO-2, CLO-3, CLO-4 and CLO-5
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

ملاحظة: في حالة كون المادة لا تحتوي على جانب عملي تضاف الدرجة الخاصة بها الى أي محور اخر يختاره استاذ المادة من تفصيلات الدرجة اعلاه

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction to medical physics, Nature and effects of ionizing radiation on biomolecules structures
Week 2	living cells and tissues. Genetic effects and methods of radiation protection. Radiobiological implications of diagnostic and therapeutic radiation
Week 3	Medical physics principles underlying medical imaging and discusses the interaction of different kinds of radiation with biological matter.
Week 4	Modalities covered: x-rays, computed tomography,
Week 5	positron emission tomography ,application with type of disease, dose rate
Week 6	Signal generation, detection.
Week 7	The associated mathematics to produce medically useful images, and factors affecting resolution and sensitivity
Week 8	Relevant radiotherapy methods include the gamma knife
Week 9	Brachytherapy application with acute and chronic dose rate
Week 10	Proton-beam therapy application as dose accelerations type of treatment
Week 11	Important & Principles of biomedical applications
Week 12	Microwave application as treatments , type of disease , dose rate
Week 13	Ultra as therapy type of disease treatments ,.sonography
Week 14	Neutron therapy , application with type of cancers ,
Week 15	NMR application and nuclear medicine,

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	
Week10	
Week 11	
Week 12	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	**Medical Imaging: Essentials for Physicians** Author(s): Anthony B. Wolbarst PhD,, Patrizio Capasso MD, DSc,, Andrew R. Wyant MD, First published:2 April 2013 Print ISBN:9780470505700 |Online ISBN:9781118480267 |DOI:10.1002/9781118480267	Yes
	Diagnostic radiology physics : a handbook for teachers and students. — Vienna D.R. Dance S. Christofides A.D.A. Maidment I.D. McLean K.H. Ng Technical Editors : International Atomic Energy Agency, 2014. p. ; 24 cm. STI/PUB/1564 ISBN 978–92–131010–1	Yes
Recommended Texts	**The Essential Physics of Medical Imaging, 3rd Edition** **By** Jerrold T. Bushberg, J. Anthony Seibert, Edwin M. Leidholdt Jr. and John M. Boone	Yes

	2018..	
Websites	https://www.wiley.com/en-sg/Medical+Imaging:+Essentials+for+Physicians-p-9780470505700 https://www.google.com/search?q=Diagnostic+radiology+physics+%3A+a+handbook+for+teachers+and+students.+%E2%80%94+Vienna&sxsrf=APwXEdep4g-coGLgaHMG7Q2pFAbcgW8now%3A1687216331430&ei=y-CQZIvxGbbc7_UPpLOo2Aw&ved=0ahUKEwjLguDQutD_AhU27rsIHaQZCssQ4dUDCA8&uact=5&oq=Diagnostic+radiology+physics+%3A+a+handbook+for+teachers+and+students.+%E2%80%94+Vienna&gs_lcp=Cgxnd3Mtd2l6LXNlcnAQAzIHCCMQ6gIQJzIHCCMQ6gIQJzIHCCMQ6gIQJzIHCCMQ6gIQJzIHCCMQ6gIQJzIHCCMQ6gIQJzIHCCMQ6gIQJzIHCCMQ6gIQJ0oECEEYAFCPDViPDWCoFWgBcAB4AIABAIgBAJIBAJgBAKABAaABArABCsABAQ&sclient=gws-wiz-serp	

