وصف البرنامج الاكاديمي

اسم الجامعة : جامعة العلوم العراقية

الكلية : كلية العلوم

القسم العلمي : الفيزياء الطبية

اسم البرنامج الاكاديمي او المهني:

بكالوريوس علوم في الفيزياء الطبية

النظام الدراسي:

نظام المقررات الدراسية

تاريخ اعداد الملف 2026/9/20

تاريخ ملء الملف 2026/9/20

اللجنة المركزية لضمان الجودة لمسار بولونيا

التوقيع :

اسم العضو م . د . كوثر عبود

التوقيع:

اسم العضو ا.م.د. رنا عبدالرحمن

التوقيع:

اسم العضو: ا.د. باسمة حسن

اللجنة الفرعية لضمان الجودة لمسار بولونيا

التوقيع :

اسم العضو م . د علاء عبدالواحد

التوقيع:

اسم العضو ا.م. رنين عباس

التوقيع:

اسم العضو: م. م. هالة اياد

دقق الملف من قبل :

شعبة ضمان الجودة والاداء الجامعي:

م. م. هالة اياد .....

Al-Iraqia Science University - College of Science
First Cycle – Bachelor's Degree Department of Medical Physics Sciences



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Mission & Vision Statement | بيين الرؤية والرسبلة

Vision Statement

To prepare highly qualified and competent graduates in Medical Physics Sciences through an integrated curriculum that combines theoretical knowledge with practical applications in medical imaging, radiation therapy, and radiation protection, contributing effectively to the healthcare sector and scientific development.

Mission Statement

The Medical Physics Sciences Department is committed to providing high-quality education and training that enables students to understand, operate, and develop medical physics technologies safely and efficiently, with emphasis on ethical practice, patient safety, research skills, and community service.

Program Specification | مواصفات البرنامج

- Program Title: Medical Physics Sciences
- Degree Awarded: Bachelor of Science (B.Sc.)
- Study Duration: 4 Years / 8 Semesters
- Study System: Full Time
- Total Credits: 240 ECTS
- Language of Instruction: English & Arabic
- Scientific Field: Medical Physics

The program is designed to equip students with fundamental and advanced knowledge in physics applied to medicine, including diagnostic imaging, radiation therapy, nuclear medicine, and radiation safety. The curriculum builds strong foundations in physics and mathematics during the first stages and progresses toward specialized medical physics applications in advanced levels.

Program Goals | أهداف البرنامج

1. The program aims to:
2. Prepare qualified medical physics graduates capable of working in hospitals and medical centers.
3. Develop students' skills in operating and maintaining medical imaging and radiation therapy equipment.
4. Provide solid knowledge in radiation protection and safety standards.
5. Enhance analytical and problem-solving skills in medical physics applications.
6. Support scientific research and continuous professional development.
7. Promote ethical responsibility and teamwork in healthcare environments.

Student Learning Outcomes | مخرجبت تعلم الطلبة

Graduates of the Medical Physics Sciences program will be able to:

- Apply fundamental physics principles in medical applications.
- Understand the physical principles of diagnostic imaging systems.
- Work safely with ionizing radiation according to international standards.
- Analyze and solve technical problems related to medical devices.
- Communicate effectively within multidisciplinary medical teams.
- Engage in lifelong learning and professional development.

Academic Staff | الهيئة التدريسية

- Assistant Professor Huda Najm Al-Deen M.Sc. in Physical Chemistry
  hudanajim@baghdadcollege.edu.iq
- Lecturer Walaa Issam Ph.D. in Laser Engineering
  walaa.isam@baghdadcollege.edu.iq
- Lecturer Laith Abdul-Sattar Ph.D. in Physics Sciences
  laith.abdulsatar@baghdadcollege.edu.iq
- Assistant Lecturer Adel Nahi M.Sc. in Applied Mathematics
  math79@baghdadcollege.edu.iq
- Assistant Lecturer Ahmed Nadhmi M.Sc. in Genetic Engineering
  ahmed-nadhmi@baghdadcollege.edu.iq

Credits, Grading and GPA | الاعتمادات والدرجات والمعدل

- Credit System: Bologna Process – ECTS
- Total Credits: 240 ECTS
- 1 ECTS = 25 Hours

Grading Scheme

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:				
Number 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.				

Calculation of the Cumulative Grade Point Average (CGPA)

1. The CGPA is calculated by the summation of each module score multiplied by its ECTS, all are divided by the program total ECTS.

   CGPA of a 4-year B.Sc. degree:

   CGPA = [(1st module score x ECTS) + (2nd module score x ECTS) + ……] / 240

Curriculum / Modules | المنهاج الدراسي

Semester 1 | 30 ECTS credits | 1 ECTS = 25 hrs

Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL	USSWL	SWL	ECTS	Module Type	Prerequisite Module(s) Code
						CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)		hr/sem	hr/sem	hr/sem			
One	1	KUS11001	Mathematics	الرياضيات	English	2	1			1		3	63	62	125	5.00	B	
	2	KUS11002	Fundamental of computer science	اساسيات علم الحاسوب	English	1		2				3	48	27	75	3.00	B	
	3	KUS11003	Democracy and Human Rights	ديمقراطية وحقوق الانسان	Arabic	2						3	33	17	50	2.00	B	
	4	SCI11004	General Biology	احياء عام	English	2		2		1		3	78	97	175	7.00	B	
	5	SCI11005	General Chemistry	كيمياء عام	English	2		2		1		3	78	97	175	7.00	C	
	6	MPH11006	Electricity	الكهربائية	English	2		2				3	63	87	150	6.00	C	
					Total	11	1	8	0	3	0	18	363	387	750	30.00		

Semester 2 | 30 ECTS | 1 ECTS = 25 hrs

Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL	USSWL	SWL	ECTS	Module Type	Prerequisite Module(s) Code
						CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)		hr/sem	hr/sem	hr/sem			
Two	1	MPH12007	Mechanics	الميكانيك	English	2		2		1		3	78	97	175	7.00	C	
	2	MPH12008	Magnetism	المغناطيسية	English	2		2		1		3	78	72	150	6.00	C	
	3	MPH12009	Programming	برمجة	English	2		2		1		3	78	72	150	6.00	C	
	4	KUS12010	Arabic Language	لغة عربية	Arabic	2						3	33	17	50	2.00	B	
	5	KUS12011	English Language	لغة انكليزية	English	2						3	33	17	50	2.00	B	
	6	SCI12012	General Physics	فيزياء عام	English	2		2		1		3	78	97	175	7.00	S	
					Total	12	0	8	0	4	0	18	378	372	750	30.00		

Semester 3 | 30 ECTS | 1 ECTS = 25 hrs

Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL	USSWL	SWL	ECTS	Module Type	Prerequisite Module(s) Code
						CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)		hr/sem	hr/sem	hr/sem			
Three	1	KUS23016	Crimes of Baath Regime in Iraq	جرائم نظام البعث بالعراق	Arabic	2						3	33	17	50	2.00	B	
	2	MPH21013	Differential Equations	معادلات تفاضلية	English	2				1		3	48	52	100	4.00	B	
	3	MPH21014	Optics	بصريات	English	2		2		1		3	78	97	175	7.00	C	
	4	MPH21015	Atomic Physics	فيزياء ذرية	English	2		2		1		3	78	97	175	7.00	C	
	5	MPH21016	Electromagnetics	كهرومغناطيسية	English	2				1		3	48	52	100	4.00	C	
	6	MPH21017	Thermodynamics	ثرموداينمك	English	2		2		1		3	78	72	150	6.00	C	
					Total	12	0	6	0	5	0	18	363	387	750	30.00		

Semester 4 | 30 ECTS | 1 ECTS = 25 hrs

Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
						CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)							
Four	1	MPH22018	Materials Science	علم المواد	English	2			1	1		3	63	62	125	5.00	B	
	2	MPH22019	Laser Physics	فيزياء الليزر	English	2		2	1			3	78	97	175	7.00	C	
	3	KUS24020	Arabic Language 2	لغة عربية 2	Arabic	2						3	33	17	50	2.00	B	
	4	KUS24021	English Language 2	لغة انكليزية 2	English	2						3	33	17	50	2.00	B	
	5	KUS24022	Applications of Computer Sceince	تطبيقات علم الحاسوب	English	1		2				3	48	27	75	3.00	S	
	6	MPH22023	Medical imaging	تصوير طبي	English	2		2		1		3	78	72	150	6.00	C	
	7	MPH22024	Medical Physics 1	فيزياء طبية 1	English	2		2				3	63	62	125	5.00	C	
					Total	13	0	8	2	2	0	21	396	354	750	30.00		

Semester 5 | 30 ECTS | 1 ECTS = 25 hrs

Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
						CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)							
Five	1	MPH31025	Biostatistics	احصاء حيوي	English	2						3	33	42	75	3.00	B	
	2	MPH31026	Medical Physics Devices1	فيزياء الاجهزة الطبية 1	English	2					1	3	48	52	100	4.00	C	
	3	MPH31027	Medical Physics 2	فيزياء طبية 2	English	2		2		1		3	78	72	150	6.00	C	
	4	MPH31028	Analogue Electronics	الكترونيات تماثلية	English	2		2		1		3	78	72	150	6.00	C	
	5	MPH31029	Anatomy	تشريح	English	2		2				3	63	62	125	5.00	C	
	6	MPH31030	Nuclear Physics	فيزياء نووية	English	2		2		1		3	78	72	150	6.00	C	
					Total	12	0	8	0	3	1	18	378	372	750	30.00		

Semester 6 | 30 ECTS | 1 ECTS = 25 hrs

Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
						CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)							
Six	1	MPH32031	Wave Physics	فيزياء موجية	English	2				1		3	48	52	100	4.00	B	
	2	MPH32032	Biological Sensor	متحسسات بايولوجية	English	2					1	3	48	52	100	4.00	C	
	3	MPH32033	Quantum Mechanics	ميكانيك الكم	English	2				1	1	3	63	62	125	5.00	E	
	4	MPH32034	Physiotherapy Techniques	تقنيات العلاج الطبيعي	English	2				1		3	48	52	100	4.00	S	
	5	MPH32035	Digital Electronics	الكترونيات رقمية	English	2		2				3	63	87	150	6.00	C	
	6	MPH32036	Physiology	فسلجة	English	2		2			1	3	78	72	150	6.00	C	
	7	MPH32037	Scientific Research Methodology	منهجية البحث العلمي	Arabic	1						3	18	7	25	1.00	B	
					Total	13	0	4	0	3	3	21	366	384	750	30.00		

Semester 7 | 30 ECTS | 1 ECTS = 25 hrs

Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam	SSWL	USSWL	SWL	ECTS	Module Type	Prerequisite Module(s) Code
						CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)	hr/sem	hr/sem	hr/sem	hr/sem			
Seven	1	MPH41038	Medical Physics 3	فيزياء طبية 3	English	2		2		1		3	78	97	175	7.00	C	
	2	MPH41039	Medical Physics Devices 2	فيزياء اجهزة طبية 2	English	2		2		1		3	78	97	175	7.00	C	
	3	MPH41040	Laser in Medicine	الليزر في الطب	English	2				1	1	3	63	62	125	5.00	C	
	4	MPH41041	Radiation Protections	الوقاية من الاشعاع	English	2				1	1	3	63	62	125	5.00	C	
	5	MPH41042	Bio Fluid	موائع حيوية	English	2					1	3	48	52	100	4.00	C	
	6	KUS47043	Ethics of Scientific Reseach	اخلاقيات البحث العلمي	English	2						3	33	17	50	2.00	B	
					Total	12	0	4	0	4	3	18	363	387	750	30.0		

Semester 8 | 30 ECTS | 1 ECTS = 25 hrs

Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam	SSWL	USSWL	SWL	ECTS	Module Type	Prerequisite Module(s) Code
						CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)	hr/sem	hr/sem	hr/sem	hr/sem			
Eight	1	MPH42044	Medical Physics 4	فيزياء طبية 4	English	2		2		1		3	78	72	150	6.00	C	
	2	MPH42045	Medical Image Analysis and Processing	تحليل ومعالجة صور طبية	English	2		2		1		3	78	72	150	6.00	C	
	3	MPH42046	Nuclear Medicine and Radiotherapy	الطب النووي والعلاج الاشعاعي	English	2		2		1		3	78	72	150	6.00	C	
	4	MPH42047	Neurophysics	فيزياء الاعصاب	English	2					1	3	48	52	100	4.00	C	
	5	MPH42048	Graduation Project	مشروع التخرج	English	2		2				3	63	137	200	8.00	B	
					Total	10	0	8	0	3	1	15	345	405	750	30.0		

Al-Iraqia Science University - College of Science
First Cycle – Bachelor's Degree Department of Medical Physics Sciences



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1. Overview

This catalogue presents the courses (modules) offered by the Business Administration program leading to the award of a Bachelor of Science degree. The program comprises 49 modules, with a total student workload of 6,000 hours and an overall value of 240 ECTS credits. All modules are delivered in accordance with the Bologna Process.

2. Undergraduate Courses 2023-2024

Module 1

Code	Course/Module Title	ECTS	Year /Semester
KUS11001	Mathmatics	5	1/1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
4	**3**	**63**	**62**
Description			
1. Identify the properties of mathematical functions and their opposites. 2. Familiarity with the properties of polynomials, exponential and logarithmic functions, trigonometric functions and their opposites. 3. Recognize the concept of differential functions and its relationship to speed and the rate of their change with time (acceleration). 4. Identify the integration of the functions and methods of Integration. 5. Knowledge of applications of integral in geometry. 1. Recognize properties of functions and their inverses; 2. Recall and use properties of polynomials, rational functions, exponential, logarithmic, trigonometric and inverse-trigonometric functions; 3. Apply the differentiation procedures to solve related rates and extreme value problems; 4. To understand the term integration. 5. To distinguish between definite and indefinite integration. 6. To describe the area and volume by means of integration.			

Module 2

Code	Course/Module Title	ECTS	Year /Semester
KUS11002	Fundamental of Computer Science	3	1/1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	**2**	**48**	**27**

Description

The computer course includes in the theoretical side the basics of computers, as well as a brief historical summary on the development and generations of computers also Computer Types. A detailed explanation of the Computer Components (Hardware and Software);additiontothestudent'sdefinitionofNumbersSystems(Decimal & Binary); the last axis comes about introducing the student to the Internet and the Intranet. As for the practical side, the student is taught the ready-made basic programs that include Microsoft Office and the Windows operating system, as the course includes practical hours, so the most important output is the student'smastery in dealing with the calculator as an easy tool to work with.

The learning outcomes of studying medical image analysis include: 1. Defining computer components (hardware and software) to the students. 2. Explaining input and output devices to the students. 3. Enabling students to recognize different types of memory. 4. Teaching students about number systems and how to convert between decimal and binary. 5. Defining the Internet and Intranet to students and discussing the similarities and differences between the two. 6. Providing hands-on experience with basic programs, including Microsoft Office and the Windows operating system, to students.

Module 3

Code	Course/Module Title	ECTS	Year /Semester
KUS11003	Democracy and Human Rights	3	1/1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	**1**	**17**	**33**

Description

تهدف المادة الى بيان اهمية الحقوق الاصلية اللصيقة بالانسان، التي تتفق مع فطرته والتي يقبلها العقل المجرد، والتي لا تختلف باختلاف الزمان والمكان وهذه هي حقوق الانسان

تسهم المادة العلمية الى تثقيف الطالب من الناحية القانونية، ليكون مطلع على ماهية الحقوق الانسانية واصلها التاريخي وتعريف ماله من حقوق وماعليه من التزامات من خلال معرفة حقه وحدود ذلك الحق وحقوق الاخرين، وما سعت اليه الدول والمنظمات الدولية والاقليمية في تعزيز مفاهيم تلك الحقوق، والزام الدول للنص عليها في التشريعات الداخلية والضمانات التي تكفل تطبيق تلك الحقوق العالمية.

Module 4

Code	Course/Module Title	ECTS	Year /Semester
SCI11004	General Biology	7	1/1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
5	**3**	**78**	**97**
Description			

1. Give a general understanding of the types, divisions, and components of organisms.
2. Understand the effect of organisms on humans and their environments.
3. Gain practical knowledge of the classification of organisms
4. Complete the reports, seminars, and presentations to develop the student's skills.

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1. Identify the most important differences between animals, plants, and microorganisms
2. Identify the processes of evolution in the organisms and the theories of their emergence
3. Statement the divisions of the plant kingdom and the animal kingdom
4. Identify the types of animal and plant tissues
5. Identifying the interdependent relationship between animals and plants.

Module 5

Code	Course/Module Title	ECTS	Year /Semester
SCI11005	General Chemistry	7	1/1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
5	**3**	**78**	**97**
Description			
1-To develop skills and understanding of different types of elements through the application of techniques. 2. To understand metals, physical and chemical properties. 3. This course deals with the basic concept of general chemistry. 4. To understand periodic table and distribution elements on it 1. Recognize the classification of elements. 2. List the various terms associated with periodic table. 3. Summarize what is meant by a basic chemical property. 4. Discuss the reaction and involvement of atoms in chemical reaction. 5. Describe bonds, oxidation number, and Lewis term. 6. Identify the elements according to conductivity and their applications. 7. Discuss the electrons distribution in the atomic levels. 8. Identify the primary terms that used to characterized physical and chemical properties.			

Module 6

Code	Course/Module Title	ECTS	Year /Semester
MPH11006	Electricty	6	1/1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
4	**2**	**63**	**87**
Description			
The study of electric charge involves differentiating between conductors and insulators and using them to demonstrate the existence of charges. In addition, Coulomb's law will be stated and its expression derived and used in calculations. Along with this, electric field, dipole moments; potential energy; and torque on an electric dipole and flux of electric field will be defined. Their expressions will be derived and also used to solve problems. Differentiate between conductors and insulators; 2. Explain charging processes. 3. State, derive and use Coulomb's law to solve problems about electric field and electric potential. 4. Use Gauss' law to a number of kinds of charge distributions in space having high symmetry (spherical, cylindrical, and uniform-plane distribution). 5. Derive the expression for calculating capacitance. 6. Explain the physical basis of Ohm's law and use Ohm's law in solving various problem of resistors connected in parallel and in series.			

Module 7

Code	Course/Module Title	ECTS	Year /Semester
MPH12007	Mechanics	7	1/2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
5	**3**	**78**	**97**
Description			
To develop an understanding of the fundamentals of mechanics. • 2. To develop problem solving skills in mechanics through the application of concepts in statics and dynamics to real world problems. • 3. To introduce the standards and associated measurements that regulate the use of mechanics. • 4. To provide reinforcement of learning using laboratory investigations. 1. Define the meaning of mechanics. 2. Develop a clear understanding of basic physical phenomena in physics and materials science as an integral part of the student's overall education 3. Compare between vectors and scalar quantities. 4. Calculate and find the displacement, velocity and acceleration of bodies. 5. Use algebra, trigonometry, and basic calculus, in solving problems in one and two dimension motion. 6. Provide detailed and accurate description of forces effect on bodies. 7. Classify the energy types. 8. Calculate the work done on subject.			

Module 8

Code	Course/Module Title	ECTS	Year /Semester
MPH12008	Magnetism	6	1/2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
5	**3**	**78**	**72**
Description			
This unit is designed to provide experiences for the student that will lead him/her into an understanding of the similarities and differences among electric, magnetic, and gravitational fields. The inquiry projects used here will support instruction in electrical circuits, gravitational dynamics, and electromagnetic phenomena of all sorts. The students will know how to demonstrate magnetic field and interaction using magnets, and current-carrying wire, show the influence of the magnetic field by a moving charge using a oscilloscope, and demonstrate the electromagnetic induction/ Faraday's law using simple materials 1. Define the terms: magnetic field, magnetic flux and flux density 2. Explain and draw magnetic field lines associated with current carrying conductors, and explain the principles of instruments based in it; 3. Explain the principles of an oscilloscope; 4. State, explain and use Faraday's law of electromagnetic induction; 5. Derive expression for force on a current-carrying wire in a magnetic field 6. Relate the force (F) to velocity (v), charge (q) and magnetic field (B) 7. How electromotive force induced.			

Module 9

Code	Course/Module Title	ECTS	Year /Semester
MPH12009	Programming	6	1/2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
5	**3**	**78**	**72**

Description

1. This course provides a manual to operate MATLAB. It presents a detailed course of MATLAB code capabilities required for general programming. 2. MATLAB is a high-performance language of technical computing. It integrates calculation, visualization and programming in an easy-to-use environment where problems and solutions are expressed in writing programs and implementing algorithms through the graphical user interface. MATLAB is an interactive system whose basic data element is an arrays that does not require dimensions. This allows solving many technical computing problems, especially those with matrix and vector formulations. 3. This course includes interactive lectures and practical applications to enable the student to apply algorithms for image processing and apply enhancement methods. In addition, it enables the student to rotate and scale the image by applying many examples.

The learning outcomes of studying computer programing include: 1. Providing the student with cognitive skills from the basic concepts of programming language and enables them to the skills to run the MATLAB program na gnidae dna the MATLAB windows and all the types of Statements. 2. Enables students to understood and run all Statements (Loop, Control, Branch), reading and writing data file. 3. Providing the student with cognitive skills to deal with operations with Arrays or Matrices. 4. Providing the student with skills in the technique of dealing with ready-made functions in the language of MATLAB. 5. Providing the student with skills in the Plotting Capabilities, Subplots, 2D Plotting, 3 D Plotting 6. Enables students to deal with the Files: M-files, and functions. 7. They will also learn about algorithms and how to apply them to solve problems. 8. Additionally, they will acquire skills in opening graphical interfaces using the GUIDE UI. 9. Furthermore, the course will cover the types of images and their importance in processing. 10. Students will be provided with digital image processing skills in the MATLAB

Module 10

Code	Course/Module Title	ECTS	Year /Semester
KUS12010	Arabic Language	2	1/2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	**1**	**33**	**17**

Description

1- تعلم العربية السليمة كونها اللغة الرسمية للوطن
2- اللغة جوهر الهوية ورمزها
3- اللغة تختلف عن اللهجة، فالاولى عالمية والثانية محلية
4- توظيف المفردات الفصيحة في الصياغة الاكاديمية للبحوث العلمية مترجمة بنظيرها الفصيح
5- التمكّن من كتابة البحوث والمقالات ذات المحتوى العلمي الصرف باللغة العربية الفصحى
6- تجنب الاخطاء الشائعة في الكتابة واختيار المفردات الصائبة
7- اثراء الخزين المعجمي لدى الطالب للمساعدة في بناء كاريزما التواصل الكلامي
8- الاطلاع على نماذج من الادب العربي شعرا ونثرا لما لها من اساس في بناء الجانب الثقافي المتنوع لدى الطالب
9- كتابة الاعداد بتمكّن فضلا الكتابة الصحيحة في صياغة الطلبات الرسمية
10- التعرف على الدرس الصوتي في اللغة العربية وعلاقته بعلم الفيزياء

باء مفردات المادة الدراسية يكون الطالب متمكنا من:

- الكتابة السليمة خالية من الاخطاء
- التعبير العلمي الاكاديمي الصحيح
- استعمال المفردات الفصيحة توظيفا ونطقا
- اضافة رصيد لغوي ومفاهيم جديدة لمعاني الكلمات
- القدرة على المخاطبة الادارية في الطلبات الرسمية

Module 11

Code	Course/Module Title	ECTS	Year /Semester
KUS12011	English Language	2	1/2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	**1**	**33**	**17**

Description

a. to enable the learner to communicate effectively and appropriately in real life situation:

b. to use English effectively for study purpose across the curriculum;

c. to develop interest in and appreciation of Literature;

d. to develop and integrate the use of the four language skills i.e. Reading, Listening, Speaking and Writing; e.to revise and reinforce structure already learnt

1. Enhance the efficiency of student to use many reference or books which reported in English language.
2. To develop the competence that students need to read a wide range of general and academic texts in English.
3. To develop students competence in reference skills [locating and evaluating information needed for assignments in a library.
4. demonstrate adequate general and detailed comprehension of a range of advanced general and academic texts
5. undertake research in an academic library

Module 12

Code	Course/Module Title	ECTS	Year /Semester
KUS12011	English Language	2	1/2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	**1**	**33**	**17**

Description

a. to enable the learner to communicate effectively and appropriately in real life situation:

b. to use English effectively for study purpose across the curriculum;

c. to develop interest in and appreciation of Literature;

d. to develop and integrate the use of the four language skills i.e. Reading, Listening, Speaking and Writing; e.to revise and reinforce structure already learnt

1. Enhance the efficiency of student to use many reference or books which reported in English language.
2. To develop the competence that students need to read a wide range of general and academic texts in English.
3. To develop students competence in reference skills [locating and evaluating information needed for assignments in a library.
4. demonstrate adequate general and detailed comprehension of a range of advanced general and academic texts
5. undertake research in an academic library

Module 12

Code	Course/Module Title	ECTS	Year /Semester
SCI112012	General Physics	7	1/2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
5	**3**	**78**	**97**
Description			
1. To have knowledge about General Physics basic principles like Mechanics of liquid and material properties. 2. To get skills in solving mathematical problems that related to physics subjects. 3. To get practical skills in managing physics experiments in the lab. and record measurements and then calculate required quantities. 4. Analysis the physical information in syllabus and be able to make conclusions by joining between physical concepts. 5. To be able to apply his knowledge in physics in market. 1. Save in memory basic principles and laws of Fluids and material properties. 2. Produce scientific concepts by joining between physical principles. 3. Joining physical concepts to produce more complicated concepts. 4. The ability to make conclusions by analysis the physical information. 5. The ability to apply all his knowledge to solve problems in reality. 6. To be able to run the devices and apparatus in the lab. 7. Assemble devices and make an experiment to prove physical relation. 8. Discuss the results get from running experiment in the lab. 9. Make reports from theory to conclusion about any physical concept proved in the lab.			