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 plants and toxicology**			Module Delivery	
Module Type	**E**			☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	**MPH-36030**				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	3		Semester of Delivery	6	
Administering Department	Medical physics		College	Science	
Module Leader	Rana Tariq Yahya		e-mail	drranaaltaee@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification	Ph.D.	
Module Tutor	Hiba Khaleel Saeed		e-mail	Hiba.khaleel@uomosul.edu.iq	
Peer Reviewer Name	Name		e-mail	E-mail	
Scientific Committee Approval Date	/06/2023		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 ***يتم كتابة اهم الأهداف التي تغطيها هذه المادة الدراسية بشكل جمل او فقرات توضح المواضيع التي سيتم التطرق اليها و دراستها و معالجتها)***	1. Clarification of how biology can make significant contributions to a other science in life. 2. Identify cell , organisms- which are useful in life. 3. This course deals with the basic concept of the most important organisms aspects of this module. 4. Learn about the most important scientific terms (cell) and their definitions related to this topic. 5. To understand the impact of these types of cells in level of organisms. 6. To perform different medical biology applications.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية ***يتم كتابة اهم المُخرجات او الناتج و الكَم العلمي الذي يتم استخدامه للتدريس في هذه المادة على شكل أسئلة أساسية تخص منهاج المادة بأكمله و يجب ان لا تقل هذه المُخرجات من ناحية العدد عن 6 مُخرجات و يفضل ان تكون بعدد أسابيع الدراسة.***	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. CLO-1. Create a list with description, the level of organisms CLO-2. Evaluate definition for the various term of prokaryotic and eukaryotic with -the differences between them. CLO-3. Analyzed the general mean of biology, and -organisms- and importance in life. CLO-4. Apply the molecular composition of cells CLO-5.Understand the meaning of water, pH scale , buffer , acidity and basicity. CLO-6. Remember the organic compounds of the cells and list types of nucleic acids and their molecular structure and their function . .
Indicative Contents المحتويات الإرشادية ***يتم كتابة اهم العناوين الرئيسية للمواضيع بشكل متسلسل و التي تشمل كافة الفقرات التي تحتويها مع إدراج عدد الساعات المطلوبة لتنفيذ كل فقرة.***	Indicative content includes the following. <u>Part A – Theoretical lectures</u> Introduction, Medical plants (3hrs), Types of medical plants, classification of medical plants (3hrs) , Plant medical extracts, types of plant extracts, methods of preparation of plant extracts(4 hrs). Pathways of metabolism in plants [*4* hrs], ,Types of stages of metabolism (3hrs), primary products of plants, roles of primary plants products((hrs) secondary metabolism of medical plants(l3hrs) , products of secondary metabolites [*4* hrs], Types of secondary metabolites products (3 hrs) , classification of secondary medical metabolites(3hrs), Alkaloids, flavonoids, terpenoids, glycosides (4 hrs), medical benefits of secondary metabolites(3 hrs) Biotechniques to identification , isolation , separation, purification of medical products (6hrs), chromatographic methods, principle of chromatographic methods, types of chromatographic methods (4 hrs).

	Disadvantages of medical plants, harmful of plants(3hrs), detection the harmful dosses of medical plants (3 hrs). Green bacterial toxins, Cyanobacterial as natural therapeutics and pharmaceutical potential role(4 hrs), Discovery and nomenclature of cyanobacteria, classification of cyanobacteria (3 hrs), basic of classification of cyanobacterial toxins , anatoxin is an example of cyanobacterial toxins (3 hrs), anticancer drug development from cyanobacteria , modern techniques for the detection of green bacterial toxins (4 hrs) . Revision problem classes [3 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies *يتم **كتابة ملخص** الاستراتيجية الرئيسية التي سيتم تبنيها في تقديم هذه المادة*	Expanding students' perceptions about this science and its contents it includes that help in stratigraphic, paleoecologic, and paleoclimatic analysis. In addition to the use of different microscopes in distinguishing the types of microfossils through observations of the external and internal structures and their diagnosis. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods for microfossils and 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
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	2	20% (10)	6 and 11	CLO-1, CLO-2 and CLO-10
	Assignments	0			
	Projects /	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	CLO-5, CLO-8
Summative assessment	Midterm Exam	2hr	10% (10)	8	CLO-1 ,CLO-2 and CLO-3
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction, Medical plants , Types of medical plants, classification of medical plants .
Week 2	Plant medical extracts, types of plant extracts, methods of preparation of plant extracts.
Week 3	Pathways of metabolism in plants ,Types of stages of metabolism, primary products of plants, roles of primary plants products.
Week 4	secondary metabolism of medical plants , products of secondary metabolites.
Week 5	Types of secondary metabolites products , classification of secondary medical metabolites, medical benefits of secondary metabolites.
Week 6	General description of Alkaloids, flavonoids, terpenoids, glycosides
Week 7	Biotechniques to identification , isolation , separation, purification of medical products.
Week 8	Chromatographic methods, principle of chromatographic methods, types of chromatographic methods.

Week 9	Disadvantages of medical plants, harmful of plants, detection the harmful dosses of medical plants.
Week 10	Green bacterial toxins, Cyanobacterial as natural therapeutics and pharmaceutical potential role(4 hrs), Discovery and nomenclature of cyanobacteria, classification of cyanobacteria (3 hrs), basic of classification of cyanobacterial toxins , anatoxin is an example of cyanobacterial toxins (3 hrs), anticancer drug development from cyanobacteria , modern techniques for the detection of green bacterial toxins (4 hrs) .
Week 11	Green bacterial toxins, Cyanobacterial as natural therapeutics and pharmaceutical potential role(4 hrs), Discovery and nomenclature of cyanobacteria, classification of cyanobacteria (3 hrs), basic of classification of cyanobacterial toxins , anatoxin is an example of cyanobacterial toxins (3 hrs), anticancer drug development from cyanobacteria , modern techniques for the detection of green bacterial toxins (4 hrs) .
Week 12	Green bacterial toxins, Cyanobacterial as natural therapeutics and pharmaceutical potential role, Discovery and nomenclature of cyanobacteria.
Week 13	Classification of cyanobacteria, basic of classification of cyanobacterial toxins.,
Week 14	Anatoxin is an example of cyanobacterial toxins, anticancer drug development from cyanobacteria. .
Week 15	Modern techniques for the detection of green bacterial toxins (4 hrs) .

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	

Week10	
Week 11	
Week 12	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Hassan. B.A.R.(2016).Medicinal Plants (Importance and Uses). Pharmaceut Anal Acta. Vol.3.	No
Recommended Texts	.Anand,U. ; Jacobo-Herrera, N. ; Altemimi , A. and Lakhssassi, N.(2019). A Comprehensive Review on Medicinal Plants as Antimicrobial Therapeutics: Potential Avenues of Biocompatible Drug Discovery. Metabolites, 9, 258.	No
Websites	Abebe, W.(2002) . Herbal medication : potential for adverse interaction with analgesic drugs .Therapeutics.	

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					
Module Title	Medical termanology			Module Delivery	
Module Type	S			☒ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	MPH-36125				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level	3		Semester of Delivery	6	
Administering Department	Medical Physics		College	Science	
Module Leader	Younis Hamad Ahmed		e-mail	Younis.h81@uomosul.edu.iq	
Module Leader's Acad. Title	Teaching Assistant		Module Leader's Qualification	MA	
Module Tutor			e-mail		
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date	12/6/2023		Version Number	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	U0M-102	Semester	2
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	This course is aimed to increase students' knowledge in terms of different vocabulary, phrases, clauses and medical physics-related terminology. It enables the learners to express what they would like to communicate while they are still studying at college or even when they get their potential jobs. Also, this course encourages the learners to read books, articles and browse department-related websites to search for information needed.
Module Learning Outcomes	- Differentiating between general English communications and scientific English communication - Learning commonly-used terminology in the field of Medical Physics. - Understanding specific phrases & expressions written or spoken. - Increasing learners' confidence in reading books and research conducted by scholars around the world. - Motivating learning strategies for learners and improving their autonomous skills. - Evaluating their language skills and benefitting from feedback given throughout the course.
Indicative Contents	Introduction about communication in English language, followed by general English information. Also, explaining some strategies to follow by earners to progress in the subject [8hrs]. Clarifying the English language skills in general and moved to vocabulary and its importance in English language [6]. Differentiating between parts of speech and showing the difference between general English and scientific English [3]. Detailing the main skills; writing, licensing, reading and speaking and doing some practice sessions with feedback sessions where needed [9]. Feedback and error corrections practices with some review over the whole course [4hrs].