Module 13

Code	Course/Module Title	ECTS	Year /Semester
KUS23016	Crimes of Baath Regime in Iraq	2	2/1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	**1**	**33**	**17**

Description

1- ان يتعرف الطالب على جرائم نظام البعث في العراق
2- ادراك الطالب لتاريخ الحقبة التيعاشها العراق خلال فترة نظام البعث
3- ادراك الطالب لكم الجرائم النفسية والاجتماعية التي ارتكبها النظام
4- ادراك الطالب للجرائم التي ارتكبت بحق البيئة من قبل النظام
5- ادراك الطالب للجرائم الوحشية التي حصلت في المقابر الجماعية

1- معرفة الجرائم التي ارتكبت من قبل نظام البعث

2- معرفة انواع الظلم والاضطهاد الذي ارتكب بحق العراقيين

Module 14

Code	Course/Module Title	ECTS	Year /Semester
MPH21013	Differential Equation	2	2/1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	**1**	**48**	**52**
Description			
1- Providing the student with a cognitive skill about the basic concepts of Derivative equations. 2- Introducing students to the most important principles of differential equations and applications. 3- Introduce the student to the differential equations and methods of their application. 4- Providing the student with knowledge of how to solve equations. 1- Enabling students to obtain knowledge and understanding of the topics of differential equations. 2- Enable students to obtain knowledge and understanding of solve of method equations 3- Enable students to obtain knowledge and understanding of the use of basic physical laws in D.E and their use in solving problems.			

Module 15

Code	Course/Module Title	ECTS	Year /Semester
MPH21014	Optics	7	2/1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
5	**3**	**78**	**97**

Description

1. Understand the fundamental of optics that representing by geometrical optics and waves optics.
2. Increase students' knowledge about optics terms such as refractive index, optical path, critical angle, total internal reflection, thin lenses, mirrors, and image formation by optical elements, as well as Interference phenomena, Diffraction phenomena, polarization phenomena of light.
3. Provide the student with knowledge information about the electromagnetic spectrum and its wide uses in the medical fields (medical imaging and medical treatment as well as medical devices based on light).
4. Preparing the student to deal professionally with optical devices and optical elements, and how to calculate their optical constants.
5. Enable the student to distinguish between the Interference phenomena and Diffraction phenomena.
6. Provide the student with knowledge about the most important optical element present in the human body, which is the eye, and how to determine vision defects mathematically.

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1. Distinguish between the ray optics and wave optics.
2. Calculating the refractive index, the optical path and determining the critical angles for light travels between two media.
3. Knowing how to form images in lenses and mirrors, calculating the focal length of optical elements.
4. Determining vision defects and how to calculate the appropriate focal length for each pathological condition of vision defects.
5. Distinguish between interference and diffraction of light and calculation the fringes width.
6. Determine the constructive interference equation for bright fringes and the destructive interference equation for dark fringes.
7. Study the electromagnetic spectrum and determine the photon's energies.
8. Defining polarization, identifying its types, and calculating the intensity of light transmitted by polarizers.

Module 16

Code	Course/Module Title	ECTS	Year /Semester
MPH21015	Atomic Physics	7	2/1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
5	**3**	**78**	**97**
Description			
Get knowledge about the principles of Atomic Physics 1- Knowledge of the atomic structure. 2- Identification the basic atomic physical laws 3- Enrich knowledge about atomic reaction			

Module 17

Code	Course/Module Title	ECTS	Year /Semester
MPH21016	Electromagnetics	4	2/1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	**2**	**48**	**52**
Description			
The main goal of study of Electromagnetic Theory course is to identify the basic principles of this theory, as follows: - General study of Vectors in the Cartesian, cylindrical and spherical coordinate systems. Also, addressing the Divergence and Gauss's theorem, Curl and Stokes theorems and Green's theorem. Study of the Electrostatic field in vacuum and addressing the Laplace and Poisson equations and their solutions in the Cartesian, cylindrical and spherical coordinate systems. Study of the Electrostatic field in the dielectric materials and addressing the phenomenon of polarization in these materials. In addition to calculating the Electrical displacement, Electrical susceptibility, Dielectric constant, and Laplace and Poisson equations in these materials. Study of Maxwell's equations in their differential and integral forms. Also, study the propagation of plane electromagnetic waves in infinite media and the polarization of these waves.			

Module 18

Code	Course/Module Title	ECTS	Year /Semester
MPH21017	Thermodynamics	6	2/1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
5	**3**	**78**	**72**
Description			
1. The course aims to provide 2nd stage students with basic knowledge of thermodynamics. 2. To understand that everything related to energy and understand the concepts such as the first law of thermodynamics and the second law and its applications. 3. To enable students to access the science of thermodynamics by understanding how to correct engineering analysis and how to deal with laws, equations, illustrations and other data. 4. Enabling the student to be able to analyze, devise and draw conclusions. theory through the application of techniques 5. Follow-up of scientific development through the Internet and keeping pace with scientific development by setting up experiments synchronized with theoretical topics.			

Module 19

Code	Course/Module Title	ECTS	Year /Semester
MPH221018	Materials Science	5	2/2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
4	**3**	**63**	**62**
Description			
1- Describe the important quantum-mechanical principle that relates to electron energies. 2- Briefly describe ionic, covalent, metallic, hydrogen, and van der Waals bonds. 3- Describe the atomic/molecular structure difference between crystalline and noncrystalline materials. 4- Draw unit cells for face-centered cubic, body-centered cubic, and hexagonal close-packed crystal structures. 5- Specify the Miller indices for a plane that has been drawn within a unit cell. 6- Classification of crystalline imperfections, calculate the weight percent and atom percent for each element in a metal alloy.			

Module 20

Code	Course/Module Title	ECTS	Year /Semester
MPH221019	Laser Physics	7	2/2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
5	**3**	**78**	**97**
Description			
1 - Description of the origin of the physical processes in laser systems. 2-Explanation of physics concepts for gain and amplification in different lasers 3–Explanation of the concepts of generation short pulses in laser devices 4 - using mathematical equations to calculate different physical parameters of laser systems			

Module 21

Code	Course/Module Title	ECTS	Year /Semester
KUS24020	Arabic Language 2	2	2/2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	**1**	**33**	**17**
Description			

1- تعلم العربية السليمة كونها اللغة الرسمية للوطن
2- اللغة جوهر الهوية ورمزها
3- اللغة تختلف عن اللهجة، فالاولى عالمية والثانية محلية
4- توظيف المفردات الفصيحة في الصياغة الاكاديمية للبحوث العلمية مترجمة بنظيرها الفصيح
5- التمكّن من كتابة البحوث والمقالات ذات المحتوى العلمي الصرف باللغة العربية الفصحى
6- تجنب الاخطاء الشائعة في الكتابة واختيار المفردات الصائبة
7- اثراء الخزين المعجمي لدى الطالب للمساعدة في بناء كاريزما التواصل الكلامي
8- الاطلاع على نماذج من الادب العربي شعرا ونثرا لما لها من اساس في بناء الجانب الثقافي المتنوع لدى الطالب
9- كتابة الاعداد بتمكّن فضلا الكتابة الصحيحة في صياغة الطلبات الرسمية
10- التعرف على الدرس الصوتي في اللغة العربية وعلاقته بعلم الفيزياء

Module 21

Code	Course/Module Title	ECTS	Year /Semester
KUS24020	English Language 2	2	2/2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	**1**	**33**	**17**
Description			

1. Build a foundational vocabulary for everyday topics such as family, work, shopping, and travel.
2. Master essential grammar structures, including the present simple, present continuous, past simple, and basic prepositions.
3. Listen for key information in simple conversations and audio texts, such as directions, introductions, and short dialogues.
4. Practice speaking in structured activities, including introductions, asking questions, and participating in short exchanges.
5. Write simple sentences and short texts, such as postcards, emails, and personal descriptions.
6. Read and understand short texts, notices, and articles on familiar topics.
7. Use practical language for daily interactions, like ordering food, asking for directions, or making plans.
8. Explore cultural differences and similarities through lessons that introduce English-speaking traditions and lifestyles

Module 22

Code	Course/Module Title	ECTS	Year /Semester
KUS24022	Applications of Computer science	3	2/2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	**2**	**48**	**27**
Description			
Cognitive objectives A1- That the student understands the fundamental physics ideas connected to medicine. A2- To comprehend the physical relationship and how to medically communicate it. A 3- Relationship between physical attributes and medical device uses. The fundamental aims. B1 - Recognize the fundamental physical rules and their application to the human body. B2 - Understanding of physical aspects influencing the human body and their relationship to the appearance of disease indications on the body.			

Module 23

Code	Course/Module Title	ECTS	Year /Semester
MPH22023	Medical Imaging	6	2/2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
5	**3**	**78**	**72**
Description			
1. To develop a basic understanding to the basic physics of medical imaging. 2. To understand the relationship between electromagnetic radiation and biological tissues. 3. To distinguish between the various interactions occurring in tissues and to be able to identify beneficial ones from the non-beneficial for medical imaging. 4. To gain basic understanding to medical imaging techniques employed in modern hospitals, including x-ray imaging, computed tomography, magnetic resonance imaging, ultrasound and nuclear isotope imaging. 5. To provide you with sufficient knowledge of introductory radiation biology and physics to allow you an appreciation of safe and optimal use of radiation imaging techniques.			

Module 24

Code	Course/Module Title	ECTS	Year /Semester
MPH22024	Medical Physics 1	5	2/2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
4	**2**	**63**	**62**
Description			
Cognitive objectives A1- That the student understands the fundamental physics ideas connected to medicine. A2- To comprehend the physical relationship and how to medically communicate it. A 3- Relationship between physical attributes and medical device uses. The fundamental aims. B1 - Recognize the fundamental physical rules and their application to the human body. B2 - Understanding of physical aspects influencing the human body and their relationship to the appearance of disease indications on the body.			

كلية بغداد للعلوم الاقتصادية الجامعة/ قسم الفيزياء الطبية ©

Baghdad college for economic sciences university/ medical physics department

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية2024-2025

ا.م. هدى نجم الدين عبد اللطيف – مادة المغناطيسية

Module Information معلومات المادة الدراسية					
Module Title	Magnetism			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**MPH12008**				
ECTS Credits	6				
SWL (hr/sem)	**150**				
Module Level	1		**Semester of Delivery**	2nd.	
Administering Department	Medical Physics		**College**	Baghdad college for economic sciences university	
Module Leader	Assist.Prof. Huda Najimuldeen		**e-mail**	hudanajim@baghdadcollege.edu.iq	
Module Leader's Acad. Title	Assist.Prof.		**Module Leader's Qualification**		
Module Tutor	Huda Najim Eldeen		**e-mail**	hudanajim @baghdadcollege.edu.iq	
Peer Reviewer Name	Prof.Dr.Yarub Kahtan		**e-mail**	yaldouri@baghdadcollege.edu.iq	
Scientific Committee Approval Date	3-2025		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Electricity	**Semester**	1 st.
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهذاف انمادة الدراسية	This unit is designed to provide experiences for the student that will lead him/her into an understanding of the similarities and differences among electric, magnetic, and gravitational fields. The inquiry projects used here will support instruction in electrical circuits, gravitational dynamics, and electromagnetic phenomena of all sorts. The students will know how to demonstrate magnetic field and interaction using magnets, and current-carrying wire, show the influence of the magnetic field by a moving charge using a oscilloscope, and demonstrate the electromagnetic induction/ Faraday's law using simple materials
Module Learning Outcomes مخرجاث التعلم للمادة الدراسية	1. Define the terms: magnetic field, magnetic flux and flux density 2. Explain and draw magnetic field lines associated with current carrying conductors, and explain the principles of instruments based in it; 3. Explain the principles of an oscilloscope; 4. State, explain and use Faraday's law of electromagnetic induction; 5. Derive expression for force on a current-carrying wire in a magnetic field 6. Relate the force (F) to velocity (v), charge (q) and magnetic field (B) 7. How electromotive force induced.
Indicative Contents انمحتوياث الإرشادية	Indicative content includes the following. Introduction to the magnetic field, Magnetic flux and Calculating the magnetic field. (18 hrs) Motion of charged particles in magnetic fields, The Torque on a Current-Carrying Coil. (12 hrs) Ampere's law. Applications of ampere's law. (15 hrs) Magnetic field of current. Biot- Savart law. (12 hrs) Induced electric field. Lens's law. Inductance. (15 hrs)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ 15 أسبوعا

Structured SWL (h/sem) الحمل الداراسي المنتظم للطانب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي انمنتظم للطانب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطانب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير انمنتظم للطانب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطانب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	➢ The magnetic field 1- Magnetism 2- The magnetic field
Week 2	➢ Magnetic field lines Magnetic flux
Week 3	➢ Calculating the magnetic field.
Week 4	➢ Motion of charged particles in magnetic fields
Week 5	➢ The Torque on a Current-Carrying Coil.
Week 6	➢ Ampere's law Applications of ampere's law
Week 7	➢ Magnetic field of current 1- Sources of magnetic field 2- Magnetic field of moving charge
Week 8	➢ Magnetic field of current element ➢ Biot- Savart law.
Week 9	➢ Magnetic field of a long straight conductor 1- Force between parallel Conductors
Week 10	➢ Magnetic field of circular loop.
Week 11	➢ Induced electromotive force Faraday's law.
Week 12	➢ Induced electric fields Lens's law.
Week 13	➢ Inductance 1- Mutual and self-inductance 2- Energy in an inductor
Week 14	➢ R-L circuit
Week 15	➢ L-C circuit
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1-	**Lab 1: Hall Effect, and Gauss Meter**
Week 2	**Lab 2: Measurement of the Earth's Magnetic Field**
Week 3	**Lab 3: Magnetic Field Induced by a Current-Carrying Wire Week 4**
Week 4	**Lab 4: Biot -Savart Law, the relation between magnetic field and distance**
Week 5	**Lab 5: Biot -Savart Law, the relation between current and magnetic field**

Week 6	**Lab 6: Current Balance**
Week 7	**Lab 7: The Transformer**
Week 8	**final Exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Physics/John D. Cutnell & Kenneth W. Johnson—9th ed.	No
Recommended Texts	Fundamentals of Physics Extended 9th-HQ-Halliday	No
Websites	**https://engineeringinterviewquestions.com/electrostatic-electrical-engineering-multiple-choice-questions-and-answers/**	

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	متسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبل	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيذ انمعانجت)	(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**			**Module Delivery** يجب تحديد متطلبات المادة	
Module Type	**Basic**			☒**Theory** ☐**Lecture** ☒ **Lab** ☒**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**SCI 11004**				
ECTS Credits	**7**				
SWL (hr/sem)	**175**				
Module Level	**1**	**Semester of Delivery**	الفصل الدراسي		
Administering Department	MPO	**College**	SC		
Module Leader	Dr. Raji Tomaa	**e-mail**	Dr.Raji@baghdadcollege.edu.iq		
Module Leader's Acad. Title	Assistant Prof.	**Module Leader's Qualification**	Ph.D		
Module Tutor		**e-mail**			
Peer Reviewer Name	Dr. Laith Abdul sattar	**e-mail**	laith.abdulsatar@baghdadcollege.edu.iq		
Scientific Committee Approval Date	**2024**	**Version Number**	**0.1**		

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

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Many strategies will be used in this module to encourage students to learn such as participation in the exercises, seminars, lab experiments, and workshops, as well as using educational videos and electronic to refine and expand their critical thinking skills. This will be achieved through classes, interactive tutorials, and by considering types of simple experiments involving some interesting sampling activities for the students.

Student Workload (SWL) الحمل الدراسي للطالب موزع على (15) اسبوع			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	75	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	100	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6.66
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation تقييم المادة الدراسية					
		Time/Number (عدد مرات الامتحان)	**Weight (Marks)**	**Week Due** (تحديد اسابيع الامتحان)	**Relevant Learning Outcome** تحديد مواد التعليم اللي سيتم الامتحان فيها
Formative assessment التقييم التكويني	**Quizzes** (امتحان شهري)	2	5%(5)	4,8	LO #1, 2, 3, 5,6, and 7
	Assignments (واجبات)	2	10%(10)	5,10	LO # 2, 4, 6, 8, and 9
	Projects / Lab. (مشاريع او مختبرات)	1	20%(20)	Continuous	
	Report (تقارير)	1	5%(5)	13	LO # 12

Summative assessment التقييم التلخيصي	**Midterm Exam** (امتحان النصف)	1hr	10%(10)	7	LO # 1-6
	Final Exam (الامتحان النهائي)	2hr	20%(20)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to the life science
Week 2	The characteristics of life
Week 3	The characteristics of organisms
Week 4	The kingdom of organisms
Week 5	Classification of Animal and plant Kingdoms
Week 6	Kingdom Monera
Week 7	Mid-term Exam
Week 8	Chemistry of life (1)
Week 9	Chemistry of life (2)
Week 10	Cell structure and function (1)
Week 11	Cell structure and function (2)
Week 12	Cell life cycle
Week 13	Mitosis
Week 14	Meiosis
Week 15	**Final exam**
Week 16	

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1,2	Lab 1,2: Microscope and cell structure
Week 3,4	Lab 3,4: Cell behavior
Week 5,6	Lab 5,6: Respiration
Week 7,8	Lab 7,8: Photosynthesis
Week 9,10	Lab 9,10: Mitosis
Week 11,12	Lab 11,12: Meiosis
Week 13,14	Lab 13,14: Gametogenesis
Week 15	Lab 15: A preparatory week before the final exam

Delivery Plan (Weekly Tutorial) المنهاج الاسبوعي الاضافي	
	Material Covered
Each week, a question sheet related to the material presented in the theoretical lecture will be solved and debated.	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Biology: Concepts and Connections; Campbell, Reece, Taylor, and Simon; Latest edition 2018	No
Recommended Texts	The Science of Biology by Sadava, Hillis, Heller and Berenbaum 9th ed. 2011	No
Websites	http://www.coursera.org/browse/biology-science	

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	**Fundamental of Computer Science**			**Module Delivery** يجب تحديد متطلبات المادة	
Module Type	**Basic**			☒**Theory** ☐**Lecture** ☐ **Lab** ☐ **Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**KUS 1102**				
ECTS Credits	**3**				
SWL (hr/sem)	**75**				
Module Level	**1**	**Semester of Delivery**	الفصل الدراسي		
Administering Department	MPO	**College**	SC		
Module Leader	Assist. Lect. Haider Mohammed	**e-mail**			
Module Leader's Acad. Title	Assistant Lect.	**Module Leader's Qualification**	MSc		
Module Tutor		**e-mail**			
Peer Reviewer Name	Assist Lect. Ahmed Nadhmi	**e-mail**	ahmed-nadhmi@baghdadcollege.edu.iq		
Scientific Committee Approval Date	**2024**	**Version Number**	**0.1**		

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 Aims أهداف المادة الدراسية	The computer course includes in the theoretical side the basics of computers, as well as a brief historical summary on the development and generations of computers also Computer Types. A detailed explanation of the Computer Components (Hardware and Software);additiontothestudent'sdefinitionofNumbersSystems(Decimal & Binary); the last axis comes about introducing the student to the Internet and the Intranet. As for the practical side, the student is taught the ready-made basic programs that include Microsoft Office and the Windows operating system, as the course includes practical hours, so the most important output is the student'smastery in dealing with the calculator as an easy tool to work with.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The learning outcomes of studying medical image analysis include: 1. Defining computer components (hardware and software) to the students. 2. Explaining input and output devices to the students. 3. Enabling students to recognize different types of memory. 4. Teaching students about number systems and how to convert between decimal and binary. 5. Defining the Internet and Intranet to students and discussing the similarities and differences between the two. 6. Providing hands-on experience with basic programs, including Microsoft Office and the Windows operating system, to students.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A Introduction to Computer, Definition of Computer, Computer History, Generations of Computers,Categories of Computer. [4 hrs] Part B Computer Components, Software. [4 hrs] Part C Computer Components, Hardware, Input Devices, Output Devices, Components of 3 the System Unit, Central Processing Unit (CPU), Memory. [4 hrs] Part D Hardware, Cache Memory, Primary, Memory (Main Memory) ,Random Access Memory, Read Only Memory, Secondary Memory, Memory Units, Storage Devices. [8 hrs] Part E Numbers Systems, Decimal Number System, Binary Number System, Convert Decimal

	to Binary System, Examples, Convert Binary to Decimal System, Examples. . [6 hrs] Part F Defining Internet and Intranet, Types of Computer Network, Computer network. [4 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	In order to enable students to learn computer skills effectively, here are some strategies that can be employed: 1. Provide hands-on activities: Incorporate hands-on activities, projects, and exercises to engage students actively in the learning process. Practical application of concepts helps students understand how computers work and reinforces their understanding. 2. By using visual aids and interactive resources: Utilize visual aids, diagrams, charts, and interactive resources like educational software, simulations, and coding platforms to make abstract concepts more tangible and engaging. 3. Foster a collaborative learning environment: Encourage students to work in teams or pairs on projects or coding exercises. Collaborative learning allows students to share ideas, help one another, and learn from different perspectives. 4. Personalize the learning experience: Recognize that students have different learning styles and paces. Provide opportunities for individualized learning, allowing students to progress at their own speed and explore topics of interest to them. Tailor the learning experience to accommodate diverse learning needs. 5. Encourage exploration and experimentation: Encourage students to explore and experiment with different programming languages, tools, and technologies. Let them pursue their own coding projects and interests. This fosters curiosity and self-directed learning. 6. Connect with real-world applications: Demonstrate how computer skills are applied in various fields and industries. Show examples of how coding is used in creating websites, mobile apps, robotics, or data analysis. Connecting computer skills to real-world applications can motivate students and help them understand the practical significance of what they are learning. 7. Through updated with technology trends: Stay abreast of the latest technology trends, tools, and programming languages. Integrate relevant and up-to-date content into the curriculum to ensure students are learning skills that are in demand in the job market. It is important to create a supportive and inclusive learning environment where

	students feel encouraged to ask questions, take risks, and explore their interests. By implementing these strategies, we can help students develop a solid foundation in computer skills and foster their passion for technology.

Student Workload (SWL) الحمل الدراسي للطالب موزع على (15) اسبوع			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	45	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	30	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 (عدد مرات الامتحان)	**Weight (Marks)**	**Week Due** (تحديد اسابيع الامتحان)	**Relevant Learning Outcome** تحديد مواد التعليم اللي سيتم الامتحان فيها
Formative assessment التقييم التكويني	**Quizzes** (امتحان شهري)	2	10%(10)	4,8	LO # 1,2,3,5,6, and 7
	Assignments (واجبات)	2	10%(10)	10,14	LO # 8, 9, 11,12 and 13
	Projects / Lab.	1	20%(20)	Continuous	
	Report (تقارير)	1	5%(5)	15	LO # 4,14
Summative assessment التقييم التلخيصي	**Midterm Exam** (امتحان النصف)	1hr	10%(10)	9	LO # 1-8
	Final Exam (الامتحان النهائي)	2hr	50%(50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Computer, Definition of Computer
Week 2	Computer History, Generations of Computers,
Week 3	Categories of Computer.
Week 4	Computer Components, Software
Week 5	Computer Components, Hardware, Input Devices
Week 6	Computer Components, Hardware, Output Devices
Week 7	Computer Components, Hardware, Components of the System Unit, Central Processing Unit (CPU), Memory
Week 8	Hardware, Cache Memory, Primary, Memory (Main Memory)
Week 9	Hardware, Random Access Memory, Read Only Memory
Week 10	Hardware, Secondary Memory, Memory Units, Storage Devices
Week 11	Numbers Systems, Decimal Number System, Binary Number System
Week 12	Numbers Systems, Convert Decimal to Binary System, Examples
Week 13	Numbers Systems, Convert Binary to Decimal System, Examples
Week 14	Defining Internet and Intranet, Types of Computer Network, Computer network
Week 15	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Windows 10: An introduction to windows 10, The start menu, Notification pane and action center.
Week 2	Lab 2: Cortana, Microsoft edge, Use multiple desktops, Tablet mode, The settings App.
Week 3	Lab 3: Microsoft word 2016: An introduction to Microsoft Word 2016, Starting Word, The Home Ribbon: Using Paragraph Styles, Bold, Italic & Underlined, Superscript & Subscript, Highlighting Text, Text Colour, Text Justification, Paragraph Indents, Bullet Lists, Numbered Lists, Cut, Copy & Paste.
Week 4	Lab 4: The Insert Ribbon: Inserting Symbols, Equations, Cover Pages, Adding Images, Adding Effects to Images, Cropping Images, Wrap Text around Images, Adding Tables, Formatting Tables, Add a Column, Insert a Row, Resizing Rows & Columns, Headers and Footers, Inserting Headers & Footers, Editing Headers & Footers.
Week 5	Lab 5: Page Numbering: The Design Ribbon (Page Borders, Page Color, Watermarks, Page

	Numbering: The Page Layout Ribbon, Page Setup, The References Ribbon, The Mailings Ribbon, The Format Ribbon, File Backstage, Saving Documents, Saving as a Different Format, Opening Saved Documents, Printing Documents.
Week 6	Lab 6: Microsoft Excel 2016: An introduction to Microsoft Excel 2016, Starting Excel, The Home Ribbon, The Insert Ribbon, The Page Layout Ribbon, The Formulas Ribbon, The Data Ribbon, The Review Ribbon, The View Ribbon, File Backstage, Introduction to a Spreadsheet, Entering Data.
Week 7	Lab 7: Simple Text Formatting, Text Orientation, Resizing Rows and Columns, inserting Rows & Columns, Cut, Copy & Poste, Sorting Data, Formatting Spreadsheet, Cell Alignment, Text Format, Cell Borders, Using Formulas, Using Functions, Count, Count IF, Auto Sum, Average, Max & Min, IF Function, Adding Charts, Change Chart Type.

Delivery Plan (Weekly Tutorial)

المنهاج الاسبوعي الاضافي

	Material Covered
Each week, a question sheet related to the material presented in the theoretical lecture will be solved and debated.	

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1- Ata Elahi, "Computer Systems, Digital Design, Fundamentals of Computer, Architecture and Assembly Language", Springer International Publishing AG 2018. 2- Peter Norton "Introduction to Computers", sixth Edition, 2008, ISBN-13:978-0-07-059374-9. 3- B. Hemanta, Computer Fundamental, Stratford College London, pp.1-20. 4- R Mansfield, "Mastering VBA for Microsoft Office", 2019, 944 Pages.	No
Recommended Texts	1- Steven Freund, Gary B. Shelly, Thomas J. Cashman, Misty Vermaat, Introduction to Computers, Eighth Edition, 2012, ISBN10 143908131X, ISBN13 9781439081310	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	**الديمقراطية وحقوق الانسان**			**Module Delivery** يجب تحديد متطلبات المادة	
Module Type	**Basic**			☒**Theory** ☐**Lecture** ☐ **Lab** ☐ **Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**KUS 1103**				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level	**1**	**Semester of Delivery**	الفصل الدراسي		
Administering Department	MPO	**College**	SC		
Module Leader	Dr. Jamal AbdulAmmir Sabri	**e-mail**	dr.jamal@baghdadcollege.edu.iq		
Module Leader's Acad. Title	Lect.	**Module Leader's Qualification**	Ph.D		
Module Tutor		**e-mail**			
Peer Reviewer Name	Assist Lect. Ahmed Nadhmi	**e-mail**	ahmed-nadhmi@baghdadcollege.edu.iq		
Scientific Committee Approval Date	**2024**	**Version Number**	**0.1**		

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 Aims أهداف المادة الدراسية	تهدف المادة الى بيان اهمية الحقوق الاصلية اللصيقة بالانسان، التى تتفق مع فطرته والتى يقبلها العقل المجرد، والتي لا تختلف باختلاف الزمان والمكان وهذه هي حقوق الانسان
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	تسهم المادة العلمية الى تثقيف الطالب من الناحية القانونية، ليكون مطلع على ماهية الحقوق الانسانية واصلها التاريخي وتعريف ماله من حقوق وماعليه من التزامات من خلال معرفة حقه وحدود ذلك الحق وحقوق الاخرين، وما سعت اليه الدول والمنظمات الدولية والاقليمية في تعزيز مفاهيم تلك الحقوق، والزام الدول للنص عليها في التشريعات الداخلية والضمانات التي تكفل تطبيق تلك الحقوق العالمية.
Indicative Contents المحتويات الإرشادية	ان المحتويات الارشادية لمادة الديمقراطية وحقوق الانسان تتلخص بتهذي الطالب (١٥ ساعة) وتعريفه ان تعامله مع غيره من بني البشر يقوم على مبدأ (ان الناس صنفان، اما اخ لك في الدين، او نظير لك في الخلق (١٥ ساعة)

Learning and Teaching Strategies استراتيجيات التعلم و التعليم	
Strategies	نعمد في هذا الجانب إلى ما يلي: ١. يعرف الطالب إبتداءً بمضمون موجز عن المفردات التي سيتم تناولها خلال المحاضرة، ثم نوجه له بعض الإسئلة التي تحرك ذهنه، وتشد إنتباهه؛ لضمان حسن الاستماع. ٢. يتم التعمق بشرح المفردات العلمية في حدود تناسب متوسط المستويات العلمية لضمان عدم تجاوز الفروق الفردية عند عموم الطلبة. ٣. يتم ترك مساحة للنقاش الحر في إطار الموضوع المخصص للمحاضرة. ٤. الحرص على جانب التغذية الراجعة للمعلومات قبل نهاية المحاضرة. ٥. التواصل الكترونيًا مع الطلبة لنشر المحاضرات المسجلة، والمكتوبة من خلال الموقع الرسمي للجامعة.

Student Work load (SWL) الحمل الدراسي للطالب ل ١٥ اسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	**30**	**Structured SWL (h/sem)** الحمل الدراسي المنتظم للطالب خلال الفصل	**2**
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	**20**	**Unstructured SWL (h/sem)** الحمل الدراسي غير المنتظم للطالب خلال الفصل	**1.3**
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,#10 and 11
	Assignments	2	10% (10)	2 and 12	Lo #3,#4,#6, and #7
	Projects / tutorial	1	10%(10)	Continuous	All
	Report	1	10% (10)	13	Lo #5, ,#8 and #10
Summative assessment	Midterm Exam	1 hr	10% (10)	7	Lo #1-7
	Final Exam	2hrs	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	تعريف وطبيعة حقوق الانسان
Week 2	التطور التاريخي لحقوق الانسان
Week 3	مميزات حقوق الانسان عن غيرها من الحقوق
Week 4	حقوق الانسان في الديانات السماوية
Week 5	حقوق الانسان في المواثيق الدولية
Week 6	حقوق الانسان في التشريعات الداخلية
Week 7	**حقوق الانسان الشخصية**
Week 8	حقوق الانسان الاجتماعية
Week 9	حقوق الانسان الثقافية
Week 10	حقوق الانسان الاقتصادية
Week 11	ضمانات حقوق الانسان الدولية
Week 12	ضمانات حقوق الانسان الاقليمية
Week 13	ضمانات حقوق الانسان الداخلية (الوطنية)
Week 14	الجزاءات المترتبة على المساس بحقوق الانسان
Week 15	امتحان نهائي

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	حقوق الانسان (تطورها، مضامينها، حمايتها)/ د. رياض عزيز هادي	Yes
Recommended Texts	حقوق الانسان/ د.حميد حنون	
Websites	https://www.noor-book.com/ https://www.un.org/ar/about-us/universal-declaration-of-human-rights https://ar.wikipedia.org/wiki	

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	**Mathmatict**			**Module Delivery** يجب تحديد متطلبات المادة	
Module Type	**Core**			☒**Theory** ☐**Lecture** ☐ **Lab** ☐ **Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**Kus1101**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	**1**	**Semester of Delivery**	الفصل الدراسي		
Administering Department	MPO	**College**	SC		
Module Leader	Assist. Lect. Karar Ali Khanjar	**e-mail**	karar.96@baghdadcollege.edu.iq		
Module Leader's Acad. Title	Assistant Prof.	**Module Leader's Qualification**	MSc		
Module Tutor		**e-mail**			
Peer Reviewer Name	Dr.Adil Nahi	**e-mail**	math79@baghdadcollege.edu.iq		
Scientific Committee Approval Date	**2024**	**Version Number**	**0.1**		

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 Aims أهداف المادة الدراسية	1. Identify the properties of mathematical functions and their opposites. 2. Familiarity with the properties of polynomials, exponential and logarithmic functions, trigonometric functions and their opposites. 3. Recognize the concept of differential functions and its relationship to speed and the rate of their change with time (acceleration). 4. Identify the integration of the functions and methods of Integration. 5. Knowledge of applications of integral in geometry.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize properties of functions and their inverses; 2. Recall and use properties of polynomials, rational functions, exponential, logarithmic, trigonometric and inverse-trigonometric functions; 3. Apply the differentiation procedures to solve related rates and extreme value problems; 4. To understand the term integration. 5. To distinguish between definite and indefinite integration. 6. To describe the area and volume by means of integration.
Indicative Contents المحتويات الإرشادية	1-To know the methods of differentiation of functions accurately and its applications. 2- To know the relationship between the function term and its differential. 3- To extract the area and volume through integration. 4 - To know the differentiation and integration of functions. 4- To use integration methods to find complex integrals.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Following up the scientific development of mathematics by reviewing modern curricula. • Follow-up and development of academic courses and compare them with other universities. • Using the latest teaching aids to motivate the student to learn and understand.

Student Workload (SWL) الحمل الدراسي للطالب موزع على (15) اسبوع			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	50	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	75	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
		Time/Number (عدد مرات الامتحان)	**Weight (Marks)**	**Week Due** (تحديد اسابيع الامتحان)	**Relevant Learning Outcome** تحديد مواد التعليم اللي سيتم الامتحان فيها
Formative assessment التقييم التكويني	**Quizzes** (امتحان شهري)	2	10%(10)	5,10	LO#1,2,10 and 11
	Assignments (واجبات)	2	10%(10)	2,12	LO#3,4,6 and 7
	Projects / Lab.				
	Report (تقارير)	1	10%(10)	13	LO#5,8, and 10
Summative assessment التقييم التلخيصي	**Midterm Exam** (امتحان النصف)	1hr	10%(10)	7	LO,#1-7
	Final Exam (الامتحان النهائي)	2hr	60%(60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Functions, Inverse Functions.
Week 2	Trigonometric Functions, Inverse Trigonometric Functions.
Week 3	Exponential and Logarithmic Functions.
Week 4	Limits and Continuity
Week 5	The Derivative, The Chain Rule.
Week 6	Implicit Differentiation, L'Hopitals Rule.
Week 7	The Derivative in graphing and applications, Relative Extrema.
Week 8	Rolle's Theorem; Mean –Value Theorem
Week 9	The indefinite integral, Areas under a curve
Week 10	The fundamental theorem of integral calculus, Area between two curves
Week 11	The integral of trigonometric functions, the integral of inverse trigonometric
Week 12	The integral of the functions logu(x),lnu(x),eu(x) and au(x)
Week 13	Methods of integration , powers of trigonometric functions
Week 14	Integration by parts
Week 15	**Volumes**
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Tutorial) المنهاج الاسبوعي الاضافي	
	Material Covered
Each week, a question sheet related to the material presented in the theoretical lecture will be solved and debated.	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Thomas & Finney "Calculus and Analytic Geometry" (2005), 11th edition, Addison Wesley.	No
Recommended Texts	Howard Anton,Irl Bivens & Stephen Davis "Calculus"(2009),9thedition,John Wiley & Sons,NC.	No
Websites	Various lectures and lecture notes on the internet.	

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**			**Module Delivery** يجب تحديد متطلبات المادة	
Module Type	**Core**			☒**Theory** ☐**Lecture** ☐ **Lab** ☐ **Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**MPH1106**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	**1**	**Semester of Delivery**	الفصل الدراسي		
Administering Department	MPO	**College**	SC		
Module Leader	Assist. Lect. Manal Nasir	**e-mail**	Manal- nasir@baghdadcollege.edu.iq		
Module Leader's Acad. Title	Assistant Prof.	**Module Leader's Qualification**	MSc		
Module Tutor		**e-mail**			
Peer Reviewer Name	Dr. Walaa Isam	**e-mail**	walaa.isam@baghdadcollege.edu.iq		
Scientific Committee Approval Date	**2024**	**Version Number**	**0.1**		

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 Aims أهداف المادة الدراسية	The study of electric charge involves differentiating between conductors and insulators and using them to demonstrate the existence of charges. In addition, Coulomb's law will be stated and its expression derived and used in calculations. Along with this, electric field, dipole moments; potential energy; and torque on an electric dipole and flux of electric field will be defined. Their expressions will be derived and also used to solve problems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Differentiate between conductors and insulators; 2. Explain charging processes. 3. State, derive and use Coulomb's law to solve problems about electric field and electric potential. 4. Use Gauss' law to a number of kinds of charge distributions in space having high symmetry (spherical, cylindrical, and uniform-plane distribution). 5. Derive the expression for calculating capacitance. 6. Explain the physical basis of Ohm's law and use Ohm's law in solving various problem of resistors connected in parallel and in series.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Unit 1: Electrostatics You'll begin your study of the electric force with an exploration of electric charges. 24 hr's Unit 2: Conductors, Capacitors, Dielectrics You'll explore how electric charge can move through an object and the factors that affect the way charge moves. 24 hr's Unit 3: Electric Circuits You'll build on your knowledge of electrical components to investigate the nature of electric circuits and explore current, resistance, and power. 24 hr's

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب موزع على (15) اسبوع			
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	87	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/Number (عدد مرات الامتحان)	**Weight (Marks)**	**Week Due** (تحديد اسابيع الامتحان)	**Relevant Learning Outcome** تحديد مواد التعليم اللي سيتم الامتحان فيها
Formative assessment التقييم التكويني	**Quizzes** (امتحان شهري)	2	10%(10)	5,10	LO #1, 2, and 5
	Assignments (واجبات)	2	10%(10)	2,12	LO # 3, 4, and 6
	Projects / Lab. (مشاريع او مختبرات)	1	10%(10)	Continuous	
	Report (تقارير)	1	10%(10)	13	LO # 3, 4 and 6
Summative assessment	**Midterm Exam** (امتحان النصف)	1hr	10%(10)	7	LO # 1-4

التقييم التلخيصي	**Final Exam** (الامتحان النهائي)	2hr	20%(20)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Electric charge, Charge is conserved, Electric Charge and the Structure of Matter
Week 2	Conductors, Insulators, and Induced Charges, Charging an object
Week 3	Coulomb's law.
Week 4	Electric field, A point charge in an electric field, A dipole in an electric field.
Week 5	Flux of the electric field, Gauss's law.
Week 6	Gauss's law and Coulomb law, An insulated conductor.
Week 7	Electric potential, Potential and the electric field, A group of point charges.
Week 8	Potential due to a dipole, Electric potential energy.
Week 9	Capacitance, Calculating Capacitance.
Week 10	Energy storage in an electric field, Parallel plate capacitor with dielectric.
Week 11	Dielectrics and atomic view.
Week 12	Current and current density, Ohm's law-A microscopic view.
Week 13	Electromotive force, Calculating the current.
Week 14	Potential difference.
Week 15	**Multi loop circuits.**
Week 16	**Final exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1-2	Lab 1: Introduction, Measurement, graph drawing and lab safity.
Week 3-4	Lab 2: Verification of Ohm's Low.
Week 5-6	Lab 3: A graphical Method for Calculating Ammeter Resistance.
Week 7	Test 1
Week 8-9	Lab 4: Calculating the Value of Unknown Resistance.
Week 10-11	Lab 5: The Ratio Between Lamp Power Dissipation and Resistance Power Dissipation.
Week 12-13	Lab 6: Capacitor Discharge and Calculating Time Constant.
Week 14	Test 2

Delivery Plan (Weekly Tutorial) المنهاج الاسبوعي الاضافي	
	Material Covered
Each week, a question sheet related to the material presented in the theoretical lecture will be solved and debated.	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Physics/John D. Cutnell & Kenneth W. Johnson—9th ed.	No
Recommended Texts	Fundamentals of Physics Extended 9th-HQ-Halliday	No
Websites	https://engineeringinterviewquestions.com/electrostatic-electrical-engineeringmultiple-choice-questions-and-answers/	

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 Chemistry**			**Module Delivery** يجب تحديد متطلبات المادة	
Module Type	**Basic**			☒**Theory** ☐**Lecture** ☒ **Lab** ☒**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**MBO11002**				
ECTS Credits	7				
SWL (hr/sem)	**175**				
Module Level	1		**Semester of Delivery**		
Administering Department	Medical PHYSICS		**College**	Baghdad College of Economics	
Module Leader	Huda Najm Al Din		**e-mail**	hudanajim@baghdadcollege.edu.iq	
Module Leader's Acad. Title	Assist. prof.		**Module Leader's Qualification**	MSC	
Module Tutor	------		**e-mail**	--------	
Peer Reviewer Name	Assist. Lect. Ahmed nadhmi		**e-mail**	ahmed-nadhmi@baghdadcollege.edu.iq	
Scientific Committee Approval Date	2024		**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 Aims أهداف المادة الدراسية	1-To develop skills and understanding of different types of elements through the application of techniques. 2. To understand metals, physical and chemical properties. 3. This course deals with the basic concept of general chemistry. 4. To understand periodic table and distribution elements on it
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize the classification of elements. 2. List the various terms associated with periodic table. 3. Summarize what is meant by a basic chemical property. 4. Discuss the reaction and involvement of atoms in chemical reaction. 5. Describe bonds, oxidation number, and Lewis term. 6. Identify the elements according to conductivity and their applications. 7. Discuss the electrons distribution in the atomic levels. 8. Identify the primary terms that used to characterized physical and chemical properties.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A-Circuit Theory Starting from atomic theory and electron distribution in the outer and inner shells the details required make enough information for the principle of chemistry. [14 hrs] Enhance the principle of general chemistry when highlight in more information about losing and acceptance electrons with the abilities for forming any bonds and forming new molecules with new properties. [13 hrs] Periodic table with highlight in the orientations of molecules to show different and variance in properties. [12hrs] . Revision problem classes [6hrs] Part B-Analogue chemistry 3-Fundamentals Electron configuration, oxidation number, The ratios of forming molecules. [15hrs] Components and active site. [8 hrs] Identification of general properties.[7 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**To describe the learning activities of the students and the teaching methods of the staff. Effective module design should result in a varied range of active learning experiences for students, including learning activities which are 'research-like'. Activities should, of course, motivate and encourage deep learning (reflection on wider meanings, rather than superficial memorisation of information). They should also be varied and flexible enough to accommodate different learning styles and orientations, and allow for inclusivity of students from different backgrounds and with different kinds of learning abilities. Learning activities therefore need to include reference to independent, interdependent (peer-supported) and online activities, as well as participation in different kinds of taught class.**

Student Workload (SWL) الحمل الدراسي للطالب موزع على (15) اسبوع			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	75	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	100	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6.66
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 التقييم التكويني	**Quizzes**	2	10% (10)	5, 10,	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 10	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment التقييم التلخيصـــي	**Midterm Exam**	2hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50%(50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Course introduction
Week 2	The nature of chemistry, Classifications of pure matter
Week 3	Atomic structure and chemistry of water
Week 4	Experimental Quantities , Atomic Number, and Mass Number
Week 5	The Periodic Table and Classification of groups
Week 6	A molecular formula, Analytical Chemistry (Reactions in Aqueous Solutions)
Week 7	Exam Mid-term Exam

Week 8	Qualitative and Quantitative analysis chemistry
Week 9	Concentration of Solutions and determine the Atomic mass units (amu)
Week 10	General Properties of Aqueous Solutions
Week 11	Chemical Reactions
Week 12	Acids, Bases and titration
Week 13	Titrimetric Methods
Week 14	Separation method of elements
Week 15	**Biomolecules, Lipids, Proteins, Nucleic acids**
Week 16	**Final Exam**

Delivery Plan (Weekly Lab Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week. 1	Lab 1: general safety rules for laboratory and equipment
Week 2	Lab 2: Standard solution
Week 3	Lab 3: Preparation of standard solution from liquid solutions
Week 4	Lab 4: Preparation of standard solution from solid materials
Week 5	Lab 5: titration strong acid with strong base
Week 6	Lab 6: titrating sodium carbonate with hydrochloric acid
Week 7	Exam Mid-term Exam
Week 8	Lab 7: pH-Metric titration
Week 9	Lab 8 : Exam
Week 10	Lab 9: titration of acetic acid in vinegar
Week 11	Lab 10: saparation methods
Week 12	Lab 11,14: Separation of I group Cations (Ag_{+}, Pb_{2+}, Hg_{2+})
Week 16	**Final Exam**

Delivery Plan (Weekly Tutorial) المنهاج الاسبوعي الاضافي	
	Material Covered
Each week, a question sheet related to the material presented in the theoretical lecture will be solved and debated.	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1- General chemistry by Darrell D. Ebbing, 2007. 2- fundamentals-of-chemistry by Romain Elsair, 2012. 3- Fundamentals of Analytical Chemistry by Stook and West 2012.	no
Recommended Texts	Organic chemistry by Morrison and Boyd 7th, 2010.	no
Websites	https://www.aqa.org.uk/subjects/science/as-and-a-level/chem.-7603-7410/subject-content	

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 الدراسية2024-2025
م.م.احمد نظمي عبدالحميد

Module Information معلومات المادة الدراسية					
Module Title	**English Language**			**Module Delivery**	
Module Type	Basic			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	KUS12011				
ECTS Credits	2				
SWL (hr/sem)	**50**				
Module Level	1		**Semester of Delivery**	2	
Administering Department	Medical Physics		**College**	Science	
Module Leader	AHMED NADHMI		**e-mail**	ahmed.nadhmi@yahoo.com	
Module Leader's Acad. Title	Asst. lect.		**Module Leader's Qualification**		
Module Tutor	AHMED NADHMI		**e-mail**	ahmed.nadhmi@yahoo.com	
Peer Reviewer Name	Asst. prof. Muayed abdulkareem		**e-mail**	**Muayed@baghdad college.edu.19**	
Scientific Committee Approval Date	**21/09/2023**		**Version Number**	**1.0**	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims	a. to enable the learner to communicate effectively and appropriately in real life situation: b. to use English effectively for study purpose across the curriculum; c. to develop interest in and appreciation of Literature; d. to develop and integrate the use of the four language skills i.e. Reading, Listening, Speaking and Writing; e.to revise and reinforce structure already learnt
Module Learning Outcomes	1. Enhance the efficiency of student to use many reference or books which reported in English language. 2. To develop the competence that students need to read a wide range of general and academic texts in English. 3. To develop students competence in reference skills [locating and evaluating information needed for assignments in a library. 4. demonstrate adequate general and detailed comprehension of a range of advanced general and academic texts 5. undertake research in an academic library
Indicative Contents	Indicative content includes the following. Attention will be given to both grammatical form and communicative function. Controlled practice will be given to consolidate form and meaning. Classroom activities will be designed to maximize active participation and use of the target language. The Language Labs will be used for students to work on their own individual needs and problems. Students' language skills will improve through completion of a range of tasks, both individual and group-based. In this programme module the Teacher / Tutor will ensure that the Learner uses correct pronunciation and grammatical constructions , to include: sentence connectors, for example, and, or, with, but, then question words, for example, why, where, who, when when communicating in the English language. An ability to read a minimum of 10 introductory level reading texts, on both social information and work-related information. In reading the texts, the Learner will complete tasks to demonstrate an understanding of the context and content of the 3 text An ability to read the message being communicated in a minimum of

	6 common such as name, address, phone number, age, date of birth The collection of work may include work sheets, cloze tests, multiple choice statements or other appropriate evidence in the form of written, oral, graphic, audio, visual or any combination of these. Any audio or video evidence must be provided on tape. Make different activity for the student to be able to use huge amount of sources such report, books, journals to enhance the abilities and skills. Revision problem classes [6 hrs] Part B - Develop the toking and spooking skills

Learning and Teaching Strategies استراتيجيات التعلم والتعليم

Strategies	Use will be made of individual, pair and groupwork to develop students abilities to read increasingly complex academic and general texts. Other skills will be practised and developed within this modules and students will be expected to work extensively out of class to develop their reading fluency. Students will study the specialist vocabulary in the context of published listening and reading materials produced particularly for these ESP situations and also explore lexis within authentic sources. Groups will be managed according to specialist areas and students will be expected to work extensively outside class contact time. Emphasis will be placed on integrating this module to work done within the International Foundation option module programme