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Engaging learners in the learning process is essential . Modern learning processes depend hugely on collaborative work by students. Also, focusing on some quick quizzes is seen as successful strategy though. Also, it is known that homework plays important roles in improving learners' academic records. Paying attention to the point that every class has mixed-ability learners.

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
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	4	20% (20)	2,3,5 and 6	LO #1, #2 and #5 and #6
	Assignments	4	10% (10)	2,4,7 and 8	LO #2, #3, #5and #6
	Projects / Lab.				
	Report	4	10% (10)	3,4,6 and 8	LO #3, #4, #5 and #6
Summative assessment	Midterm Exam	2hr	10% (10)		
	Final Exam	3hr	50% (50)		
Total assessment					100% (100 Marks)

ملاحظة: في حالة كون المادة لا تحتوي على جانب عملي تضاف الدرجة الخاصة بها الى أي محور اخر يختاره استاذ المادة من تفصيلات الدرجة اعلاه

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	An introduction on general English language
Week 2	Understanding communication in English language
Week 3	Delivering study strategies for learners throughout the whole course
Week 4	Methods of improving English language skills

Week 5	An introduction about vocabulary in English language in general
Week 6	Teaching some skills required to increase and improve learners' vocabulary in the course.
Week 7	Teaching learners different phrases, clauses and expressions commonly-used in the field.
Week 8	Doing useful class activity in order to encourage collaborative work between students.
Week 9	Teaching writing skills and focusing on writing short paragraphs correctly.
Week 10	Doing feedback sessions and focusing on error corrections
Week 11	Teaching listening skills and assigning homework individually and collaboratively.
Week 12	Teaching reading skills in general and focusing on necessary strategies required.
Week 13	Doing some reading practice inside classroom and giving some feedback and error correction.
Week 14	Teaching speaking skills and encouraging group sessions and course-related discussions
Week 15	Reviewing some main topics from the past weeks and doing quick re-capping for the course.

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	
Week10	
Week 11	
Week 12	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?

Required Texts	Monika, K. (2014). *An Introduction to Basic Medical English Terminology*. Debrecen.	NO
Recommended Texts	Quang, N. (2009). *English for Medical Students*. HUE	NO
Websites	https://pdfcoffee.com/qdownload/english-for-medical-students-coursebook-pdf-free.html https://l.facebook.com/l.php?u=https%3A%2F%2Fcompress-pdf.xiyu.info	

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 Virology				
Module Type	E	☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar			
Module Code	MPH-36030				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level	3		Semester of Delivery	6	
Administering Department	Medical physics		College	Sciences	
Module Leader	Zeyad Thonnoon Al-Rassam		e-mail	dr.zeyadalrassam@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification	Ph.D.	
Module Tutor	Hiba Khaleel Saeed		e-mail	Hiba.Khaleel@uomosul.edu.iq	
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date	/06/2023		Version Number		