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ **15** أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب اسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب اسبوعيا	1
Total SWL (h/sem)	50		

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Week 1 Reading Comprehension
Week 2	Week 2 Writing I
Week 3	Week 3 Writing I
Week 4	Week 4 Learning English through Literature
Week 5	Week 5 Advanced Reading
Week 6	Week 6 Linguistics
Week 7	Week 7 Advanced Writing
Week 8	Week 8 Grammar I
Week 9	Week 9 Grammar II
Week 10	Week 10 Introduction to Literature
Week 11	Week 11 Debate and Dialogue
Week 12	Week 12 General Translation
Week 13	Week 13 Listening & Speaking
Week 14	Listening & Speaking
Week 15	Exam
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1-2	
Week 3-4	
Week 5-6	
Week 7	
Week 8-9	
Week 10 - 11	
Week 12-13	
Week 14	

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Haarman et al. Reading Skills for the Social Sciences. OUP Cotton, D. et al. Business Class. Nelson	No
Recommended Texts	An appropriate selection of Collins Specialist English Dictionaries, ArangeofA-leveltypeStudyGuides	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 الدراسية2024-2025
م.م.ابراهيم جبار خالد

Module Information معلومات المادة الدراسية					
Module Title	**اللغة العربية**			**Module Delivery**	
Module Type	Basic			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	KUS12010				
ECTS Credits	2				
SWL (hr/sem)	**50**				
Module Level	1		**Semester of Delivery**	2	
Administering Department	Medical Physics		**College**	Science	
Module Leader	Ibrahem Jabbar Khaled		**e-mail**	Ibrahim95@yahoo.com	
Module Leader's Acad. Title	Asst. lect.		**Module Leader's Qualification**		
Module Tutor	Ibrahem Jabbar Khaled		**e-mail**	Ibrahim95@yahoo.com	
Peer Reviewer Name	Asst. lect. Ahmed Nadhmi		**e-mail**	**ahmed.nadhmi@yahoo.com**	
Scientific Committee Approval Date	**6/11/2024**		**Version Number**	**1.0**	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims	١. تعليم العربية الفصيحة كونها اللغة الرسمية للوطن. ٢. إبراز أن اللغة جوهر الهوية ورمزها. ٣. توضيح الفرق بين اللغة واللهجة، فاللغة عامة واللهجة خاصة. ٤. استخدام المفردات الفصيحة في السياقات الأكاديمية والعلمية. ٥. تمكين الطلاب من كتابة البحوث والمقالات باللغة العربية الفصحى. ٦. تجنب الأخطاء الشائعة في الكتابة واختيار المفردات المناسبة. ٧. تعزيز الفهم العميق لدى الطلاب لبناء وصياغة التواصل الكلامي. ٨. الاطلاع على نماذج من الأدب العربي شعرًا ونثرًا والاستفادة منها في بناء الذائقة اللغوية. ٩. تطوير مهارات الكتابة الواضحة في السياقات الرسمية والاجتماعية. ١٠. التعرف على علم الصوتيات في اللغة العربية وعلاقته بعلم الفيزياء.
Module Learning Outcomes مخرجات التعلم	بعد إنهاء المقرر، سيكون الطالب قادرًا على: ١. الكتابة السليمة الخالية من الأخطاء. ٢. التعبير العلمي والأكاديمي الدقيق. ٣. توظيف المفردات الفصيحة بتركيب صحيح. ٤. إضافة أساليب لغوية جديدة لفهم المعاني. ٥. اكتساب مهارات التخاطب الإداري في الطلبات الرسمية.
Indicative Contents	المحتويات الإرشادية للمقرر الدراسي: ١. اللغة والمجال العلمي: • لكل تخصص لغته الخاصة التي تلائم مجاله وتعبّر عنه، حيث تمتلك المصطلحات العلمية دلالاتها الخاصة التي تميزها. • تتطلب اللغة العلمية وضوحًا ودقة في المصطلحات المستخدمة في المصادر العلمية المختلفة. ٢. المعاجم العربية وأنواعها: • تختلف المعاجم من حيث طبيعة تصنيف المفردات، فهناك معاجم تاريخية، ومعاجم بلاغية، ومعاجم خاصة بالمصطلحات العلمية. • تمتاز اللغة العربية بتنوع معاجمها وثرائها، مما يعكس التطور التاريخي واللغوي فيها. ٣. علامات الترقيم وأهميتها: • تلعب علامات الترقيم دورًا أساسيًا في فهم النصوص المكتوبة، حيث تساهم في توضيح

المعنى وتقسيم الأفكار وتسهيل القراءة.

• تستخدم في الكتابة العلمية والأدبية على حد سواء، إذ تسهم في إبراز العلاقات بين الجمل والأفكار.

٤. الأسلوب الكتابي وأنواعه:

• الأسلوب الكتابي يمثل بصمة الكاتب، ويتنوع بين الأسلوب العلمي، الأدبي، والخطابي، ولكل نوع خصائصه الخاصة.

• يؤثر الأسلوب في وضوح النصوص واستيعاب القارئ لها.

٥. الأفعال وأزمنتها:

• تمثل الأفعال الجانب الزمني في اللغة، وتتنوع بين الأفعال الثلاثية، الرباعية، الخماسية، والسداسية.

• يدرس هذا الموضوع العلاقة بين الزمن والفعل في اللغة العربية مقارنة بلغات أخرى.

٦. الصوتيات في اللغة العربية وعلاقتها بالفيزياء:

• دراسة الأصوات في اللغة العربية من منظور فيزيائي يوضح مخارج الحروف وتأثير الذبذبات الصوتية عليها.

• يشمل ذلك العلاقة بين علم الأصوات النطقي وعلم الأصوات السمعي ودورهما في تحليل اللغة العربية.

٧. الشعر العربي ودوره الثقافي:

• يمثل الشعر العربي تجسيدًا للمشاعر الفردية والجماعية، ويعد سجلًا لتاريخ وثقافة العرب.

• يتميز بتنوع بحوره وأغراضه مثل المدح، الهجاء، والفخر.

٨. رسم الهمزة وقواعدها:

• الهمزة من القضايا الإملائية المهمة التي تؤثر على المعنى، وتختلف في رسمها بين الوصل والقطع.

• دراستها ضرورية لكل كاتب ناطق باللغة العربية لضمان الدقة في التعبير.

٩. المفاعيل في اللغة العربية:

• تشمل المفاعيل عدة أنواع مثل المفعول به، المفعول المطلق، المفعول لأجله، المفعول فيه، والمفعول معه.

• توجد آراء مختلفة حول المفاعيل بين النحويين والبلاغيين، مما يجعل دراستها ضرورية لفهم تركيب الجمل.

١٠. الأخطاء اللغوية الشائعة:

• تنتشر الأخطاء النحوية والإملائية والأسلوبية بين المتحدثين باللغة العربية، خصوصًا في الإعلام والكتابات الرسمية.

• تشمل الأخطاء الشائعة في العدد، التذكير والتأنيث، والخلط بين بعض المفردات ذات المعاني المتقاربة. ١١. كتابة الطلبات الرسمية: • تتطلب الطلبات الرسمية أسلوبًا واضحًا ودقيقًا، مع ضرورة توظيف الألفاظ المناسبة دون حشو أو تكرار. • يجب أن تكون الطلبات مختصرة، مركزة، وتعبر عن الهدف المطلوب بوضوح	

Learning and Teaching Strategies استراتيجيات التعلم والتعليم

Strategies	استراتيجيات التعلم والتدريس للمقرر يعتمد تدريس مقرر اللغة العربية على مجموعة من الاستراتيجيات التعليمية التي تهدف إلى تمكين الطالب من المهارات اللغوية الأساسية وتعزيز استخدامه الصحيح للغة العربية الفصحى. وتشمل هذه الاستراتيجيات ما يلي: ١. التعليم التفاعلي • يتم إشراك الطلاب في أنشطة تفاعلية تساعدهم على ممارسة اللغة العربية بطريقة عملية. • تشمل الأنشطة الحوارات، والمناقشات الجماعية، والعروض التقديمية، مما يسهم في تحسين مهارات التعبير الشفوي والكتابي. ٢. التطبيق العملي للمهارات اللغوية • يتم تدريب الطلاب على كتابة المقالات والبحوث الأكاديمية بلغة عربية سليمة، مع التركيز على تجنب الأخطاء الشائعة. • تشمل التدريبات تطبيق قواعد النحو والصرف والإملاء في الكتابة الفعلية. ٣. التحليل اللغوي والنقدي • يتم تحليل نصوص متنوعة، سواء كانت أدبية أو علمية، لفهم بنيتها اللغوية وأسلوبها البلاغي. • تشجع هذه الطريقة التفكير النقدي وتساعد الطلاب على استيعاب الفروق بين الأساليب المختلفة في الكتابة. ٤. استخدام التكنولوجيا في التعليم • الاستفادة من الموارد الرقمية، مثل المواقع التعليمية، والمعاجم الإلكترونية، وبرامج التدقيق اللغوي، لدعم تعلم اللغة العربية. • توظيف العروض التقديمية والوسائط المتعددة لشرح القواعد النحوية والصرفية بطرق تفاعلية. ٥. المحاكاة والتمثيل • تنفيذ تمارين تفاعلية مثل تمثيل أدوار في مواقف حياتية تتطلب استخدام اللغة العربية بطريقة صحيحة. • هذه الطريقة تساعد الطلاب على تحسين قدراتهم اللغوية في السياقات الرسمية وغير الرسمية. ٦. التعلم الذاتي والتقييم المستمر • يتم تشجيع الطلاب على تطوير مهاراتهم اللغوية من خلال أنشطة التعلم الذاتي، مثل قراءة الكتب والمقالات، وكتابة اليوميات. • استخدام التقييم التكويني من خلال اختبارات قصيرة، وتمارين كتابية، لتحديد نقاط القوة

والضعف لدى الطلاب والعمل على تحسينها. ٧. التعلم التعاوني والعمل الجماعي • يتم تقسيم الطلاب إلى مجموعات للعمل على مشروعات لغوية مشتركة، مما يعزز مهارات التواصل والتعاون. • يتم تبادل الأفكار والتعليقات حول الكتابات المختلفة لتطوير مهارات النقد والتحليل اللغوي. الهدف من هذه الاستراتيجيات تهدف هذه الاستراتيجيات إلى تمكين الطلاب من استخدام اللغة العربية الفصحى بمهارة، سواء في الكتابة أو التحدث، وتزويدهم بالأدوات اللازمة لفهم وتحليل النصوص بطريقة علمية وأكاديمية	

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ **15** أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب اسبوعيا	٢
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	١٧	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب اسبوعيا	١
Total SWL (h/sem)	٥٠		

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

assessment	**Exam**				
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	الفرق بين اللغة العلمية واللغة الادبية.
Week 2	المعاجم العربية وأنواعها.
Week 3	علامات الترقيم وأهميتها.
Week 4	الأسلوب الكتابي وتأثيره.
Week 5	الأفعال في اللغة العربية وأزمنتها.
Week 6	دراسة الشعر العربي القديم والحديث.
Week 7	الامتحان النصفي.
Week 8	علم الهمزة (همزة الوصل والقطع).
Week 9	الكتابة الصحيحة للعدد والمبتدأ والخبر.
Week 10	المفاعيل في اللغة العربية ودلالاتها.
Week 11	دراسة الأخطاء اللغوية الشائعة ومعالجتها.
Week 12	التعرف على الأساليب الرسمية في كتابة الطلبات الإدارية.
Week 13	النثر العربي وأنواعه.
Week 14	الشعر العباسي والحديث.
Week 15	مراجعة قبل الامتحان النهائي.
Week 16	الامتحانات

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1-2	
Week 3-4	
Week 5-6	
Week 7	
Week 8-9	
Week 10 - 11	
Week 12-13	
Week 14	

Learning and Teaching Resources مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	الكتب والمراجع • الكتب المطلوبة: • كتاب "العربية الجامعية لغير المتخصصين" – د. عبد الراجحي • كتاب "النحو التطبيقي" – د. عبد الله الشارضي • تاريخ الأدب العربي" – شوقي ضيف"	كلا
Recommended Texts	• كتب إضافية مقترحة: • النحو الوافي" – عباس حسن"	كلا
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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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 Programming**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**MPH12009**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		First	**Semester of Delivery**		2nd
Administering Department			**College**	Science	
Module Leader Haider Mohammed		e- mail haider.mohammed@baghdadcollege.edu.iq			
Module Leader's Acad. Title		Assistant Lecturer	**Module Leader's Qualification**		M.Sc.
Module Tutor Haider Mohammed			**e-mail**	Maysara.aljaf@kus.edu.iq	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		21/09/2023	**Version Number**		1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. This course provides a manual to operate MATLAB. It presents a detailed course of MATLAB code capabilities required for general programming. 2. MATLAB is a high-performance language of technical computing. It integrates calculation, visualization and programming in an easy-to-use environment where problems and solutions are expressed in writing programs and implementing algorithms through the graphical user interface. MATLAB is an interactive system whose basic data element is an arrays that does not require dimensions. This allows solving many technical computing problems, especially those with matrix and vector formulations. 3. This course includes interactive lectures and practical applications to enable the student to apply algorithms for image processing and apply enhancement methods. In addition, it enables the student to rotate and scale the image by applying many examples.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The learning outcomes of studying computer programing include: 1. Providing the student with cognitive skills from the basic concepts of programming language and enables them to the skills to run the MATLAB program and dealing with the MATLAB windows and all the types of Statements. 2. Enables students to understood and run all Statements (Loop, Control, Branch), reading and writing data file. 3. Providing the student with cognitive skills to deal with operations with Arrays or Matrices. 4. Providing the student with skills in the technique of dealing with ready-made functions in the language of MATLAB. 5. Providing the student with skills in the Plotting Capabilities, Subplots, 2D Plotting, 3 D Plotting 6. Enables students to deal with the Files: M-files, and functions. 7. They will also learn about algorithms and how to apply them to solve problems. 8. Additionally, they will acquire skills in opening graphical interfaces using the GUIDE UI. 9. Furthermore, the course will cover the types of images and their importance in processing. 10. Students will be provided with digital image processing skills in the MATLAB

	language.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A</u> Logical Operators, Algorithms and Control Structures, Advantages of algorithm. [5 hrs] <u>Part B</u> MATLAB Windows: Window layout, Command Windows, History Window, Workspace Window, Editor Window, Figure Window, General MATLAB Code: Types of Statements, Rules for Statement Editing, Arithmetic Statement. Constant Value, Variables, Numerical. Variable, Logical Variable, Character Variable, Arrays and Matrices: Index Concept Numerical Arrays and Matrices, Operations on one Arrays or Matrices, N-Dimension Matrices, Logical Arrays, character and String Variables. [12 hrs] <u>Part C</u> Operators, Expression, Loop Statement, Control Statement, Branch Statement, reading and writing data file, Plotting: , Plotting Elementary Function- XY- plotting functions, Generating Sub-Plots, Create Line Plot from Matrix, Specify Line Style, Specify Line Style and Color, Specify Line Width, and Color, Add Title and Axis Labels. [12 hrs] <u>Part D</u> Functions & Files, a) Elementary Mathematical Functions, b) User Defined Functions ,c) Advanced Function Programming ,d) Working with Data Files, Introduction to Graphical User Interfaces (GUI) using GUIDE ,Set the Window Size in GUIDE, Layout the Simple GUIDE UI. [10 hrs] <u>Part E</u> Programming Techniques: Image Types , •Indexed images, •Intensity (or grayscale) images, •RGB (or truecolor) images, Convert signals from an image sensor into digital images, Examples ,Convert Between Image Types, Convert Between Data Types. [8 hrs] <u>Part F</u> Image Rotation and Scale, Examples, Define Image Processing, Image processing in MATLAB, Read Image, Show Image, Examples, Improve clarity, and remove noise and other artifacts, (Enhancement methods in image processing). [8 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	When it comes to teaching computer programming, it is important to use strategies that engage students, promote active learning, and facilitate the development of problem-solving and critical-thinking skills. Here are some effective teaching strategies for computer programming: 1. Hands-on coding practice: must provide ample opportunities for students to write code and practice programming through assign coding exercises, projects, and challenges that allow students to apply the concepts they have learned. 2. Pair programming: should encourage students to work in pairs, with one student as the "driver" who writes the code and the other as the "navigator" who reviews the code and offers suggestions. This collaborative approach promotes active learning, communication, and problem-solving skills. 3. Code reviews and feedback: Regularly review and provide feedback on students' code. Offer constructive criticism and guidance on how to improve their programming skills. Encourage students to review and provide feedback to their peers, fostering a culture of collaboration and continuous improvement. 4. Project-based learning: Assign projects that require students to design and develop software applications or solve real-world problems using programming. Project-based learning provides a context for applying programming skills, encourages creativity, and promotes deeper understanding of programming concepts. 5. Demonstrate coding practices: Model good coding practices by writing clean, well-structured code. Explain the reasoning behind coding decisions, such as variable names, code organization, and documentation. Show examples of code refactoring and optimization to help students understand the importance of writing efficient code. 6. Use visual aids and interactive resources: Utilize visual aids, diagrams, flowcharts, and interactive programming environments to explain programming concepts. Visual representations can help students grasp abstract concepts and understand program flow. 7. Real-world examples and applications: Connect programming concepts to real-world examples and applications. Illustrate how programming is used in various domains, such as web development, mobile app development, data analysis, or game development. This helps students understand the practical applications of programming and fosters motivation. 8. Updated with technology trends: Stay informed about the latest programming languages, frameworks, and tools. Integrate current and relevant examples into your teaching to expose students to industry-relevant skills.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.8
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	5% (5)	4	LO # 1, 2,3,7 and 11
	Assignments	2	10% (10)	5,7,14	LO # 4, 5,6,10,11,12 and 13
	Projects / Lab.	1	20% (20)	Continuous	
	Report	1	5% (5)	10	LO # 8 and 9
Summative assessment	**Midterm Exam**	1hr	10% (10)	9	LO # 1-8
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Logical Operators, Algorithms and Control Structures, Advantages of algorithm, Examples
Week 2	MATLAB Windows: Window layout, Command Windows, History Window, Workspace Window, Editor Window, Figure Window.
Week 3	General MATLAB Code: Types of Statements, Rules for Statement Editing, Arithmetic Statement. Constant Value, Variables, Numerical. Variable, Logical Variable, Character Variable.
Week 4	Arrays and Matrices: Index Concept Numerical Arrays and Matrices, Operations on one Arrays or Matrices, N-Dimension Matrices, Logical Arrays, character and String Variables.
Week 5	Operators, Expression, Loop Statement, Control Statement, Branch Statement, reading and writing data file.

Week 6	Plotting: , Plotting Elementary Function- XY- plotting functions, Generating Sub-Plots, Create Line Plot from Matrix, Specify Line Style, Specify Line Style and Color, Specify Line Width, and Color, Add Title and Axis Labels.
Week 7	Functions & Files, a) Elementary Mathematical Functions, b) User Defined Functions ,c) Advanced Function Programming ,d) Working with Data Files .
Week 8	Introduction to Graphical User Interfaces (GUI) using GUIDE
Week 9	Set the Window Size in GUIDE, Layout the Simple GUIDE UI
Week 10	Programming Techniques: Image Types , •Indexed images, •Intensity (or grayscale) images, •RGB (or truecolor) images.
Week 11	Convert signals from an image sensor into digital images, Examples
Week 12	Convert Between Image Types, Convert Between Data Types, Examples
Week 13	Image Rotation and Scale, Examples
Week 14	Define Image Processing, Image processing in MATLAB, Read Image, Show Image, Examples
Week 15	Improve clarity, and remove noise and other artifacts, (Enhancement methods in image processing) , Examples
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1,2	Lab 1: MATLAB Windows, example of Constant Value, Variables, Numerical. Variable, Logical Variable, Character Variable.
Week 3,4	Lab 2: Examples of Arrays and Matrices: Index Concept Numerical Arrays and Matrices, Operations on one Arrays or Matrices, N-Dimension Matrices, Logical Arrays, character and String Variables.
Week 5,6	Lab 3: Examples of Operators, Expression, Loop Statement, Control Statement, Branch Statement, reading and writing data file.
Week 7	Mid Exam
Week 8,9	Lab 4: Examples of Plotting: , Plotting Elementary Function- XY- plotting functions, Generating Sub-Plots, Create Line Plot from Matrix, Specify Line Style, Specify Line Style and Color, Specify Line Width, and Color, Add Title and Axis Labels.
Week10,11	Lab 5: Functions & Files, Introduction to Graphical User Interfaces (GUI) using GUIDE ,Set the Window Size in GUIDE, Layout the Simple GUIDE UI
Week11,12	Lab 6: Programming Techniques: Image Types , •Indexed images, •Intensity (or grayscale) images, •RGB images, Convert signals from an image sensor into digital images, Examples.
Week12,13	Lab 7: Examples of convert between Image Types, Convert Between Data Types, Show Image.

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1- Matlab: Numerical Computing, Tutorials point,2014. 2- Alasdair McAndrew, An Introduction to Digital Image Processing with Matlab, Notes for SCM2511 Image, Processing 1, Semester 1, 2004, School of Computer Science and Mathematics, Victoria University of Technology. 3- The MathWorks, Image Processing Toolbox For Use with MATLAB, Version 2, COPYRIGHT 1993 - 2000.	Yes
Recommended Texts	1- Brian R. Hunt, Ronald L. Lipsman, Jonathan M. Rosenberg, R. Coombes, John E. Osborn, and Garrett J. Stuck, AGuide to MATLAB for Beginners and Experienced Users, Cambridge, University Press,2001	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	**General Physics**			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☒**Lecture** ☒**Lab** ☒**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**SCI12012**				
ECTS Credits	**7**				
SWL (hr/sem)	**175**				
Module Level		1	**Semester of Delivery**		2
Administering Department		Medical Physics	**College**	Science	
Module Leader	Dr. Akeel M. Kadim		**e-mail**	laith.abdulsatar@baghdadcollege.edu.iq	
Module Leader's Acad. Title		Assist. Profesor	**Module Leader's Qualification**		Ph.D.
Module Tutor	Akeel M. Kadim		**e-mail**	dr.akeelm.kadim@kus.edu.iq	
Peer Reviewer Name		Dr.Walaa esam	**e-mail**	walaa.isam@baghdadcollege.edu.iq	
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 Aims أهداف المادة الدراسية	1. To have knowledge about General Physics basic principles like Mechanics of liquid and material properties. 2. To get skills in solving mathematical problems that related to physics subjects. 3. To get practical skills in managing physics experiments in the lab. and record measurements and then calculate required quantities. 4. Analysis the physical information in syllabus and be able to make conclusions by joining between physical concepts. 5. To be able to apply his knowledge in physics in market.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Save in memory basic principles and laws of Fluids and material properties. 2. Produce scientific concepts by joining between physical principles. 3. Joining physical concepts to produce more complicated concepts. 4. The ability to make conclusions by analysis the physical information. 5. The ability to apply all his knowledge to solve problems in reality. 6. To be able to run the devices and apparatus in the lab. 7. Assemble devices and make an experiment to prove physical relation. 8. Discuss the results get from running experiment in the lab. 9. Make reports from theory to conclusion about any physical concept proved in the lab.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1- You will begin your study with Fluid Properties like density and pressure 2- You will learn how to measure the Pressure and Pressure varying with depth 3- You will learn Pascal and Archimedes principles 4- You will study Fluid dynamics and Bernoulli equation 5- You will study thermal Physics (heat, internal energy and specific heat) 6- You will study kinetic theory of gases

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding

	their critical thinking skills. This will be achieved through classes, online lectures and home works and by considering type of simple experiments involving some sampling activities that bring attention of the students.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	97	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
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)	4,6	LO #1, 2
	Assignments	2	10% (10)	2, 12	LO # 3, 4, and 5
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 5, 9
Summative assessment	**Midterm Exam**	1 hr	10% (10)	7	LO # 1-7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Fluid Mechanics: Fluid Density and Pressure
Week 2	Measuring Pressure
Week 3	Pascal principle
Week 4	Archimedes principle of Buoyancy
Week 5	Fluid dynamics and Bernoulli's Equation
Week 6	Surface tension

Week 7	Exam
Week 8	Thermal Physics: Heat and internal energy
Week 9	Specific Heat
Week 10	Energy transfer
Week 11	Applications of Energy transfer
Week 12	Calorimeter
Week 13	Ideal gases
Week 14	Kinetic theory of gases
Week 15	Applications of Kinetic theory of gases
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1,2	Lab 1,2: Introduction to diagrams and report writing
Week 3,4	Lab 3,4: Surface tension
Week 5,6	Lab 5,6: Center of Pressure
Week 7,8	Lab 7,8: Flow Through a Venturi Meter
Week 9,10	Lab 9,10: Measure the specific Heat capacity of liquid by method of cooling
Week 11,12	Lab 11,12: Measure the specific Heat capacity of Copper by Calendar method
Week13,14	Lab 13,14: Determination of coefficient of apparent cubic expansivity of a liquid
Week 15	Lab 15: Measure of Specific Heat capacity of Metal by method of mixtures

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Applied Physics by Schaum 2013	No
Recommended Texts	Physics for scientists and engineers by Serway 2004.	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering	

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	MPH12007				
ECTS Credits	**7**				
SWL (hr/sem)	**175**				
Module Level	1		**Semester of Delivery**	2	
Administering Department	Medical Physics		**College**	Science	
Module Leader	**Assit. Lect. Manal Nasir**		**e-mail**	manalpower@baghdadcollege.edu.iq	
Module Leader's Acad. Title	Assit. Lect.		**Module Leader's Qualification**	Msc	
Module Tutor	Assit. Lect. Manal Nasir		**e-mail**	manalpower@baghdadcollege.edu.iq	
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	21/9/2023		**Version Number**	0.1	

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 Aims أهداف المادة الدراسية	1. To develop an understanding of the fundamentals of mechanics. 2. To develop problem solving skills in mechanics through the application of concepts in statics and dynamics to real world problems. 3. To introduce the standards and associated measurements that regulate the use of mechanics. 4. To provide reinforcement of learning using laboratory investigations.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Define the meaning of mechanics. 2. Develop a clear understanding of basic physical phenomena in physics and materials science as an integral part of the student's overall education 3. Compare between vectors and scalar quantities. 4. Calculate and find the displacement, velocity and acceleration of bodies. 5. Use algebra, trigonometry, and basic calculus, in solving problems in one and two dimension motion. 6. Provide detailed and accurate description of forces effect on bodies. 7. Classify the energy types. 8. Calculate the work done on subject.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Vectors and scalars Learn the differences between scalars and vectors quantity. The mathematical process that done on vector quantities. [15 hrs] Part B- motion The differences between distance and displacement, speed and velocity. The motion in one dimension. The motion in two dimensions. The uniform circular motion. Non uniform circular motion. [30 hrs]. Part C- forces: Newton's laws in motion. Weight force, friction force, drag force. Nature force [10 hrs] Part D- work and energy: Work done on subject. Kinetic energy. Potential energy. Spring. The power [17 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	This course will be delivered through a combination between theoretical lectures in the classroom and experimental lectures in the Lab. The students will receive the outcome of each lecture through discussions, videos related to the subject and questions. In addition, the information will be developed by self-learning through reading and searching to hand in the essay and home works.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	97	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Vectors and scalar
Week 2	Unit victors.
Week 3	Motion in one dimension
Week 4	Motion in two dimensions
Week 5	Uniform circular motion.
Week 6	Force and motion: Newton's laws.
Week 7	Midterm exam.
Week 8	Forces types
Week 9	Work
Week 10	Energy, kinetic energy
Week 11	Potential energy
Week 12	Power
Week 13	Momentum
Week 14	Collision in one dimension
Week 15	Collision in two dimensions
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to the mechanics lab: safety and training
Week 2	How can we draw graph in mechanics lab?
Week 3	The simple pendulum
Week 4	Hooke's law
Week 5	The linear air track: Part 1
Week 6	The linear air track: Part 2
Week 7	Young's modulus

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**Jearl Walker "fundamental of physics" (2005), 8th edition.**	Available online
Recommended Texts	**Hans C. Ohanian, John T. Markert "physics for engineers and scientists "(2009), 3rd edition.**	yes
Websites	**Various lectures and lecture notes on the internet.**	

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	Optics			**Module Delivery** يجب تحديد متطلبات المادة	
Module Type	Core			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☒ **Practical** ☒ **Seminar**	
Module Code	MPH21014				
ECTS Credits	7				
SWL (hr/sem)	175				
Module Level	2^{nd}		**Semester of Delivery**	1^{st}	
Administering Department	Medical Physics		**College**	Science	
Module Leader	Dr. Walaa Isam Rasool		**e-mail**	walaa.isam@baghdadcollege.edu.iq	
Module Leader's Acad. Title	Instructor Doctor		**Module Leader's Qualification**	Ph.D	
Module Tutor	Dr. Walaa Isam Rasool		**e-mail**	walaa.isam@baghdadcollege.edu.iq	
Peer Reviewer Name	Dr. laith abdulsatar		**e-mail**	Laith.abdulsatar@baghdadcollege.edu.iq	
Scientific Committee Approval Date	01/09/2024		**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 Aims أهداف المادة الدراسية	1. Understand the fundamental of optics that representing by geometrical optics and waves optics. 2. Increase students' knowledge about optics terms such as refractive index, optical path, critical angle, total internal reflection, thin lenses, mirrors, and image formation by optical elements, as well as Interference phenomena, Diffraction phenomena, polarization phenomena of light. 3. Provide the student with knowledge information about the electromagnetic spectrum and its wide uses in the medical fields (medical imaging and medical treatment as well as medical devices based on light). 4. Preparing the student to deal professionally with optical devices and optical elements, and how to calculate their optical constants. 5. Enable the student to distinguish between the Interference phenomena and Diffraction phenomena. 6. Provide the student with knowledge about the most important optical element present in the human body, which is the eye, and how to determine vision defects mathematically.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Distinguish between the ray optics and wave optics. 2. Calculating the refractive index, the optical path and determining the critical angles for light travels between two media. 3. Knowing how to form images in lenses and mirrors, calculating the focal length of optical elements. 4. Determining vision defects and how to calculate the appropriate focal length for each pathological condition of vision defects. 5. Distinguish between interference and diffraction of light and calculation the fringes width. 6. Determine the constructive interference equation for bright fringes and the destructive interference equation for dark fringes. 7. Study the electromagnetic spectrum and determine the photon's energies. 8. Defining polarization, identifying its types, and calculating the intensity of light transmitted by polarizers.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A - Nature and propagation of light Particle theory of light – Particle theory of light (Newton's Theory)- Wave theory of Light (Huygens Theory)- Dual Nature of Light De Broglie Hypothesis- Concept of a photon- Energy of photon - Characteristics of light waves- The Electromagnetic Spectrum. [8 hrs] Part B – Geometrical Optics Ray Optics- Refractive Index- Laws of Refraction- Snell's Law- Optical Path Length- Fermat's Principle- The Critical Angle - Total internal reflection - Refraction of Light through a Glass Prism. [8 hrs] Dispersion- Color Dispersion - Spherical surfaces - Graphical constructions- Convention of signs for distances- Derivation of the Gaussian formula – Magnification image in spherical surfaces. [8 hrs]

	Thin lenses -Types of lenses- Image Formation- The lens formula- Image Formation -Derivation of the lens Maker's formula- Lateral Magnification of Lenses- The Power of thin lens- Thin Lens combinations- Mirror formula- Gaussian formula for spherical mirror. [8 hrs] Spherical Mirrors- Mirror formula - Gaussian formula for spherical mirror- The lateral magnification image of the mirror- Mirror image characteristics. [4 hrs] The Human Eye- Myopia (nearsightedness)- Hypermetropia (farsightedness)- Presbyopia - Cataract- Astigmatism- Types of Astigmatism- Myopic astigmatism- Hyperopic astigmatism- Mixed astigmatism [10 hrs] Revision problem classes [8 hrs] Part C – Waves Optics Superposition of waves - Coherent and incoherent sources- Constructive Superposition - Destructive Superposition- Superposition of two waves at the same frequency- Standing Waves- Superposition of two harmonic perpendicular oscillations. [10 hrs] Interference of Light Waves- Types of interference- Conditions for interference- Young's Experiment- Intensity Distribution in the Young's Experiment- Fringe Width and Mathematical Expression. [12 hrs] - Diffraction- Single Slit Diffraction (Fraunhofer Diffraction)- Diffraction by Rectangular Aperture- Resolving Power of a Rectangular and Circular Aperture- Double-Slit Diffraction Pattern- Diffraction Grating- Dispersion power of grating- Resolving Power. [12 hrs] Polarization of light- Types of Polarization -Polaroid- Maul's Law- Brewster's Law- Application of Polarization. [9 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Strategies in teaching optics are centered on the teacher and the students, It depends mainly on equipping the student with theoretical and practically skills in the field of geometric optics and wave optics through the participation of students in preparing reports, assignments, seminars and projects, preparing lectures, solve optics examples and encouraging students' teamwork. And conduct optics experiments in the laboratory and increase their scientific skills and how they deal with devices and optical elements. The strategy of the optics class is to increase students' awareness of the importance of optical laws on which medical devices used in medical clinics and hospitals depend.

Student Workload (SWL) الحمل الدراسي للطالب موزع على (15) أسبوع			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	97	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
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%	5,10	LO# 1,2
	Assignments	2	10%	2,12	LO# 3,4,6 and 7
	Projects / Lab.		10%	continuous	
	Report	1	10%	13	LO # 5,8
Summative assessment	**Midterm Exam**	1 hr	10%	7	L0# 1-7
	Final Exam	3 hr	50%	16	All
Total assessment			100%(100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Nature and propagation of light electromagnetic spectrum.
Week 2	Refractive index , Fermat principle ,Critical angles and total internal reflection.
Week 3	Dispersion of light. prism and minimum deviation angle.
Week 4	Reflection and refraction at spherical surfaces.
Week 5	Thin Lenses , Lens maker's equation, Gaussian formula.
Week 6	Lenses combined.
Week 7	Mirrors and Magnification of images in mirrors.
Week 8	Optical Devices, The eye, defect of visions.
Week 9	Waves and Physical Optics, Transverse wave and the hypotheses of light.
Week 10	Superposition of Waves and Coherent and incoherent sources.
Week 11	Interference phenomena, Young's Experiment and Intensity Distribution in the Young's Experiment.
Week 12	Diffraction Phenomena and types of diffractions.
Week 13	Fraunhofer diffraction and Single Slit Diffraction (Fraunhofer Diffraction).
Week 14	Dispersion power of grating and Resolving power of grating.
Week 15	Polarization of light.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Optical path experiment
Week 2	Lab 2: snell's law and critical angle experiment
Week 3	Lab 3: convex lens Determine focal length experiment
Week 4	Lab 4: concave mirror experiment
Week 5	Lab 5: prisms and light dispersion experiment
Week 6	Lab 6: Grating Diffraction experiment
Week 7	Lab 7: Newton's Rings
Week 8	Lab 8: Young's double slit experiment

Delivery Plan (Weekly Tutorial) المنهاج الاسبوعي الإضافي	
	Material Covered
Each week, a question sheet related to the material presented in the theoretical lecture will be solved and debated.	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1- Fundamental of Optics, by Jenkins and White Application and Design, 4th Edition, John Wiley, 2010. (R856.M489 2010). 2- Introduction to Modern Optics , 2nd Edition by Grant R. Fowle.	No
Recommended Texts	Handbook of Optics, Third Edition Volume I: Geometrical and Physical Optics, Polarized Light, Components and Instruments(set) , by Michael Bass , Casimer DeCusatis , Jay Enoch .	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

التصوير الطبي

Module Information معلومات المادة الدراسية					
Module Title	**Medical Imaging**			**Module Deliver**	
Module Type	**Core**			☒**Theory** ☐ **Lecture** ☒**Lab** ☒**Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MPH22023				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	2nd		**Semester of Delivery**	2nd	
Administering Department	Medical Physics		**College**	Science	
Module Leader	Dr. Laith Abdulsatar		**e-mail**	laith.abdulsatar@baghdadcollege.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	-		**e-mail**	-	
Peer Reviewer Name	-		**e-mail**	-	
Scientific Committee Approval Date	01/7/2024		**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 Aims أهداف المادة الدراسية	1. To develop a basic understanding to the basic physics of medical imaging. 2. To understand the relationship between electromagnetic radiation and biological tissues. 3. To distinguish between the various interactions occurring in tissues and to be able to identify beneficial ones from the non-beneficial for medical imaging. 4. To gain basic understanding to medical imaging techniques employed in modern hospitals, including x-ray imaging, computed tomography, magnetic resonance imaging, ultrasound and nuclear isotope imaging. 5. To provide you with sufficient knowledge of introductory radiation biology and physics to allow you an appreciation of safe and optimal use of radiation imaging techniques.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Identify the role of medical physicist in the medical imaging process. 2. Understand the concept of ionizing radiation. 3. Distinguish between different interactions of x-ray with matter. 4. Understand the outcome of each x-ray interaction with matter. 5. Differentiate the main terms related to radiation attenuation. 6. Understand x-ray production process. 7. Appreciate the main features of x-ray images. 8. Classify x-ray modalities. 9. Review CT system design. 10. Differentiate between different modes of CT acquisition. 11. Comprehend the approach of nuclear imaging 12. Differentiate between different types of medial nuclear imaging. 13. Review the principles of ultrasound imaging. 14. Distinguish between different types of MRI. 15. Define the main concepts of radiation biology
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: <u>Part A – Medical Imaging principles</u> The basis of medical imaging, The role of a Medical Physicist, Electromagnetic

	Radiation, Radiation from Electron Transitions, Characteristic x-rays and Auger Electrons [15 hours] Part B – Medical Imaging with Ionizing Radiation Interaction of x-ray Radiation with Matter, Kerma, Radiation Dose, X-ray Production, X-ray Detection, Computed (digital) Radiography, Radiographic image, Mammography, Computed Tomography, Modes of CT Acquisition, Clinical use of CT scans, Nuclear physics, Tomography with radionuclides, SPECT and PET [30 hours] Part C – Medical Imaging with non-Ionizing Radiation Ultrasound waves, Ultrasound Transducers, 3D-Ultrasound, Doppler-ultrasound, Magnetic Resonance Imaging and Clinical applications of MRI [20 hours] Part D- Radiation Biology Classification of Biologic Effects, Stochastic effects, Deterministic effects, Radiation Protection, Attenuation of X-rays and Gamma Rays,, Half-Value Layer [7 hours]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module will be delivered through a combination of lectures, discussions and web-based learning. At the end of each lecture, students will receive more specific learning outcomes for the lecture and be expected to undertake self-directed further reading and research.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**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/Nu	**Weight (Marks)**	**Week Due**	**Relevant Learning**

		mber			Outcome
Formative assessment	Quizzes	2	20% (20)	5, 10	LO #1-4, 5-9 and 10-14
	Assignments	2	10% (10)	6,10	LO #3-5
	Projects / Lab.	1	10% (10)	Continuous	
	Report				
Summative assessment	Midterm Exam	1 hr	10% (10)	8	LO # 1-9
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Medical Imaging
Week 2	Electromagnetic Radiation
Week 3	Radiation interaction with matter
Week 4	X-ray Production
Week 5	X-ray interaction with matter
Week 6	X-ray Detection
Week 7	X-ray Modalities
Week 8	Midterm Exam
Week 9	Computed Tomography
Week 10	Nuclear Imaging
Week 11	Ultrasound Imaging
Week 12	Magnetic Resonance Imaging
Week 13	Radiation Biology & Protection
Week 14	Radiation Attenuation
Week 15	Overview of future developments in medical imaging
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction to medical imaging lab
Week 2	Lab 2: Features of Medical images
Week 3	Lab 3: X-ray positioning
Week 4	Lab 4: CT positioning and imaging procedures
Week 5	Lab 5: MRI positioning and imaging procedures
Week 6	Lab 6: PET scan Procedure
Week 7	Lab 7: Medical imaging standard practices

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1. Samei, Ehsan, and Donald J. Peck. Hendee's physics of medical imaging. John Wiley & Sons, 2019. 2. Alisy-Roberts, P., and J. Williams. "Farr's Physics for Medical Imaging." (2008).	No
Recommended Texts	Dendy, Philip Palin, and Brian Heaton. Physics for diagnostic radiology. CRC press, 2011.	No
Websites	https://www.iomp.org/	

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 لعام ٢٠٢٥-٢٠٢٦

اسم المادة: الثرموداينمك القسم: الفيزياء الطبية اسم الاستاذ: أ.م. هدى نجم الدين عبد اللطيف
المرحلة الثانية- الفصل الدراسي الاول

Module Information معلومات المادة الدراسية					
Module Title	Thermodynamics			**Module Delivery** يجب تحديد متطلبات المادة	
Module Type	Core			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MPH21018				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	2nd		**Semester of Delivery**	1	
Administering Department	MPHY		**College**	SCI	
Module Leader	Ass. Prof. Huda Najimeuldeen		**e-mail**	hudanajim@ baghdadcollege.edu.iq	
Module Leader's Acad. Title	Ass. Prof.		**Module Leader's Qualification**	MsC.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name			**e-mail**	E-mail	
Scientific Committee Approval Date	27-9-2025		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. The course aims to provide 2nd stage students with basic knowledge of thermodynamics. 2. To understand that everything related to energy and understand the concepts such as the first law of thermodynamics and the second law and its applications. 3. To enable students to access the science of thermodynamics by understanding how to correct engineering analysis and how to deal with laws, equations, illustrations and other data. 4. Enabling the student to be able to analyze, devise and draw conclusions. theory through the application of techniques 5. Follow-up of scientific development through the Internet and keeping pace with scientific development by setting up experiments synchronized with theoretical topics.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Learning the basic concepts of thermodynamics and the properties of substances using property tables or property relations. 2. Understanding the different forms of energy, energy interactions by heat and work transfer, and the 1st law of thermodynamics. 3. Solving real world engineering problems related to energy by applying the 1st law thermodynamics to closed and open systems like piston-cylinder devices, turbines, and charging/discharging processes. 4. Understanding the 2nd law of thermodynamics and quantifying the performance of heat engines, heat pumps and refrigerators, reversible and irreversible processes 5. Defining entropy, developing entropy change relations, and deriving the increase of entropy principle, 6. Performing 2nd law analysis of engineering processes by quantifying entropy generation. 7. Analyzing some basic thermodynamics cycles like the Otto, Diesel, Brayton cycles for power production and the vapor compression refrigeration cycle for cooling applications.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A -Thermodynamic systems_Thermodynamic systems (closed and open),Thermodynamic properties and equilibrium, State of a system, state postulate for simple compressible substances, state diagrams, paths and processes on state diagrams, Concepts of heat and work, different modes of work, Concept of temperature [15 hrs]. Concept of energy and various forms of energy, Internal energy, enthalpy, Specific heats, First law applied to elementary processes, closed systems and control volumes, steady and unsteady flow analysis [13 hrs] Part B -Thermodynamic properties Thermodynamic properties of pure substances in solid, liquid and vapor phases, P-vT behaviour of simple compressible substances, phase rule [10hrs]. Thermodynamic property tables and charts, ideal and real gases, ideal gas

	equation of state and van der Waals equation of state, Law of corresponding states, compressibility factor and generalized compressibility chart [15 hrs] Part C: laws of thermodynamics Limitations of the first law of thermodynamics , Concepts of heat engines and heat pumps/refrigerators, Kelvin-Planck and Clausius statements and their equivalence, Reversible and irreversible processes, Carnot cycle and Carnot principles/theorems, Thermodynamic temperature scale, Clausius inequality and concept of entropy, Microscopic interpretation of entropy (The principle of increase of entropy) and (T-s diagrams), Second law analysis of control volume, Availability and irreversibility, Third law of thermodynamics [20 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy in delivering this course is to encourage students to participate in thermodynamic problem solving, while simultaneously improving and expanding their critical thinking skills through training in the correct way of thinking to solve complex problems. This is achieved through classes and practical experiments matched with theoretical studies and by thinking about the type of scientific experiments that include some applications of thermodynamic laws that are of interest to students.

Student Workload (SWL) الحمل الدراسي للطالب موزع على (١٥) اسبوع			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.8
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)	2,6,10,12	LO #1, 2,
	Assignments	1	10% (10)	2, 12	LO # 3, 4, 6 and
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 5,

Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1. 5
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**General Introduction** **Basic definitions of thermodynamics**
Week 2	**Definitions and concept for microscopic properties**
Week 3	**Zeroth law of thermodynamics and general law of gases**
Week 4	**Equation sate and work Week 5**
Week 5	**1st law of thermodynamics and the internal energy function**
Week 6	**Heat transfer and the specific heat capacity at constant pressure Week 7**
Week 7	**Phase Diagram**
Week 8	**2 nd law of thermodynamics and irreversible processes nd2**
Week 9	**Carnot cycle**
Week 10	**Gibbs and Helmholtz free energy**
Week 11	**Entropy**
Week 12	**Enthalpy**
Week 13	**Maxwell equations Week 14**
Week 14	**3ed.law of thermodynamics rd3 Week 15**
Week 15	**Nernast principle Week 16**
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)المنهاج الاسبوعي الاضافي	
	Material Covered
Week 1	Lab 1 : Measurement of Thermal Conductivity by Lee's Disc method.
Week 2	Lab 2: Specific Heat Capacity of liquid by cooling method Experiment
Week 3	Lab 3: Determination of the coefficient of apparent cubic expansivity of a liquid by Mathiessen' s sinker method.
Week 4	Lab 4: Entropy of system.
Week 5	Lab 5: Experiment to measure Specific Heat Capacity of a Metal by Method of Mixtures.
Week 6	Lab 6: Measuring the Specific Heat Capacity for Different material Week 7
Week7	Lab 7:Coefficient of Linear Expansion of copper

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Fundamental of thermodynamics (6th edition) S. BORGNAKKE and VAN WYLEN	Yes
Recommended Texts	Thermodynamics: An Engineering Approach, 9th ed in SI Units Yunus A. Çengel, Michael A. Boles, M. Kanoğlu, McGraw-Hill Education	NO
Websites	https://www.tutorialspoint.com/gate_syllabus/gate_xe_thermodynamics_syllabus.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

Atomic Physics

Module Information معلومات المادة الدراسية					
Module Title	Atomic Physics			**Module Delivery** يجب تحديد متطلبات المادة	
Module Type	core			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MPH21015				
ECTS Credits	7				
SWL (hr/sem)	175				
Module Level	2nd		**Semester of Delivery**	1st	
Administering Department	Medical Physics		**College**	Science	
Module Leader	Dr.Laith Abdul Sattar Jabbar		**e-mail**		
Module Leader's Acad. Title	Lecture		**Module Leader's Qualification**	PhD	
Module Tutor	Dr.Laith Abdul Sattar Jabbar		**e-mail**	laith.abdulsatar@baghdadcollege.edu.iq	
Peer Reviewer Name	Assist. Prof. Farid M. Mahdi		**e-mail**	f.m.mahdi@baghdadcollege.edu.iq	
Scientific Committee Approval Date	6/11/2024		**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 Aims أهداف المادة الدراسية	Get knowledge about the principles of Atomic Physics
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Knowledge of the atomic structure. 2- 2- Identification the basic atomic physical laws 3- 3- Enrich knowledge about atomic reaction
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1- The importance of atomic physics in understanding the atomic structure of materials. 2- The importance of knowing the new techniques in atomic physics 3- Knowing how to conclude from facts to get new principles.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب موزع على (15) اسبوع			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	97	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
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)	5,10	LO #1, 2
	Assignments	2	10% (10)	2,12	LO # 1,2, and 3
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 2,3
Summative assessment	**Midterm Exam**	1hr	10% (10)	7	LO # 1-3
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Atomic models (Rutherford model)
Week 2	Bohr model
Week 3	Atomic Hydrogen quantization
Week 4	Atomic spectrum of hydrogen atom
Week 5	Correspondence principle, Quantum numbers, Pauli exclusion principle, Hund's rule
Week 6	Exam
Week 7	Plank theory
Week 8	Black body radiation
Week 9	Photoelectric effect
Week 10	X-ray
Week 11	Spin-orbit interaction
Week 12	Selection rules
Week 13	Zeeman effect
Week 14	Stark effect
Week 15	Preparatory week before the final Exam
Week 16	**Exam**

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1-2	Milikan oil drop experiment
Week 3-4	Determination of specific charge e/m the electron experiment
Week 5-6	Frank-Hertz experiment
Week 7	Exam
Week 8-9	Photo- electric effect
Week 10-11	Stephan's law of Black body radiation
Week 12-13	Planck constant
Week 14	Review

Delivery Plan (Weekly Tutorial) المنهاج الاسبوعي الاضافي	
	Material Covered
Each week, a question sheet related to the material presented in the theoretical lecture will be solved and debated.	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Atomic Physics by C.J. Foot, University of Oxford, 2005	no
Recommended Texts	Atomic and Nuclear Physics, by T.A.Littlefield & N.Thorley	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.