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	The study of medical virology is an important field in the medical and biological sciences, this course shows how medical virology can contribute to solving a wide range of scientific problems in the field of medical physics. This course also deals with clarifying the basic concept of medical virology and identifying the relationship of virology with medical applications. In addition to understanding viral diseases and their crucial role in public health, furthermore their roles in developing and adding new applications to medical physics. At the end of the course, students will have an understanding of viral diseases, develop prevention and treatment strategies, and safeguard public health, while Medical virology concepts, techniques, and clinical applications. This will be achieved through theoretical lectures, lessons, scientific visits, and other extracurricular activities.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The study of medical virology encompasses various learning outcomes that aim to provide students with a comprehensive understanding of viruses and their impact on human health. CLO-1: Knowledge of viral structure and replication: Students should acquire a solid understanding of the structure, classification, and replication mechanisms of different types of viruses. CLO-2: Understanding viral pathogenesis: Students should learn how viruses cause diseases and the underlying mechanisms of viral pathogenesis. CLO-3: Familiarity with common viral diseases: Students should gain knowledge about the epidemiology, clinical manifestations, diagnosis, and treatment of major viral diseases affecting humans. CLO-4: Laboratory techniques in virology: Students should develop practical skills in virology laboratory techniques. CLO-5: Understanding antiviral therapies and vaccines: Students should learn about the principles and mechanisms of antiviral drugs used for the treatment of viral infections. CLO-6: Critical analysis of scientific literature: Students should develop the ability to critically analyze scientific literature related to virology. CLO-7: Communication and collaboration: Students should develop effective communication skills to convey scientific information related to virology. CLO-8: Role of viruses as vectors in genetic engineering and gene therapy.
Indicative Contents المحتويات الإرشادية	Theoretical lectures Recognition of viruses [3 hrs]. Structure of Viruses [3 hrs]. Characteristics of viruses [3 hrs]. Classification of viruses [3 hrs]. Viral production/replication [3 hrs]. The interaction between the virus and Prokaryotic host cells. [3 hrs]. The interaction between the virus and Eukaryotic host cells. [3 hrs]. Coronavirus [3 hrs]. Herpesviridae [3 hrs]. Orthomyxoviridae [3 hrs]. Paramyxoviridae [3 hrs]. Hepatitis viruses [3 hrs]. Crimean-Congo haemorrhagic fever (CCHF) virus [3 hrs]. The human immunodeficiency virus [3 hrs]. Viruses and Cancer [3 hrs].

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents . This will be achieved through lectures, labs, and interactive tutorials and by types of practical activities.

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
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	2	10% (10)	1,2,5	CLO-1, CLO-2 , CLO-5, CLO-9 , CLO-12
	Assignments	2	10% (10)	7 and 12	CLO-4, CLO-6
	Projects	1	10% (10)		All
	Report	1	10% (10)		All
Summative assessment	Midterm Exam	2hr	10% (10)	7	CLO-1, CLO-2, CLO-3, CLO-4 and CLO-5
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

ملاحظة: في حالة كون المادة لا تحتوي على جانب عملي تضاف الدرجة الخاصة بها الى أي محور اخر يختاره استاذ المادة من تفصيلات الدرجة اعلاه

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Recognition of viruses
Week 2	Structure of Viruses
Week 3	Characteristics of viruses
Week 4	Classification of viruses
Week 5	Viral production/replication
Week 6	The interaction between the virus and Prokaryotic host cells.
Week 7	The interaction between the virus and Eukaryotic host cells.
Week 8	Coronavirus
Week 9	Herpesviridae
Week 10	Orthomyxoviridae
Week 11	Paramyxoviridae
Week 12	Hepatitis viruses
Week 13	Crimean-Congo haemorrhagic fever (CCHF) virus
Week 14	The human immunodeficiency virus
Week 15	Viruses and Cancer