Modules Description Form

نموذج وصف المادة الدراسية

Differential Equations

Modules description Information معلومات المادة الدراسية				
Modules Title	**Differential Equations**		**Modules Delivery**	
Type	**Basic**		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Course Code	MPH21013			
ECTS Credits	**4**			
SWL (hr/sem)	**100**			
Modules Level	2nd	**Semester of Delivery**	1st	
Administering Department	Medical Physics	**College**	Science	
Modules Leader	Assit. Lecturer. Adil Nihe	**e-mail**	math79@baghdadcollege.edu.iq	
Modules Leader's Acad. Title	Assistant Lecturer	**Modules Leader's Qualification**	MSc.	
Modules Tutor	non	**e-mail**		
Peer Reviewer Name	non	**e-mail**		
Scientific Committee Approval Date	27/09/2025	**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite course	The course to develop the student's ability to understand differential equations (D.E) in physical applications and apply a number of issues based on basic differential equations principles, and to provide the student with the ability to interpret some applications related to physical subject and their applications, and to build the basic for understanding the subsequent courses.	**Semester**	
Co-requisites course	Non	**Semester**	

Aims of a Cource, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Aims Course أهداف المادة الدراسية	1- Providing the student with a cognitive skill about the basic concepts of Derivative equations. 2- Introducing students to the most important principles of differential equations and applications. 3- Introduce the student to the differential equations and methods of their application. 4- Providing the student with knowledge of how to solve equations.
Course Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Enabling students to obtain knowledge and understanding of the topics of differential equations. 2- Enable students to obtain knowledge and understanding of solve of method equations 3- Enable students to obtain knowledge and understanding of the use of basic physical laws in D.E and their use in solving problems.

Indicative Contents	Indicative content includes the following. Part A – D.E equations Introduction Fundamental of Type of D.E and Conversion analysis of coordinates [5 hrs] Homogeneous D.E Operations. [3 hrs] Non-Homogeneous D.E. Operations [5 hrs] D.E in first and second Oerder [3 hrs] Parameters Separations in D.E. [5 hrs] Exact equation and Applications [3 hrs] Non-Exact Equations and Applications [5 hrs] Bernoulli Euations and Applications [4 hrs] Part B- Reduces Order in D.E [3 hrs], Basic Solving Homo D.E.[3 hrs] Homo. D. E. in Order Constant [3 hrs] Euler Formula in D. E. [3 hrs] Solve Applications [3 hrs]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	1- Method of giving lectures, explanation and clarification. 2- Student groups. 3- E-learning within the university. 4- Application of education.

Student Workload (SWL)
الحمل الدراسي للطالب

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	4	5 % (20)	5, 10	LO #1, 2
	Assignments	4	5% (20)	2, 12	LO # 3, 4
	Projects / Lab.				
	Report				
Summative assessment	Midterm Exam	1 hr	10% (10)	7	LO # 1-7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

Week no.	Material Covered
Week 1	Introduction, Fundamental of Differential Equations
Week 2	D.E Systems, System conversion and Concept of D.E. in Coordinates
Week 3	Type D.E, Oprations and Physics laws of Operation
Week 4	Homogeneous Equations, Type of of Equations
Week 5	Non-Homo. D.E, Solve applications
Week 6	D.E in Two Order and three Order

Week 7	**Exam**
Week 8	**Homogeneous D.E Two Order and three Order**
Week 9	**Exact Equations and Applications**
Week 10	**D. E. in First Order and Second Order in their applications**
Week 11	**Eullers Formulla in D.E. equations**
Week 12	**Bernoulli D. E. and Applications**
Week 13	**Solving Methods D.E in Practical Wave**
Week 14	**Non-Exact Equations and Applications Solve**
Week 15	**Non-Exact Equations in First and Second Orders**
Week 16	**Final Exam duration**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**Differential Equations by Viorel Barbu, 2016**	Yes
Recommended Texts	**1. Ordinary Differential Equations by Harry Pollard, 2020.**	yes
Websites		

GradingScheme 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	**FX** - Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
(0 - 49)	**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

Electromagnetics

Module Information معلومات المادة الدراسية					
Module Title	Electromagnetics			**Module Delivery** يجب تحديد متطلبات المادة	
Module Type	Core			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MPH21016				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level	2nd		**Semester of Delivery**	1st	
Administering Department	Medical Physics		**College**	Baghdad College of Economic Sciences	
Module Leader	Assist. Prof. Farid M. Mahdi		**e-mail**	f.m.mahdi@baghdadcollege.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ms.c	
Module Tutor	Assist. Prof. Farid M. Mahdi		**e-mail**	f.m.mahdi@baghdadcollege.edu.iq	
Peer Reviewer Name	Dr. Walaa Isam Rasool		**e-mail**	walaa.isam@baghdadcollege.edu.iq	
Scientific Committee Approval Date	1/10/2025		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	The main goal of study of Electromagnetic Theory course is to identify the basic principles of this theory, as follows: - General study of Vectors in the Cartesian, cylindrical and spherical coordinate systems. Also, addressing the Divergence and Gauss's theorem, Curl and Stokes theorems and Green's theorem. - Study of the Electrostatic field in vacuum and addressing the Laplace and Poisson equations and their solutions in the Cartesian, cylindrical and spherical coordinate systems. Study of the Electrostatic field in the	**Semester**	

	dielectric materials and addressing the phenomenon of polarization in these materials. In addition to calculating the Electrical displacement, Electrical susceptibility, Dielectric constant, and Laplace and Poisson equations in these materials. - Study of Maxwell's equations in their differential and integral forms. Also, study the propagation of plane electromagnetic waves in infinite media and the polarization of these waves		
Co-requisites module	Non	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The main goal of study of Electromagnetic Theory course is to identify the basic principles of this theory, as follows: - General study of Vectors in the Cartesian, cylindrical and spherical coordinate systems. Also, addressing the Divergence and Gauss's theorem, Curl and Stokes theorems and Green's theorem. Study of the Electrostatic field in vacuum and addressing the Laplace and Poisson equations and their solutions in the Cartesian, cylindrical and spherical coordinate systems. Study of the Electrostatic field in the dielectric materials and addressing the phenomenon of polarization in these materials. In addition to calculating the Electrical displacement, Electrical susceptibility, Dielectric constant, and Laplace and Poisson equations in these materials. Study of Maxwell's equations in their differential and integral forms. Also, study the propagation of plane electromagnetic waves in infinite media and the polarization of these waves.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Enabling students to obtain knowledge and understand the topics of Electromagnetics. 2- Write and Solve wave equation 3- Show ability of make decisions and work alone or in team.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Unit 1: Vectors You'll begin your study of vector, divergence, stoks and Green theorems 24 hr's Unit 2: : Electrostatics You'll explore how electric charge can move through an object and the factors that affect the way charge moves and its effects on matter. 24 hr's Unit 3: Maxwell Equations You'll build on your knowledge of Maxwell equation and poynting vector and its relation to hr's wave propagation. 24

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1-Method of giving lectures, explanation and clarification. 2- Student groups. 3- E-learning within the university. 4- Application of education.

Student Workload (SWL) الحمل الدراسي للطالب موزع على (15) اسبوع			
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**	4	%5 (20)	5,10	LO# 1,2
	Assignments	4	%5(20)	2,12	LO# 3,4
	Projects / Lab.				
	Report				
Summative assessment	**Midterm Exam**	1hr	%10 (10)	7	LO# 1-7
	Final Exam	3 hr	%50 (50)	16	All
Total assessment			%100 (100 mark)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Coordinate system and Vectors
Week 2	Gauss theorem and Stoke's theorem and Green theorem
Week 3	Coulombs and Gauss laws
Week 4	Poisson's and Laplace equations
Week 5	Poisson's and Laplace equations in spherical coordinates
Week 6	Polarization in dielectrics
Week 7	**Mid Exam**
Week 8	Boundary conditions between two different media
Week 9	Faraday law
Week 10	Maxwell's Equations
Week 11	Solve of Maxwell's Equations
Week 12	Poynting vector
Week 13	The complex form of the Poynting vector

Week 14	Propagation of plane electromagnetic waves in infinite media
Week 15	Solving the wave equation in Infinite media - Examples
Week 16	**Final Exam duration**

Delivery Plan (Weekly Tutorial) المنهاج الاسبوعي الاضافي	
	Material Covered
Each week, a question sheet related to the material presented in the theoretical lecture will be solved and debated.	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	• Introduction to Electrodynamics by David J. Griffith, Prentice Hall, 3ed. 1999	No
Recommended Texts	Electromagnetics by Edward J. Rothwell &Michael J. Cloud, CRC press 2001	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	**English Language2**			**Module Delivery**	
Module Type	**Basic**			☐**Theory** ☒**Lecture** ☐**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	KUS24021				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level		2nd	**Semester of Delivery**		2nd
Administering Department		Medical Physics	**College**	Science	
Module Leader	**Ahmed Nadhmi**		**e-mail**	ahmed.nadhmi@baghdadcollege.edu.iq	
Module Leader's Acad. Title		Assit. Lect.	**Module Leader's Qualification**		Msc
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date		2024	**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 Aims أهداف المادة الدراسية	1. Build a foundational vocabulary for everyday topics such as family, work, shopping, and travel. 2. Master essential grammar structures, including the present simple, present continuous, past simple, and basic prepositions. 3. Listen for key information in simple conversations and audio texts, such as directions, introductions, and short dialogues. 4. Practice speaking in structured activities, including introductions, asking questions, and participating in short exchanges. 5. Write simple sentences and short texts, such as postcards, emails, and personal descriptions. 6. Read and understand short texts, notices, and articles on familiar topics. 7. Use practical language for daily interactions, like ordering food, asking for directions, or making plans. 8. Explore cultural differences and similarities through lessons that introduce English-speaking traditions and lifestyles
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Introduce themselves and others, ask and answer basic personal questions, and use the verb to be in simple sentences. 2. Describe possessions and family relationships, using possessive adjectives and singular/plural nouns correctly. 3. Talk about daily routines, times, and schedules while using the present simple tense and frequency adverbs. 4. Discuss abilities, skills, and permissions using can and can't, and learn functional language for making requests. 5. Describe places and homes, use there is/there are with prepositions of place, and ask for and give directions. 6. Talk about past experiences and events using the past simple tense (regular verbs) and vocabulary for historical events. 7. Express preferences, likes, and dislikes, and practice using verbs followed by -ing or to forms. 8. Ask about prices, and use countable/uncountable nouns with some, any, and much/many. 9. Describe current actions using the present continuous tense and compare it with the present simple. 10. Talk about future plans and intentions using going to, and learn vocabulary for travel and holidays. 11. Discuss past events using the past simple tense (irregular verbs) and share personal experiences.
Indicative Contents	Indicative content includes the following.

المحتويات الإرشادية	Each unit will focus on its primary learning outcomes, with about 10-15 minutes spent on introducing vocabulary and grammar, 20-25 minutes on practicing listening and speaking, and the remaining 20-25 minutes on reading comprehension, writing, and functional language exercises. To maximize time, more complex topics like past tense or future forms will be prioritized over less frequent structures. The course will include a brief warm-up activity at the start of each session, followed by targeted practice and ending with a summary or real-life application task.[10 hours] The review sessions will consolidate key language skills from multiple units, focusing on active practice through games, discussions, or role-plays. The final 2 hours will involve assessments, such as short quizzes and oral presentations, and a practical activity like creating or responding to functional language scenarios. [7 hours]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	- Lectures - Role playing - Flipped classroom approach - Time management - Immediate feedback - Group work

Student Workload (SWL) الحمل الدراسي للطالب			
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	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
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	20% (20)	5, 10	LO #1, 2, 4,5 and 6
	Assignments	2	10% (10)	3,12	LO # 3, 4, 6 and 7
	Projects	1	10% (10)	Continuous	LO #1- 11
	Report				
Summative assessment	**Midterm Exam**	1 hr	10% (10)	8	LO # 1-9
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Greetings, introductions, and the verb to be.
Week 2	Learn vocabulary for family, countries, and possessive adjectives.
Week 3	Practice the present simple tense, frequency adverbs, and time expressions.
Week 4	Explore the use of can/can't for abilities and making polite requests.
Week 5	Learn vocabulary for homes, prepositions of place, and asking for/giving directions.
Week 6	Introduce the past simple tense (regular verbs) and key time expressions.
Week 7	Express opinions using verbs like like, love, hate followed by -ing.
Week 8	Focus on countable/uncountable nouns, quantifiers (some, any, much, many), and shopping conversations.
Week 9	Compare the present simple and present continuous tenses in context.
Week 10	Discuss future plans using going to and vocabulary for travel and holidays.
Week 11	Focus on irregular past simple verbs and sharing personal experiences.
Week 12	Practice practical language for real-life scenarios like ordering food and making arrangements
Week 13	Use comparative adjectives and simple future forms (will) to talk about hopes and predictions.

Week 14	Revisit and reinforce grammar, vocabulary, and skills learned in previous lectures.
Week 15	oral presentations, or role-plays to assess learners' progress
Week 16	**Preparatory week before the final Exam**

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Soars, L., Soars, J. (2002). New Headway: Beginner: Student's Book B. Spain: OUP Oxford.	No
Recommended Texts	Cunningham, S., Redston, C., Moor, P. (2002). Cutting Edge: Starter. United Kingdom: Longman.	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	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded

(0 – 49)	**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 مادة اللغة العربية

Module Information معلومات المادة الدراسية					
Module Title	**اللغة العربية2**			**Module Delivery**	
Module Scince	**Basic**			**☒Theory** **☐ Lecture** **☐ Lab** **☐ Tutorial** **☐ Practical** **☐ Seminar**	
Module Code	KUS24020				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level	2		**Semester of Delivery**	2	
Administering Department	Medecal Phesics		**College**	Scince	
Module Leader	ibrahem.jabbar		**e-mail**	ibrahem.jabbar@baghdadcollege.edu.iq	
Module Leader's Acad. Title	Assistant lecturer		**Module Leader's Qualification**	Msc	
Module Tutor	Name		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/09/2023		**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 Aims أهداف المادة الدراسية	1- تعلم العربية السليمة كونها اللغة الرسمية للوطن 2- اللغة جوهر الهوية ورمزها 3- اللغة تختلف عن اللهجة، فالاولى عالمية والثانية محلية 4- توظيف المفردات الفصيحة في الصياغة الاكاديمية للبحوث العلمية مترجمة بنظيرها الفصيح 5- التمكّن من كتابة البحوث والمقالات ذات المحتوى العلمي الصرف باللغة العربية الفصحى 6- تجنب الاخطاء الشائعة في الكتابة واختيار المفردات الصائبة 7- اثراء الخزين المعجمي لدى الطالب للمساعدة في بناء كاريزما التواصل الكلامي 8- الاطلاع على نماذج من الادب العربي شعرا ونثرا لما لها من اساس في بناء الجانب الثقافي المتنوع لدى الطالب 9- كتابة الاعداد بتمكّن فضلا الكتابة الصحيحة في صياغة الطلبات الرسمية 10- التعرف على الدرس الصوتي في اللغة العربية وعلاقته بعلم الفيزياء
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	عند انتهاء مفردات المادة الدراسية يكون الطالب متمكنا من: 1- الكتابة السليمة خالية من الاخطاء 2- التعبير العلمي الاكاديمي الصحيح 3- استعمال المفردات الفصيحة توظيفا ونطقا 4- اضافة رصيد لغوي ومفاهيم جديدة لمعاني الكلمات 5- القدرة على المخاطبة الادارية في الطلبات الرسمية
Indicative Contents المحتويات الإرشادية	1– لكل تخصص لغته التي تومئ اليه، وتدل عليه، ولغة كل علم تنبع من طبيعة كنه، فالاختصاصات العلمية لها معجم خاص بها يعبر عن جوهرها ومضمونها، فضلا عن المصطلحات الخاصة بها التي تدل عليها، وكذلك المصادر العلمية التي يُرجع اليها، والحال كما في اللغة الادبية؛ فهي ايضا لها مفرداتها وطريقة كتابتها والتعبير بها وعبرها، ومصطلحاتها الخاصة بها التي تعبر عنها وتدل عليها. 2– المعاجم – بشكل عام - على اختلاف موارها تمثل محتوىً وكنفا لمفردات اي لغة مقترنة بالشرح والتفسير لتلك المفردات، اما المعاجم في اللغة العربية فهي واسعة ومتنوعة؛ فهناك معاجم غير معجمات اللغة، فالعربية فيها اول معجم جغرافي في التاريخ، معجم البلدان لـــ (ياقوت الحموي)، فضلا عن المعاجم المتخصصة في جزئية معينة، مثل معاجم البلاغة، فضلا عن تنوع المدارس في تأليف المعاجم وتبويبها وطريقة البحث عن المفردة فيها. 3- العلامة تندرج ضمن حقل علم السيمياء او السيميائية، وعلامات الترقيم من المواضيع المهمة بالأخص في البحوث الاكاديمية، بغض النظر عن التخصص، سواء كان التخصص علميا، او انسانيا، من هنا تأتي اهمية علامات الترقيم؛ فلها دور سيميائي، ودلاليّ مهم في الكتابة النّصيّة وفي بناء النص، فهي تُسهّل الفهم على القارئ، وتوضح المعنى المقصود، عبر القراءة والتلفّظ بالعبارة، فعلامات التّرقيم خير وسيلة لإظهار الصّراحة وبيان الوضوح في الكلام المكتوب؛ لأنّه يدلّ النّاظر إلى تلك العلامات الاصطلاحيّة وعلى العلاقات التي تربط أجزاء الكلام بعضها ببعض بوجه عام، وأجزاء كلّ جملة بوجه خاص، وكما يقول المتخصصون عن علامات الترقيم: بأن الوقف ليس مستقلّاً، وإنّما هو من توابع التّفكير، أي: إنّ السّكتات المقرّرة بمقادير مضبوطة في مواضع معينة، ليست مجرد محطّات تنفسيّة بالمعنى البيولوجيّ للتّنفس، وإنّما في المقام الأوّل وقفات معنويّة. فالعبرة من النّاحية اللّغويّة ليست بأن يستعيدَ القارئ نفسَه، بل المهم أن يتعاطى القارئ السكتَ بمقاديرَ معلومة، وفي مواضعَ محددة من السلسلة المنطوقة رفعاً للَبس، وصوناً لمقصد المتكلّم عن التبدّل، فهذه العلامات تجسيد لمشاعر الكاتب وقصدياته فيها. 4– الاسلوب الكتابي يمثل بصمة للكاتب الذي يصدر عنه، ويتجسد عند القارئ، ولكل كاتب اسلوبه الخاص به، ينعكس ذلك في نتاج الكاتب، وللأسلوب انواع مختلفة، فهناك الاسلوب العلمي، والاسلوب الادبي، والاسلوب الخطابي، ولكل نوع خصائصة، وقالبه الذي يتكون فيه. 5– الاحداث التي تقترن بالزمن تمثل الافعال، والأفعال في العربية تناظر الازمنة في اللغات الاخرى من جانب معين، او من جزئية معينة، والعربية تحتوي على عدد كبير من الجذور، جذور الأفعال، ففي العربية أفعال ثلاثية ورباعية وخماسية وسداسية، والفعل جزء مهم من اجزاء الكلام الاساسية، فضلا عن الجانب الصوتي في هذه الجذور، فعلم (الأصوات الفيزيائي) من العلوم المهمة في اللغة العربية، إذ يُعد علم (الأصوات الأكوستيكي)

Indicative Contents المحتويات الإرشادية	علما أقرب إلى الفيزياء منه للعلوم الإنسانية، وهو يمثل المرحلة الوسطى بين علم الأصوات النطقي وعلم الأصوات السمعي، وعلاقته مع اللغة العربية انطلاقا من البذرة الاولى في دراسة مخارج الحروف فيزيائيا ودلاليا. 6– الكلام عن الشعر لا ينتهي؛ فالشعر تجسيد لمشاعر الفرد المتمثل بالشاعر، والمشاعر الجمعية للانسانية جمعاء، فهو موجود لدى كل بني البشر، والشعر العربي القديم كان بمثابة نشيدا وطنيا لهم، يمثل هويتهم الثقافية الرصينة ويمثل سجلا لتاريخهم وأمجادهم، على اختلاف اغراضه من غزل ومدح ورثاء وغير ذلك، وبحور الشعر في الشعر العربي مبنية بناء صوتيا فريدا عبر التفعيلات التي وضعها الخليل بن احمد الفراهيدي ووضع فلسفتها وكنهها وقواعدها، والشعر رصيد ثقافي، وحجة في الكلام، وزينة ورونقا يضاف على شخصية الفرد والمجتمع بشكل عام. 7– الهمزة من المواضيع الاجرائية لدى الفرد الكاتب، بغض النظر عن التخصص، فيحتاجها كل فرد ناطق كاتب بها، فلها قواعدها التي تصدر عنها، وتُكتب بالشكل السليم منها، فموضوع رسم الهمزة من الاهمية بمكان؛ فرسمها يغير من المعنى، فلا بد من وضعها ورسمها بالشكل الصحيح لتوخي التعبير الدقيق عن المعنى المقصود. 8– المفاعيل في اللغة العربية، من الموضوعات المهة في درس اللغة العربية، ولا بد لكل دارس من معرفتها بشكل عام، وهناك آراء مختلفة بين البلاغيين والنحويين عن المفاعيل، هل ان تلك المفعولات فضلة، أم أنها ركن رئيس في الجملة ؛ فالنحويون يرون انها فضلةً في الجملة، وأن ركني الجملة الأساسيين هما: الفعل، والفاعل ، وأما البلاغيون فيرون :إنها ليست فضلة، وإنما هي ركن أساسي في الجملة؛ لأن كل كلمة تَدُل على معنى في الجملة، واذا ما دلت على معنى فلا تُعد فضلة، وإنما هي ركن رئيس في الجملة وبنائها، ورأي البلاغيين أقرب للصواب من رأي النحويين، فدراستها في العربية لغير المختصين مما يضيف لهم خزينا تعبيريا متنوعا. 9– من المعروف وجود ظاهرة الأخطاء اللغوية نحويةً كانت أو املائية أو اسلوبية، عند متحدّثي اللغة العربية وبالأخص عند غير المختصين بها ولا سيما مَن يعملون في مجال الاعلام، وهذه الظاهرة اتسعت وزاد انتشارها في العصر الحديث، فأخذت هذه الأخطاء تغزو مجالات الدراسة جميعها، من ذلك موضوع (العدد) في اللغة العربية، فنجد كثيراً من الطلبة وكذلك من عامة الناس يستعملون الأرقام بدلاً من كتابتها بالحروف؛ وذلك لتجنب الوقوع في الخطأ وهذا دليل ضعف لا يليق بالدارس أياً كان تخصصه؛ ولهذا فموضوع العدد وقواعد كتابته في اللغة العربية موضوع لا غنىً عنه في زمن لغة الأرقام. 10– هناك مجموعة من الالفاظ متداولة بشكل كبير، تُستعمل في غير مكانها الصحيح، وفي غير ما وُضعت له وهذه الالفاظ تُستعمل في المخاطبات الرسمية الادارية بالمعنى غير الصحيح او الدقيق الذي تحمله تلك الألفاظ من معاني، فضلا عن أهمية توخي الدقة في هذه الألفاظ توظيفا لها في الطلبات الرسمية التي تُقدم على اختلاف موضوعاتها، فالطلب لا بد من ان يكون مختصرا مركزا، يعطي الفكرة الموجزة، والهدف المقصود منه ازاء صاحب الادارة الذي تُقدم اليه الطلبات، وما في ذلك من ايجابيات العمل في التخفيف واختصار للجهد والوقت في تنفيذ المهام الادارية الموكلة الافراد على اختلاف درجاتهم.
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	صناعة شخصية متكاملة للطالب الجامعي من حيث التخصص العلمي الدقيق والتخصص المساند

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	الجموع في اللغة العربية / الجمع المذكر السالم
Week 2	الجمع المؤنث السالم
Week 3	جمع التكسير
Week 4	نماذج من الصيغ الصرفية وتوظيفها دلاليا
Week 5	الأفعال الخمسة وتقسيماتها
Week 6	نماذج مختارة من الشعر العربي القديم - الشعر العباسي
Week 7	Mid-term Exam

Week 8	التوابع / التوكيد
Week 9	العطف
Week 10	البدل
Week 11	الاسماء الخمسة
Week 12	نماذج من الشعر الحديث
Week 13	النثر العربي / الرواية الحديثة
Week 14	الترادف – المشترك اللفظي
Week 15	الأخطاء الشائعة الجزء الثاني – طريقة كتابة الطلبات الرسمية
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources

مصادر التعلم والتدريس

	1- كتاب: العربية الجامعية لغير المتخصصين / د. عبده الراجحي **2-** كتاب: النحو التطبيقي / د. عبده الراجحي **3-** الصرف التطبيقي / د. عبده الراجحي **4-** النحو الوافي / عباس حسن **5-** تاريخ الادب العربي / شوقي ضيف	**Available in the Library?**
Required Texts		
Recommended Texts		
Websites	شبكة الفصيح لعلوم اللغة العربية	

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	Applications of Computer Science			**Module Delivery**	
Module Type	Support			☒**Theory** ☐**Lecture** ☒ **Lab** ☐ **Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	KUS24022				
ECTS Credits	3				
SWL (hr/sem)	75				
Module Level	2nd		**Semester of Delivery**	2nd	
Administering Department	Medical Physics		**College**	Science	
Module Leader Haider Mohammed	e - mailhaider.mohammed@baghdadcollege.edu.iq				
Module Leader's Acad. Title	Assit. Lecturer		**Module Leader's Qualification**	Msc	
Module TutorHaider Mohammed			**e-mail**	Mustafa.alani@kus.edu.iq	
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	2024		**Version Number**	0.1	

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 Aims أهداف المادة الدراسية	1. Security and Networking: • To introduce students to computer networks, their components, and basic security principles. • To prepare students for managing and mitigating network threats. 2. Computer Troubleshooting: • To equip learners with the ability to diagnose and resolve common hardware and software issues. 3. E-Commerce: • To familiarize learners with electronic banking services, including online and mobile banking. 4. Introduction to AI: • To provide an overview of artificial intelligence and its applications in everyday life. • To introduce key ethical considerations, societal impacts, and future developments in AI.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Security and Networks: • Describe different types of networks and their components. • Implement basic security measures to protect network integrity. 2. Computer Troubleshooting: • Apply diagnostic tools to identify hardware/software problems. • Use practical methods to resolve technical issues. 3. E-Commerce: • Utilize electronic banking services for transactions. • Explain the mechanisms behind online banking and security. 4. Artificial Intelligence: • Identify applications of AI in daily life, such as smartphones and healthcare. • Discuss the ethical and societal challenges posed by AI technologies.

	• Predict future trends and innovations in AI.
Indicative Contents المحتويات الإرشادية	1. Network security principles: (4 hrs) • Understanding threats such as malware, phishing, and hacking. • Fundamentals of networking and its components. 2. E-Commerce: (2 hrs) • Fundamentals of online banking: • Online and mobile banking. • Debit and credit card services. • Use of electronic alerts for secure banking. 2. Computer Troubleshooting: (4 hrs) • Identifying common hardware and software problems: Troubleshooting hardware issues (e.g., printers, keyboards, connectivity). • Resolving software conflicts (e.g., operating system errors, application crashes). • Diagnostic tools: Usage of built-in system tools for troubleshooting (e.g., Task Manager, disk utilities). • Introduction to third-party diagnostic software. 3. Introduction to Artificial Intelligence (AI): (4 hrs) • AI in Daily Life: Applications of AI in smartphones, virtual assistants (e.g., Siri, Google Assistant). 4. The Role of AI in Modern Smartphones: (4 hrs) • How AI is utilized in Modern Smartphones.

	5. Applications and Tools of AI: (4 hrs) • AI applications. • AI tools. 6. AI and Society: (2 hrs) • How AI affects the social life. • AI and the future of humanity. 7. Ethical Challenges in AI: (2 hrs) • Issues of privacy, surveillance, and the job market. 8. Future of AI: (2 hrs) • Trends, recent research, and emerging technologies.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Deliver theoretical content through structured lectures. 2. Use multimedia aids (e.g., presentations, videos) to enhance understanding of abstract topics like AI and networking. 3. Hands-on practice for email setup, document collaboration, and troubleshooting. 4. Lab-based exercises to simulate network setups and resolve network issues. 5. Demonstrations of e-commerce tools, such as secure online banking and mobile payment systems.

	6. Collaborative problem-solving for troubleshooting real-life IT issues. 7. Group discussions on AI's impact on society and ethical challenges. 8. Present real-world scenarios of AI applications in healthcare, finance, and transportation. 9. Analyze security breaches and propose preventive measures for network security. 10. Assign projects such as: o Designing secure email workflows. o Developing troubleshooting guides for common computer issues. o Proposing solutions for AI-related societal challenges. 11. Assign readings from textbooks and reference materials for self-study. 12. Encourage the use of online tutorials and open-source tools for further exploration. 13. Formative Assessment: o In-class quizzes and practical evaluations. o Group presentations on assigned topics. 14. Summative Assessment: o Final theoretical exams to assess understanding. o Practical tests to evaluate troubleshooting and application skills.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	45	**Structured SWL (h/w)** الحمل الدرا ي س المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	30	**Unstructured SWL (h/w)** الحمل الدرا سي 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	3	15% (15)	5,7,10	LO#1,2,10 and 11
	Assignments	1	5% (5)	12	LO#3,4,6 and 7
	Projects / Lab.	1	10% (10)	15	LO # 4,14
	Report	1	10% (10)	13	LO#5,8, and 10
Summative assessment	Midterm Exam	1hr	10% (10)	7	LO,#1-7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Networking, Overview of networks and types of networks.
Week 2	Network Security Basics, understanding network threats.
Week 3	Introduction to E-Commerce and Online Banking, Concepts of electronic banking, online banking basics
Week 4	Computer Troubleshooting: Identifying software and hardware issues and solving them.
Week 5	Basic Troubleshooting Techniques, Tools and techniques for diagnosing issues.
Week 6	Introduction to Artificial Intelligence, Definition, history, and overview of AI.
Week 7	Key Characteristics of AI, benefits of AI, Challenges and ethical considerations.
Week 8	The role of AI in modern smartphones, virtual assistants.
Week 9	Adaptive learning, Real-Time Translation Services.
Week 10	Applications of AI, AI in education, healthcare, finance, and marketing
Week 11	Further Applications of AI, AI in transportation and advertising
Week 12	Applications of AI: Finance, Robotics and Automation Technologies.
Week 13	AI and Society, AI's impact on social and international relations
Week 14	Ethical Challenges in AI, Ethical concerns, privacy, and AI's impact on jobs
Week 15	The Future of AI, Future trends, research, and emerging technologies
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Weeks 1	Definition of programming and MATLAB environment
Week 2	Variables
Weeks 3	Using MATLAB a calculator
Weeks 4	Vectors and matrices
Weeks 5	Decision making: If statement, if…else statement, nested if
Weeks 6	Loops: for loop, nested for loop
Week 7	Graphical User Interface
Week 8	Final exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1. **Graham Brown, David Watson, "Cambridge IGCSE Information and Communication Technology," 3rd Edition (2020).** 2. **Alan Evans, Kendall Martin, Mary Anne Poatsy, "Technology In Action Complete," 16th Edition (2020).** 3. **Ahmed Banafa, "Introduction to Artificial Intelligence (AI)," 1st Edition (2024).**	no
Recommended Texts	**1. الخضر علي الخضر بحات, " أساسيات الحاسوب " , 2016.** **2. الدكتور عادل عبدالنور, "مدخل إلى عالم الذكاء الاصطناعي", 2005.**	no
Websites	• https://www.mathworks.com/ • https://www.wix.com/blog/ecommerce/2023/12/ai-in-ecommerce • https://boostcommerce.net/resources/ai-ecommerce	

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

جرائم نظام البعث في العراق

Module Information معلومات المادة الدراسية					
Module Title	Crimes of Baath Regime in Iraq			**Module Delivery** يجب تحديد متطلبات المادة	
Module Type	Basic			☒ **Theory** ☐ **Lecture** ☐ **Lab** **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	KUS23016				
ECTS Credits	2				
SWL (hr/sem)	50				
Module Level	2nd		**Semester of Delivery**	1st	
Administering Department	Medical Physics		**College**	Science	
Module Leader	Ibrahem Jabbar Khaled		**e-mail**	Ibrahem95@yahoo.com	
Module Leader's Acad. Title	Asst. lect.		**Module Leader's Qualification**		
Module Tutor	Ibrahem Jabbar Khaled		**e-mail**	Ibrahem95@yahoo.com	
Peer Reviewer Name	Asst. lect. Ahmed Nadhmi		**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 Aims أهداف المادة الدراسية	1- ان يتعرف الطالب على جرائم نظام البعث في العراق 2- ادراك الطالب لتاريخ الحقبة التيعاشها العراق خلال فترة نظام البعث 3- ادراك الطالب لكم الجرائم النفسية والاجتماعية التي ارتكبها النظام 4- ادراك الطالب للجرائم التي ارتكبت بحق البيئة من قبل النظام 5- ادراك الطالب للجرائم الوحشية التي حصلت في المقابر الجماعية
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- معرفة الجرائم التي ارتكبت من قبل نظام البعث 2- معرفة انواع الظلم والاضطهاد الذي ارتكب بحق العراقيين
Indicative Contents المحتويات الإرشادية	1- اسلوب الحوار بين الطالب والاستاذ 2- عرض الآراء ومناقشة نقاط القوة والضعف لكل منها 3- اتاحة الفرصة للطالب بالتفكير وتبني الخيارات الصحيحة

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	من خلال مقاييس اسلوب المناقشة والاختبارات اليومية

Student Workload (SWL) الحمل الدراسي للطالب			
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	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
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, 10	LO #1, 2
	Assignments	2	10% (10)	2, 12	LO # 1,2
	Projects				
	Report	1	20% (20)	13	LO # 1,2
Summative assessment	Midterm Exam	1 hr	10% (10)	7	LO # 1-2
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	تعريف الجريمة لغة واصطلاحا واقسام الجرائم
Week 2	جرائم نظام البعث وفق توثيق قانون المحكمة الجنائية العراقية العليا 2005 م 1- انواع الجرائم الدولية 2- القرارات الصادرة من المحكمة الجنائية العليا
Week 3	الجرائم النفسية والاجتماعية (آلياتها وآثارها)
Week 4	موقف النظام البعثي من الدين
Week 5	عسكرة المجتمع وانتهاكات القوانين العراقية
Week 6	صور انتهاكات حقوق الانسان وجرائم السلطة
Week 7	قرارات الانتهاكات السياسية والعسكرية والتطرق الى اماكن السجون والاحتجاز
Week 8	امتحان
Week 9	الجرائم بحق البيئة وتشمل التلوث الحربي والاشعاعي وانفجار الالغام
Week 10	الجرائم بحق البيئة وتشمل تدمير المدن والقرى (سياسة الارض المحروقة)
Week 11	الجرائم بحق البيئة وتشمل تجفيف الاهوار
Week 12	جرائم تجريف بساتين النخيل والاشجار
Week 13	جرائم المقابر الجماعية
Week 14	جرائم المقابر الجماعية وتشمل التصنيف الزمني لمقابر الابادة الجماعية في العراق
Week 15	مراجعة

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**كتاب جرائم البعث في العراق الصادر من وزارة التعليم العالي والبحث العلمي**	No
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

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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
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

Materials Science

Module Information معلومات المادة الدراسية					
Module Title	**Materials Science**			**Module Delivery**	
Module Type	**Basic**			☒**Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MPH22018				
ECTS Credits	5				
SWL (hr/sem)	**125**				
Module Level		2nd	**Semester of Delivery**		2nd
Administering Department		Medical Physics	**College**	Science	
Module Leader	Dr. Walla Isam		**e-mail**	walla.isam@baghdadcollege.edu.iq	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		Ph.D.
Module Tutor	Dr. Walla Isam		**e-mail**	walla.isam@baghdadcollege.edu.iq	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		16/9/ /2024	**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 Aims أهداف المادة الدراسية	1- Describe the important quantum-mechanical principle that relates to electron energies. 2- Briefly describe ionic, covalent, metallic, hydrogen, and van der Waals bonds. 3- Describe the atomic/molecular structure difference between crystalline and noncrystalline materials. 4- Draw unit cells for face-centered cubic, body-centered cubic, and hexagonal close-packed crystal structures. 5- Specify the Miller indices for a plane that has been drawn within a unit cell. 6- Classification of crystalline imperfections, calculate the weight percent and atom percent for each element in a metal alloy. 7- Explain the use of X-ray diffraction measurements in determining crystalline structures.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understanding the basic concepts in materials science (the purpose of studying materials science and engineering, classification of materials, interatomic bonds, metallic crystal structures, and crystal systems) and relating them to the materials' properties. 2. Understanding of the basic concepts in crystalline defects and analysis of the materials using optical and electron microscopes and x-ray diffraction characterization. 3. Compute ionic radii using unit cell dimensions. 4. Given the masses and atomic weights of two or more elements in a metal alloy, calculate the weight percent and atom percent for each element.
Indicative Contents المحتويات الإرشادية	**Atomic Structure and Interatomic Bonding:** **Atomic Structure:** Fundamental Concepts, Electrons in Atoms, The Periodic Table **Atomic Bonding in Solids:** Bonding Forces and Energies, Primary Interatomic Bonds, Secondary Bonding or van der Waals Bonding. **The Structure of Crystalline Solids:** Crystal Structures: Fundamental Concepts, Unit Cells, Metallic Crystal Structures, Density Computations, Polymorphism and Allotropy, Crystal Systems. **Crystallographic Points, Directions, and Planes:** Point Coordinates, Crystallographic Directions, Crystallographic Planes, Linear and Planar Densities, Close-Packed Crystal Structures. **Crystalline And Noncrystalline Materials:** Single Crystals, Polycrystalline Materials, X-Ray Diffraction: Determination of Crystal Structures, Noncrystalline Solids. **Imperfections in Solids:** **Point Defects**: Vacancies and Self-Interstitials, Impurities in Solids, Specification of Composition. **Miscellaneous Imperfections:** Dislocations–Linear Defects, Interfacial Defects, Surface Defects, Bulk or Volume Defects, Atomic Vibrations. **Microscopic Examination:** Basic Concepts of Microscopy, Microscopic Techniques, Grain Size Determination.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Establish a positive learning environment: Create an atmosphere of respect, collaboration, and inclusion. 2. Use a variety of teaching methods: Incorporate lectures, discussions, demonstrations, experiments, and hands-on activities to keep students engaged. 3. Set clear expectations: Explain the goals of the lesson and the criteria for success. 4. Provide feedback: Give timely and constructive feedback to help students learn from their mistakes. 5. Encourage active learning: Ask questions and provide opportunities for students to practice and apply their knowledge. 6. Promote critical thinking: Challenge students to think critically and analyze information. 7. Foster collaboration: Encourage students to work together to solve problems and share ideas. 8. Utilize technology: Incorporate technology into the classroom to enhance the learning experience

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
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, 10	LO #1, 2, and 4
	Assignments	2	10% (10)	2, 12	LO # 3, 4
	lab				
	Report	1	20% (20)	13	LO # 3, 4
Summative assessment	**Midterm Exam**	1 hr	10% (10)	7	LO # 1-4
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to the Materials Science
Week 2	Classification of Materials
Week 3	Atomic Structure and Interatomic Bonding (Electrons in Solids)
Week 4	Atomic Structure and Interatomic Bonding (Interatomic Bonds)
Week 5	The Structure of Crystalline Solids, Unit Cells, Metallic Crystal Structures
Week 6	Density Computations, Polymorphism and Allotropy, Crystal Systems
Week 7	Crystallographic Planes and Directions
Week 8	Single and Polycrystalline Materials
Week 9	X-ray Diffraction Analysis of Crystal Structures
Week 10	Imperfections in Solids, Point Defects
Week 11	Specification of Composition
Week 12	Linear Defects
Week 13	Bulk Defects
Week 14	Grain-size Determination
Week 15	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1-2	
Week 3-4	
Week 5-6	
Week 7	
Week 8-9	
Week 10-11	
Week 12-13	
Week 14	

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	J. C. Williams and G. R. David, *Materials Science and Engineering: An Introduction*, 9th ed. USA: John Wiley & Sons, Inc., 2013.	No
Recommended Texts	D. R. Askeland, P. P. Fulay, and D. K. Bhattacharya, *Essentials of Materials Science and Engineering*. USA: Cengage Learning, 2010.	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
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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
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Physics of Laser			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☐ **Lecture** ☒**Lab** ☐ **Tutorial** ☐ **Practical** ☒**Seminar**	
Module Code	MPH22019				
ECTS Credits	**7**				
SWL (hr/sem)	**175**				
Module Level	2		**Semester of Delivery**	2	
Administering Department	Medical Physics		**College**	Science	
	Dr. Walla Isam		**e - mail**	walaa.isam @baghdadcollege.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor Nam	Dr. Walla Isam		**e-mail**	walaa.isam @baghdadcollege.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	2024		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1 - Description of the origin of the physical processes in laser systems. 2-Explanation of physics concepts for gain and amplification in different lasers 3–Explanation of the concepts of generation short pulses in laser devices 4 - using mathematical equations to calculate different physical parameters of laser systems
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Define the meaning of laser. 2. Develop a clear understanding of basic physical phenomena in thermal physics and materials science as an integral part of the student's overall education 3. 2. Explain natural phenomena using simple physics concepts. 4. Compare between laser and other sources of light. 5. Calculate and find the ratio of atoms population in the energy levels. 6. Use algebra, trigonometry, and basic calculus, in solving problems in Laser physi cs and Laser cavity 7. Provide detailed and accurate description of ABCD ray tracing in an optical cavit y 8. Classify the laser types according to active medium materials. 9. List and give details of different applications of laser
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – light principle Basic of light phenomena, the electromagnetic radiation theory and equations, the properties of photon, laser definition, laser hazard, safety of laser and classification of laser [15 hrs] Part B- Laser Properties Laser history, coherence light, directionality of light, monochromatic light, brightness ,interaction of radiation with atom, normal population , population inversion, laser levels, Einstein relation, laser elements, laser cavity, the modes inside the cavity, types of cavity, stability of laser resonators, laser gain and laser losses, continues wave laser (CW), pulsed laser operation, laser spikes, Q-switched mode and modes locking, propagation of Gaussian profile. [30 hrs]. Part C- laser types: Gas laser, He-Ne laser, CO_2 laser, Argon ion laser, Solid state laser, ruby laser, Nd:YAG laser, liquid laser, dye laser, semiconductors laser. [10 hrs]

	Part D- Laser applications: Laser matter interaction, absorption of laser radiations, thermal effect, laser vaporization and plasma formation, laser ablation, scientific application, Hologram, industrial application, drilling and cutting, communication application, laser in military [17 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	This course will be delivered through a combination between theoretical lectures in the classroom and experimental lectures in the Lab. The students will be receive the outcome of each lecture through discussions, videos related to the subject and questions. In addition, the information will be developed by self-learning through reading and searching to hand in the essay and home works.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	97	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	6,10	LO #1-2, 4-5, 6-7, 9-10
	Assignments	5	10% (10)	2,3,5,6,7	LO #1, 2, 4, 5, 6
	Projects / Lab.	15	10% (10)	Continuous	
	Report	1	10% (10)		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Properties of light
Week 2	Laser properties
Week 3	Interaction of radiation with atoms
Week 4	Population of atoms
Week 5	Laser levels, three level laser and four level lasers.
Week 6	Elements of laser.
Week 7	Midterm exam
Week 8	Lasing action
Week 9	Laser cavity
Week 10	Modes of the resonators
Week 11	Laser gain
Week 12	Laser operation
Week 13	The properties and propagations of Gaussian beam
Week 14	Laser types
Week 15	Laser applications
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to laser lab.
Week 2	Lab 2: diffraction from single slit.
Week 3	Lab 3: measuring the diameter of human hair by laser diffraction
Week 4	Lab 4: determination of wavelength of laser light by using diffraction grating.

Week 5	Lab 5: Laser beam divergence
Week 6	Lab 6: laser spot size
Week 7	Lab 7: laser spot size Measurement of the absorption coefficient of material By Using Laser light

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Laser Principles, Types & Applications: K R Nambiar, New Age International, 2004	No
Recommended Texts	Lasers: Theory and Applications : A K Ghatak and K Thyagarajan, McMillan, 2003	No
Websites	https://www.keyence.eu/ss/products/marking/lasermarker/knowledge/principle.jsp	

Grading Scheme
مخطط الدرجات

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

نموذج وصف المادة الدراسية

Biosensor

المتحسسات الحيوية- المستوى الثالث

Module Information معلومات المادة الدراسية					
Module Title	Biosensor			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☒**Lecture** ☐**Lab** ☒**Tutorial** ☐**Practical** ☒**Seminar**	
Module Code	MPH32032				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	3th		**Semester of Delivery**	2nd	
Administering Department	Medical Physics		**College**	College of Science	
Module Leader	Dr. Abdulmohaimen W Fakhri		**e-mail**	mohamenw2@kus.edu.iq	
Module Leader's Acad. Title	Lec..Dr		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Non		**e-mail**	E-mail	
Peer Reviewer Name	Non		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To understand the principles of biosensors and their applications in various fields. 2. To learn about the different types of biosensors and their working mechanisms. 3. To analyze the performance characteristics of biosensors, such as sensitivity, selectivity, and stability. 4. To evaluate the challenges associated with biosensor development, such as biocompatibility and signal interference. 5. To apply knowledge gained from biosensor studies to real-world problems in healthcare, environmental monitoring, food safety, and other fields.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**1. Enabling students to obtain knowledge and understanding of the topics of principles of biosensors.** **2. Obtaining a prominent scientific staff that tries to understand the biosensors and its applications** **3. Enable students to obtain knowledge and understanding of biosensors applications and conduct various practical experiments.** **4. Enable students to obtain knowledge and understanding of the use of basic**
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Biosensors: Description of biosensors, Biomolecules used in biosensors, Types of biosensor, Define of immobilization and methods, bio-receptors, Characteristic of biosensor performance factors, enzymatic biosensors, Biosensors Technology, Using of biosensor [8 hrs]. Biomolecules used in biosensors, these biomolecules are typically enzymes, antibodies, nucleic acids, or other proteins and types of biosensors is electrochemical biosensors, optical biosensors, piezoelectric biosensors,, ion-sensitive field-effect transistors, etc [10 hrs]. Immobilization methods are techniques used to attach biomolecules as well Bio-receptors are biomolecules used to bind target molecules in biosensors as well Characteristic of biosensors include high sensitivity, selectivity, and specificity, Performance factors affecting the performance of biosensors include the choice of bio-

	receptors, immobilization method and Enzymatic biosensors use enzymes as bio-receptors to catalyze a reaction between the target molecule and a substrate. Biosensors technology involves the integration of bio-receptors, immobilization methods, transducing elements, and electronics[10 hrs]. There are many different types of biosensors, but they all generally work by using a biological sensing element [8 hrs]. <u>Part B -</u> One important application of biosensors is in the field of immune-biosensor [8 hrs]. In conclusion, biosensors are powerful tools with a wide range of applications in fields such as medicine, environmental monitoring, and food safety [8 hrs].

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Providing students with basics and specifications 2. Encouraging students to discover how the understand biosensor works with physical laws and its physiological and therapeutic effects by themselves through 3. Understanding the general laws of physics. This is done through scientific discussions in class as well as through practical application in hospitals and medical clinics. 4. Forming discussion groups during the lectures to discuss the topics raised during the lecture 5. Explanation and clarification 6. Thinking questions such as what, how, when and why for specific topics

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.4
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	15% (10)	5, 10	LO #1, 2, 9 and 10
	Assignments	2	15% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.				
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	1 hr	10% (10)	8	LO # 1-8
	Final Exam	3hr	50% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Description of biosensors
Week 2	Biomolecules used in biosensors
Week 3	Types of biosensor
Week 4	Define of immobilization
Week 5	immobilization methods
Week 6	Bio-receptors
Week 7	Characteristic of biosensor performance factors
Week 8	Enzymatic biosensors
Week 9	Biosensors Technology
Week 10	Using of biosensor
Week 11	Applications of biosensor
Week 12	Immune-biosensors
Week 13	Introduction of DNA
Week 14	DNA biosensors
Week 15	Electrochemical sensors
Week 16	Final Exam duration

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Biosensors fundamentals and application, antony P.F.Turner ,Isao K. and George S. Wilson ,Oxford Scince Puplication 1987	Yes
Recommended Texts	Essentials (lecture nots in chemistry V84) Gennady Evtugyn , Springer 2014	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

Quantum Mechanic in Medical

ميكانيك الكم في الطب – المستوي الثالث

Module Information معلومات المادة الدراسية					
Module Title	Quantum Mechanics			**Module Delivery**	
Module Type	**Elective**			☒**Theory** ☒**Lecture** ☐ **Lab** ☒**Tutorial** ☒ ☒**Practical** ☒**Seminar**	
Module Code	MPH32033				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	3th		**Semester of Delivery**	2nd	
Administering Department	Medical Physics		**College**	Science	
Module Leader	Assit. Prof.Dr. Fadhil K. Farhan		**e-mail**	Dr.fadhil1966@kus.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	non		**e-mail**	non	
Peer Reviewer Name	non		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1- Providing the student with a cognitive skill about the basic concepts of physics in general. 2- Introducing students to the most important principles of quantum mechanics. 3- Introducing the student to the wave properties included in the Schrödinger equation and the wave function. 4- Providing the student with knowledge of how to calculate the wave function and the time-dependent and non-time-dependent Schrödinger equation. 5- Introducing the student to the expected value and variance and deriving the mathematical relations for these phenomena. 1. 6- Introducing the student to the mathematical laws and relations that relate to the constant of motion and the Hermitian influences.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	A- Cognitive goals A1- That the student understand the basic concepts of spectrum science. A2- To describe the relationship between the incident energy and the absorption spectrum. A 3- The link between material properties and their emission spectrum. A 4- To recognize the most important laws and relationships that link the spectrum of molecules. B - The soft skills objectives of the course. B1 - The applied side in practical hours B2 - Comprehension, comprehension and cognitive analysis. B3 - Observation and perception.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A - **An introduction to the principles and fundamentals of quantum mechanics** An introduction to the atom and the hypotheses that describe particle motion, The most important hypotheses that dealt with the nature of the atom,[8 h/w], Wave nature and matter, wave function, Definition and description of the wave function from quantum mechanics, properties of wave functions,[7 h/w], Comparison of quantum mechanics and classical mechanics on the behavior of particles within an

	atom, Physical phenomena and their interpretation of energies and wave motion according to quantum mechanics and clas Schrödinger sical mechanics, [10 h/w], Part B - **Wave functions and the Schödienger equation** The mathematical formula for the wave function, wave function equation , Derivation of the wave function with respect to energy and momentum [10h/w], Solve the time dependent Schödienger equation, Derivation of the position dependent Schrödinger equation , Applications to the Schrödinger equation [8 h/w], Hermetic influences, Characteristics of Hermetic Effects in Quantum Mechanics, Characteristics of Hermetic Effects in Quantum Mechanics , Variance and covariance in quantum mechanics , [7 h/w], Equation of motion and motion constant , Self and non-self-functions in quantum mechanics , [7 h/w], Applications of eigenvectors and motion constants[7 h/ w].