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	
Week10	
Week 11	
Week 12	

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**Principles of Virology** Multi-Volume (ASM Books) 5th Edition by Jane Flint , Vincent R. Racaniello , Glenn F. Rall , Theodora Hatziioannou , Anna Marie Skalka , ASM PREES WILEY, 2020	no
Recommended Texts	. **Fenner and White's Medical Virology** Fifth Edition, Christopher J. Burrell, Colin R. Howard, Frederick A. Murphy Academic Press is an imprint of Elsevier 2016	No
Websites	https://www.amazon.com/Principles-Virology-Multi-ASM-Books/dp/1683670329/ref=sr_1_1?crid=1XZBRBZGEXOIO&keywords=Medical+Virology&qid=1687608920&s=books&sprefix=medical+virology+%2Cstripbooks-intl-ship%2C599&sr=1-1 https://www.amazon.com/Fenner-Medical-Virology-Christopher-Burrell/dp/012375156X/ref=tmm_hrd_swatch_0?_encoding=UTF8&qid=1687608815&sr=1-3	

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	Molecular Biology			Module Delivery	
Module Type	**Core**			☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	MPH-24114				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	2		Semester of Delivery	4	
Administering Department	Medical Physics		College	Science	
Module Leader	Talal Sabhan Salih		e-mail	talal.salih@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification	Ph.D.	
Module Tutor	Assel AbdulMunam (Ph. D.)		e-mail	aseelallayla@uomosul.edu.iq	
Peer Reviewer Name	Jassim Mohamed Dalia Abidalalah Noor Mazin		e-mail	jasim.yaseen@uomosul.edu.iq dalia.rahawi@uomosul.edu.iq noormazin@uomosul.edu.iq	
Scientific Committee Approval Date	/06/2023		Version Number	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	MPH-1216	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 module seeks to understand how molecular biology can make significant contributions to a wide range of scientific benefits in medical physics sciences. This course deals with the basic concept of nucleic acids in molecular biology. Learn about the most fundamental concepts of important topics in modern biology such as gene functions and genetic disorder and related diseases. Moreover, the module tries to understand and comprehend the impact of molecular biology processes on medical physics science. At the end of this course, students should be able to demonstrate a clear understanding of the facts and basic concepts of molecular biology which are covered in lectures. This will be achieved through, theoretical lectures, tutorials and laboratory
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1: Define the basic concepts of molecular biology. 2: Understanding the most different structure and organization between Eukaryotes and Prokaryotes at the gene level. 3: Learn about the gene functions in human DNA and the relationship of homologous genes in different living organisms. 4: Learn about how the DNA replication in Eukaryotes occurs and the most important stages that are involved in. 5: Explain the most important stages that are involved in DNA transcription and RNA translation through the gene expression. 6: Explain what the gene mutation are and how do mutations occur at the gene and chromosomal levels. 7: Define the types of mutagenesis in the DNA and the most related DNA repair systems. 8: Understanding the types of genetic disorder and gene therapy processes in Humans. 9: Exploring the most up to date bioinformatics tools that are applied in genetic diseases identification. 10: Know how to determine the age of human utilizing the DNA properties that can facilitate so many medical and forensic tasks to be solved. 11: Learn about the revolutionizing genetic analysis: Polymerase Chain Reaction (PCR).

	12: Explain the gene cloning vectors: exploring plasmids and bacteriophages as Genetic Tools. 13: Know about plasmid replication and regulation: unravelling the mechanisms of control.
Indicative Contents المحتويات الإرشادية	Part A – Theoretical lectures Introduction to Genetics: Understanding the Basics [2 hrs]. Unveiling DNA as the Genetic Material: Insights from Bacteria and Virus Experiments [2 hrs]. Gene structure and organisation in Eukaryotes and Prokaryotes [3 hrs]. Gene Functions and Homologous Genes [3 hrs]. DNA Replication in Eukaryotes [5 hrs]. Gene Expression-Transcription and Translation [3 hrs]. Biological, Chemical and Physical Mutagenesis [4 hrs]. Genetic disorder and gene therapy in humans. Bioinformatics tools for genetic diseases identification [2 hrs]. Human Age determination using the DNA analysis [3 hrs]. DNA Replication in Prokaryotes [4 hrs]. Revolutionizing Genetic Analysis: Polymerase Chain Reaction (PCR) [3 hrs]. Gene Cloning Vectors: Exploring Plasmids and Bacteriophages as Genetic Tools [3 hrs]. Plasmid Replication and Regulation: Unravelling the Mechanisms of Control [2 hrs]. Part B – Practical labs DNA extraction and purification from different living cells, plasmid extraction: Isolating DNA from bacterial cells, quantitative and qualitative analysis of DNA and amplifying segments of DNA using Polymerase Chain Reaction (PCR) technique [18 hrs]. Gel electrophoresis of DNA bands, DNA sequence homology analysis using BLAST tool and restriction enzymes: nature's molecular scissors for DNA manipulation [16 hrs].

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about molecular biology science and its contents. In addition to the use of different methods and experiments in expanding the knowledge of modern molecular biology through doing related lab experiments and results analysis. This will be achieved through lectures, labs, and interactive tutorials and by types of practical activities.

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

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	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	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

ملاحظة: في حالة كون المادة لا تحتوي على جانب عملي تضاف الدرجة الخاصة بها الى أي محور اخر يختاره استاذ المادة من تفصيلات الدرجة اعلاه

Delivery Plan (Weekly Syllabus)
المنهاج الأسبوعي النظري

	Material Covered
Week 1	Introduction to Genetics: Understanding the Basics.
Week 2	Unveiling DNA as the Genetic Material: Insights from Bacteria and Virus Experiments.
Week 3	Gene structure and organization in Eukaryotes and Prokaryotes.
Week 4	Gene Functions and Homologous Genes.
Week 5	DNA Replication in Eukaryotes.
Week 6	Gene Expression- DNA Transcription and RNA Translation.
Week 7	Gene mutation and how do mutations occur?.
Week 8	Biological, Chemical and Physical Mutagenesis and DNA repair system.
Week 9	Genetic disorder and gene therapy in humans.
Week 10	Bioinformatics tools for genetic diseases identification.

Week 11	Human Age determination using the DNA analysis.
Week 12	DNA Replication in Prokaryotes
Week 13	Revolutionizing Genetic Analysis: Polymerase Chain Reaction (PCR).
Week 14	Gene Cloning Vectors: Exploring Plasmids and Bacteriophages as Genetic Tools.
Week 15	Plasmid Replication and Regulation: Unravelling the Mechanisms of Control.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: DNA Extraction and Purification from Different Living Cells.
Week 2	Lab 2: Plasmid Extraction: Isolating DNA from Bacterial Cells.
Week 3	Lab 3: Quantitative and Qualitative analysis of DNA.
Week 4	Lab 4: Amplifying Segments of DNA using Polymerase Chain Reaction (PCR) Technique.
Week 5	Lab 5: Gel Electrophoresis of DNA bands.
Week 6	Lab 6: DNA Sequence Homology Analysis using BLAST tool.
Week 7	Lab 7: Restriction Enzymes: Nature's Molecular Scissors for DNA Manipulation.
Week 8	Lab 8:
Week 9	Lab9:
Week10	Lab 10:
Week 11	Lab 11:
Week 12	Lab 12:

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Tropp, B. E. (2022). *Principles of molecular biology*. Jones & Bartlett Publishers. Trasacon, Inc., USA.	Yes Yes

	Baker, T. A., Bell, S. P., Gann, A., Levine, M., Losick, R., & Inglis, C. H. S. L. P. (2008). Molecular biology of the gene. San Francisco, CA, USA: Pearson/Benjamin Cummings.	
Recommended Texts	Davis, L. (2012). *Basic methods in molecular biology*. Elsevier..	No No
Websites	https://books.google.iq/books?hl=en&lr=&id=VNWyEAAAQBAJ&oi=fnd&pg=PP1&dq=genomes&ots=weMoghD-KW&sig=CAiz3FVarQQPNLC0v2wHR58on7w&redir_esc=y#v=onepage&q=genomes&f=false	

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.