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 educational programs and by thinking about linking the course content with the devices and equipment that depend on the principles and laws of the course for their work.

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Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	61	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	64	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem)	125		

الحمل الدراسي الكلي للطالب خلال الفصل	

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	4, 9	LO #1, 2, 9 and 10
	Assignments	2	10% (10)	2, 10	LO # 3, 4, 6 and 7
	Projects	1	10% (10)	Continuous	
	Report	1	10% (10)	12	LO # 5, 8 and 10
Summative assessment	Midterm Exam	1 hr	10% (10)	8	LO # 1-8
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to the wave function
Week 2	The wave field of the function
Week 3	Operators Types
Week 4	Absorber quantities
Week 5	Schrödinger equation
Week 6	Solve the time dependent Schrödinger equation
Week 7	Solve the position-dependent Schrödinger equation
Week 8	expected values in quantum mechanic
Week 9	Variation in values and The kinematic equation
Week 10	solve problems
Week 11	Properties of Hermetic operators
Week 12	Applications of Hermetic operators
Week 13	hydrogen atom
Week 14	Angular momentum and linear momentum
Week 15	**Calculate the power and wave function of a voltage barrier**

Week 16	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1- A.C. Philips and John Wiley 2- Introduction to Quantum Mechanics	NO
Recommended Texts	1- Mohammad Reza Pahlavani 2- Theoretical Concepts of Quantum Mechanics 2012	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

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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Modules Description Form

نموذج وصف المادة الدراسية

الالكترونيات الرقمية

Modules description Information معلومات المادة الدراسية				
Modules Title	**Digital Eectronics**		**Modules Delivery**	
Type	**Core**		☒Theory ☒ Lecture ☒Lab ☒ Tutorial ☐Practical ☐Seminar	
Course Code	MPH32035			
ECTS Credits	**6**			
SWL (hr/sem)	**150**			
Modules Level	3rd		**Semester of Delivery**	2nd
Administering Department	Medical Physics		**College**	Science
Modules Leader	Assit. Prof. Dr. Jafer F. Odah Assit. Prof. Dr. Akeel M. Kadim		**e-mail**	Dr.akeelm.kadim@kus.edu.iq
Modules Leader's Acad. Title	Assistant Professor		**Modules Leader's Qualification**	Ph.D.
Modules Tutor	non		**e-mail**	
Peer Reviewer Name	non		**e-mail**	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite course	The course to develop the student's ability to understand and apply a number of issues based on basic digital electronics principles, and to provide the student with the ability to interpret some applications, and to build the basic for understanding the subsequent courses.	**Semester**	
Co-requisites course	Analoge Electronics	**Semester**	1st

Aims of a Cource, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Aims Course أهداف المادة الدراسية	1- Providing the student with a cognitive skill about the basic concepts of digital electronics. 2- Introduce the student to the digital logic gates properties and methods of their application. 3- Providing the student with knowledge of how to calculate the laws of logic algebra and solving 4- Introducing the student to digital logic conversion systems.
Course Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Enabling students to obtain knowledge and understanding of the topics of digital electronics. 2- Enable students to obtain knowledge and understanding of logic gates practical experiments. 3- Enable students to obtain knowledge and understanding of the use of basic algebra laws in digital logic and their use in solving problems.

Indicative Contents	Indicative content includes the following. Part A – Introduction in digital logic gates and Conversion systems [12 hrs] Applications of Conversion systems [10 hrs] Types of Logic Gates [12 hrs] Boolean algebra and De Morgan Theorems [15 hrs] Application of Boolean algebra and DeMorgan theorems [15hrs] Subtraction and Addition System [12 hrs] Networks [15 hrs] Part B- Types of Flib-Flop and Applications [15hrs] Counter and Registration [10 hrs] Solve Applications [10hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1- Method of giving lectures, explanation and clarification. 2- Student groups. 3- E-learning within the university. 4- Application of education. 5- Experiential learning.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**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, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10 % (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	1 hr	10% (10)	7	LO # 1-7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

Week no.	Material Covered
Week 1	Introduction, Fundamental of Digital Electronics
Week 2	Conversion Systems, Decimal and Binary Systems
Week 3	Conversion Systems, Octal and Hexadecimal Systems
Week 4	Logic Gates Basic Logic Gates NOT, OR, AND
Week 5	Exclusive Logic Gates, EX-OR and EX-NOR
Week 6	Universal Logic Gates NAND and NOR

Week 7	**Boolean algebra and De Morgan Theorem**
Week 8	**Applications Boolean algebra and De Morgan Theorem in Simplifications equation logic gates**
Week 9	**Substraction and Addition Operation in Logic Gates**
Week 10	**Karnaugh Maps and Application to Simplification equations**
Week 11	**NAND-NAND and NOR-NOR networks**
Week 12	**Types of Flip-Flop (D flip-flop, RS flip-flop and K flip-flop)**
Week 13	**Counter and their applications**
Week 14	**Rigestration and their applicatios**
Week 15	**Solve Applications**
Week 16	**Final Exam duration**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
Week no.	**Material Covered**
Week 1	**Lab 1: Basic Logic Gate**
Week 2	**Practical Application**
Week 3	**Lab 2: Exclusive and Universal logic gates**
Week 4	**Practical Application**
Week 5	**Lab 3: Boolean al gebra and De Morgan Theorems**
Week 6	**Practical Application**
7	**Lab 4: Coding and Decoding Systems**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Digital Electronics: Principles, Devices and Applications by Anil K. Maini, 2007**	Yes
Recommended Texts	**1. Digital Electronics Logic and Design by Cherry Bhargava, 2019.**	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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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	**Wave physics**			**Module Delivery**	
Module Type	**Basic**			☒**Theory** ☐ **Lecture** ☐**Lab** ☐**Tutorial** ☐**Practical** ☒**Seminar**	
Module Code	MPH32031				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	3rd		**Semester of Delivery**	2nd	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Name: Kauakib Jafar Rasheed		**e-mail**	E-mail : kewakib.jafar.rasheed@kus.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	M.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

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 Aims أهداف المادة الدراسية	The module aims to develop students' understanding of : a) Compare between particle motion and wave motion in different types of waves. b) Distinguish between pulse waves and periodic waves. c) Distinguish between Longitudinal and Transverse waves. d) Relate the speed, frequency and length of a wave. e) Relate the energy carried by a wave to the amplitude of the wave. f) Describe the interaction of sound and soft tissues. g) Explain sound production and propagation. h) Summarize the basic principles and techniques of ultrasound
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• 1: The student should be able to describe the nature of a wave and explain the distinction between wave motion and particle motion. • 2: The student should be able to identify and distinguish between contrasting types of waves. • 3: The student should be able to describe the basic characteristics of waves such as frequency, wavelength, amplitude, period, and speed. • 4: The student should be able to utilize mathematical relationships related to wave characteristics. • 5: The student should be able to define wave speed and identify the variables which effect wave speed. • 6: The student should be able to utilize the definition of wave speed to solve simple computational problems involving speed, distance and time. • 7: The student should be able to perform straight-forward calculations using the wave equation. • 8: The student should be able to interpret textual information and diagrams in order to perform mathematical analyses using the wave equation. • 9: The student should be able to predict how alterations in the medium through which a wave is traveling will affect the properties of that wave. • 10: The student should be able to predict the orientation of the reflected pulse at the boundary between two media. • 11: The student should be able to recognize the distinction between constructive and destructive interference.

	• 12: The student should be able to utilize the principle of superposition to predict the shape and amplitude of a wave form resulting from the interference of two waves. ○ 13: The student should be able to identify Pulsed wave ultrasound. Pulse duration , PRP, PRF and duty factor, Spatial pulse length, Intensities , Methods for measuring intensities
Indicative Contents المحتويات الإرشادية	○ 1)Types of Waves ○ a) Wave - Transmission of energy without transmission of mass. ○ b) Mechanical Wave - A wave that travels through an elastic medium. ○ c) Electromagnetic Wave - Waves that transmit energy without a medium. ○ d) Pulse Wave - Wave consisting of a single energy pulse. ○ e) Periodic Wave - Waves composed of numerous periodic pulses. ○ f) Medium - Material through which a wave travels. ○ 2) Mechanical Wave Forms ○ a) Transverse Wave - Energy transmitted as vibrations of medium at right angles to direction of wave movement (vibrate up and down or side to side). ○ b) Longitudinal Wave - Transmission of energy by vibration of medium particles parallel to wave motion (vibrate back and forth). ○ i) Compression – Ares where medium particles are compressed together ○ ii) Rarefaction – Area where medium particles are spread apart ○ iii) Wavelength – Beginning of one compression or rarefaction to the next ○ iv) Amplitude – Is related to how compacted the medium particles are ○ v) Example – Sound waves ○ 3) Electromagnetic Waves ○ a) Produced by energy given off by high energy electrons ○ b) Composed of oscillating electric and magnetic fields ○ c) Electric and magnetic fields vibrate perpendicular to each other ○ d) Transverse but not mechanical waves ○ e) Do not require a medium for transmission ○ f) Can travel through space ○ g) May carry large amounts of energy (enough to destroy living tissue) ○ h) X-rays, gamma rays, UV light all will damage or destroy living tissue ○ 4) Particle and Wave Motion ○ a) Wave Motion - As waves travels through a medium, the direction of travel is away from the source. ○ i) In a linear medium (rope) the wave travels along the medium (in a line). ○ ii) In a planer medium (water surface) the wave travels as an ever widening circle. ○ iii) In a 3 dimensional medium (air) the wave travels as an ever widening sphere. ○ b) Motion of Medium Particles ○ i) Transverse (Linear waves) - Medium particles vibrate perpendicular to the wave. ○ ii) Longitudinal - Medium particles vibrate back and forth parallel to the direction of wave movement. ○ 5) Wave Characteristics ○ a) Amplitude - The amount of energy carried by the wave is related to the size of the wave squared. ○ b) Speed – Speed that the wave travels through the medium ○ i) Electromagnetic Waves – 3x108 m/s or 186,000 miles/s ○ ii) Sound – 340m/s or 1100ft/s

	○ iii) Other waves – Varies c) Speed, frequency and length of a wave are related by the following formula: V = f x λ V - Speed f - Frequency λ - Wavelength Wave Interference ○ 6) Learning Objectives a) Differentiate between constructive and destructive interference. ○ b) Combine multiple waves using the “Superposition” principle. ○ c) Describe how waves reflect. ○ d) Explain how “Standing” waves are produced. ○ e) Label the parts of a standing wave. ○ 7) Wave Interference a) several waves can be superimposed (occupy the same space at the same time). ○ b) When multiple waves occur in the same space and time the interaction is called interference. ○ i) Positive Interference - The crests of two or more waves occupy the same space and time. The amplitudes are added together to produce the resulting amplitude. ○ ii) Negative Interference - The crest of one wave interferes with the trough of another wave. Addition of the two tends to cancel out. ○ iii) Superposition Principle - When 2 waves occupy the same space and time, their amplitudes are added together to produce a resulting amplitude. ○ 8) Reflected Waves ○ a) When waves strike a surface, they are reflected in the opposite direction. i) Reflected wave is a mirror image of the original. ○ b) The superposition of an original and reflected wave produces a standing wave. ○ i) Waves appear to stand in place while medium vibrates up and down. ○ ii) Composed of alternating nodes and antinodes. ○ (1) Node - An area of destructive interference. ○ (2) Antinode - An area of constructive interference. ○ 9) Standing Waves ○ a) When a wave reflects back over itself a standing wave is produced b) Standing Wave Characteristics ○ i) Wave appears to be stationary ○ ii) Superposition of the forward and reverse waves produce a standard wave form ○ (1) Node – Area where the medium does not vibrate ○ (2) Antinode – Area of greatest medium deflection ○ c) Standing waves are commonly produced by musical instruments ○ i) Wind instruments produce standing waves inside the tube ○ ii) String instruments produce standing waves in their strings ○ 10) Key Concepts Review ○ a) Explain the concept of Superposition. ○ b) Know the characteristics of constructive and destructive interference. ○ c) Know how waves are reflected. d) Know how standing waves are produced. ○ e) Be able to label the parts of a standing wave. ○ 11) Describing sound waves ○ a. Parameters ○ i. Period and frequency ○ ii. Amplitude, power and intensity ○ iii. Speed of sound ○ 1. Tissue type ○ 2. Stiffness

	○ 12). Density ○ iv. Wavelength ○ E. Pulsed wave ultrasound ○ i. Pulse duration ii. PRP, PRF and duty factor ○ iii. Spatial pulse length ○ F. Intensities a. Methods for measuring intensities ○ i. Spatial ○ ii. Temporal ○ iii. Pulsed ○ b. The ten commandments of intensity ○ 13) . Interaction of Sound and Media

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب			
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	20% (10)	5, 10	LO #1, 2, 3,4,6,7,8 and 9
	Assignments	2	10% (10)	7, 12	LO # 6, 7, 8 and 10
	Report	1	10% (10)	13	LO #11, 12 and 13
	Midterm Exam	1 hr.	10% (10)	8	LO # 1-7

Summative assessment	**Final Exam**	3hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction - Waves and wave equation Waves, Transverse and Longitudinal waves. The 1-D wave equation. Phase velocity. Travelling wave on a spring
Week 2	Transmission and reflection of waves on media discontinuities. Power transmission/reflection coefficients.
Week 3	Superposition principle. Standing waves and beats. Group velocity. Fourier decomposition of waves.
Week 4	Doppler effect in sound and electromagnetic waves
Week 5	Doppler ultrasound ,continuous wave Doppler system-pulsed wave Doppler systems
Week 6	Definition of Sound waves and ultrasound waves properties and propagation of ultrasonic waves
Week 7	ultrasound waves Production, Piezoelectric effect, transducer probes
Week 8	Mid-term Exam
Week 9	Specific acoustic impedance , Acoustical characteristics of human body
Week 10	Interaction ultrasound with tissues
Week 11	Ultrasonic Dosimetry ,safety of diagnostic ultrasound
Week 12	High power ultrasound in therapy
Week 13	Biological effect of ultrasound waves
Week 14	Discussion
Week 15	**Preparatory week before the final Exam**
Week 15	**final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Tim Freegarde (2012). *Introduction to the Physics of Waves*. Cambridge: Cambridge University Press. nd 2. W. M. McDicken, Diagnostic Ultrasonic principles and use of Instrument, 2 edition, John Wiley and Sons, New York, 1992 .	Yes
Recommended Texts	Michiel Postema, Fundamentals of Medical Ultrasonics, Taylor & Francis, 2011	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	**Basic Physiology**			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☐**Lecture** ☒**Lab** ☒**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	MPH32036				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	3rd		**Semester of Delivery**	2nd	
Administering Department	Medical Physics		**College**	SC	
Module Leader	Dr. Mahdi Haider		**e-mail**	Mahdi.h@kus.edu.iq	
Module Leader's Acad. Title	Assist professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	-------		**e-mail**	--------	
Peer Reviewer Name	Dr. Saad Hussein		**e-mail**	saad_2019@ku.edu.iq	
Scientific Committee Approval Date	18/06/2023		**Version Number**	ق/أ.م/ 508	

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 Aims أهداف المادة الدراسية	1. To acquaint the students with the components of the body cells and blood in order to prepare them for the practical life 2. To learning how the body organs work togather and what the physiological aspect of it 3. To learning the students to perform some blood physiological markers tests 4. Training the students to check some human body vital signs and how to check the human body organs functions
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Identify what the meaning of physiology science and what the other sciences related with it 2. Identify how the body organs work and what the physiological function of it 3. Study the physiology of the hematopoiesis in human body 4. Study the cardiovascular system and iits components 5. Identify how the Central nerve system work and its components 6. Stud the Endocrinology of human body 7. Study how the muscular system works and what the physiological function of its
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - Circuit Theory</u> Physiology science- the tools of physiology science, the branches of physiology science, the different between anatomy and physiology , blood components. [12 hrs] <u>Part B - Hematopoiesis</u> Blood - blood components, maturation of blood cells, function of blood and blood cells ,Hematocrit, the diseases related with hematocrit. [14 hrs] Revision problem classes. [6 hrs] <u>Part C Cardiovascular system</u> The components of cardiovascular system - the heart, Structure of the heart, How the heart work, the types of cardiac muscle cells, The Action potential role of cardiomyocyte , the blood vessels. [18 hrs] <u>Part D – Cells in Life</u> Neurons – Types of neurons, components of nerve system, the brain components ,

	The spinal nerve, Types of spinal nerves, the cranial nerve, the types of cranial nerves , the meninges and its layers.[12 hrs] Part D – Muscular system The types of muscles - the function of muscular systems , how the muscle works, the contraction and relaxation of muscles, the muscle tetanus and the disease related with muscle disorders.[10 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.8
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, 8	LO #1, 2, 10 and 11
	Assignments	1	5% (5)	6, 10	LO # 3, 4, 6 and 7
	Projects / Lab.	1	20% (20)	Continuous	
	Report	1	5% (5)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	1 hr	10% (10)	8	LO # 1-5
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction – the Branches of physiology , the different between the physiology and anatomy
Week 2	The tools use in study the human body physiology and types of blood tests
Week 3	Blood components RBC , WBC, Platelet maturation
Week 4	The blood synthesis and maturations of blood cell
Week 5	The blood, functions, components, plasma, functions and serum.
Week 6	The hematocrit and the diseases related with it
Week 7	Introduction in Cardiovascular system
Week 8	The components of Cardiovascular system and its functions
Week 9	Blood red cells, shape, count, function, origin, the hemoglobin, constituents, normal value, function.
Week 10	Blood white cells, type, number, function, blood groups. Platelets, number, function, blood clotting, anti-coagulants, origin of blood clots.
Week 11	The cardiovascular system, the heart, structure, heart valves, the cardiac cycle, cardiac conductive system, factors affecting heart rate.
Week 12	The heart sounds and murmurs, blood supply to the heart, electrical properties of cardiac muscles E.C.G.
Week 13	The blood vessels, functional classification, structure of the vessels wall, the systemic circuit, pulmonary circuit, regulation of the blood vessels.
Week 14	The nervous system, the nerve cell and its function, the nerve impulse, the synapses, the nerves.
Week 15	The muscular system, types of muscles, characteristics of each type**,** The skeletal muscle, excitation, contraction coupling in the muscle fatigue, the muscle pain. The endocrine system, the hormone, chemistry, action, types of endocrine glands and their secretion.
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1,2	Lab 1,2: Introduction to physiology lab
Week 3,4	Lab 3,4: Blood Draw
Week 5,6	Lab 5,6: ECG TEST

Week 7,8	Lab 7,8: EEG test
Week 9,10	Lab 9,10: Cardiac markers
Week 11,12	Lab 11,12: Troponin test
Week 13,14	Lab 13,14: CK-MB TEST
Week 15	Lab 15: Revision

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Human physiology , Berne & Levy Physiology 8th Edition 2019	Yes
Recommended Texts	BRS Physiology (Board Review Series) 7th Edition, 2018	No
Websites	https://www.coursera.org/browse/physiiologicl-science	

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	MPH35027				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	3		**Semester of Delivery**	1st.	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Dr. Jafer Fahdel Odah		**e-mail**	hajasafa@kus.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	10/08/2025		**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 Aims أهداف المادة الدراسية	1. To develop problem solving skills and understanding of analog electronic circuits through the application of techniques. 2. To understand voltage, current, power in the transistors and diodes from a given circuit. 3. This course deals with the basic concept of analog electronics circuits. 4. This is the basic subject for all electrical and electronic circuits. 5. To understand and construct all voltage amplifiers problems. 6. To perform amplifiers types analysis.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Explain the energy levels, conductors, insulator and semiconductors 1. Recognize how semiconductors devices are built. 2. List the various terms associated with electronics circuits. 3. Summarize what is meant by a basic electronics circuit. 4. Discuss the reaction and involvement of atoms in semiconductors types. 5. Describe transistors, diodes, and how they work. 6. Define donors and acceptors atoms in semiconductors. 7. Identify the basic circuit elements and their applications. 8. Discuss the operations of voltage amplifiers circuit. 9. Discuss the various properties of transistors and diodes. 10. Explain the efficiency of voltage amplifiers with deep analysis. 11. Identify the oscillators circuit analysis.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Chapter One: Introduction - Introduction about energy levels, Conductors, insulator, semiconductor, intrinsic semiconductor, Extrinsic Semiconductors, N-type and P-type semiconductors, Semiconductor P-N junction diode, Energy Band Diagram of a P-N Junction, Reverse biased diode, Forward biased diode, Diode applications . [10 hrs.] - Transistor (or Bipolar Junction Transistors (BJTs)), Transistor symbols, Common Emitter – dc – analysis, Characteristic curves, Hybrid parameters, Equivalent circuit, Properties of the common emitter (CE) amplifier, Drawing the load line: (Determination of quiescent point Q-point). [8 hrs.] - Transistor biasing, Biasing aims, Bias circuits, Fixed bias circuit, Emitter feedback bias circuit, Collector feedback bias circuit, Voltage divider bias

	circuit, Voltage divider self-bias bias circuit, examples, Common collector circuit, Common base circuit. [10 hrs.] - Field Effect Transistor (FET), Junction FET (JFET), The output characteristic curves of the JFET, JFET small signal parameters, 1. Low frequencies model, 2. High frequencies model, The purposes of biasing, Biasing circuits, Gate bias circuit, Self-bias circuit, Voltage divider self-bias circuit, Source bias circuit, Current source bias, A. Using one power supply, B. Using two power supplies, Self-bias common source amplifier, Calculation the gain of the amplifier 1. without R_L, 2. with R_L, JFET amplifier 1. Common source amplifier, 2. Common drain amplifier, 3. Common gate amplifier, Applications of JFET at the Ohmic region: 1. Analog switch (A. Shunt switch and B. Series switch), 2. Voltage variable resistance, examples [10 hrs.] - Metal Oxide Semiconductor Field Effect Transistor, 1. Depletion MOSFET (D-MOSFET), D-MOSFET symbols in electric circuits, Characteristic curves of D-MOSFET, Transconduction curve, Biasing circuits, 2. Enhancement MOSFET (E-MOSFET), Characteristic curves and transcoduction curve of E-MOSFET, E-MOSFET symbols in electric circuits, Biasing circuits, Examples. [10 hrs.] Chapter Two: Amplifiers - Properties of ideal voltage amplifiers, Frequency response curve, Multistage amplifier, Bandwidth of a multistage amplifier, Ways of coupling in multistage amplifier: 1. RC coupling, 2. Transformer coupling, 3. Direct coupling, Classes of voltage amplifiers, 1. Class A, 2. Class B, 3. Class AB, 4. Class C, Efficiency of amplifier, Power distribution of class A amplifier, Efficiency of class B amplifier, Power amplifier (class A), Power amplifier (class B) (push-pull power amplifier), Tuned amplifier, Examples. [10 hrs.] - Feedback, Classification of amplifiers: 1. Voltage amplifier, 2. Current amplifier, 3. Trans-resistance amplifier, 4. Trans-conductance amplifier, Feedback configuration: 1. Shunt derived – Series fed (Voltage amplifier), 2. Shunt derived – Shunt fed (Trans-conductance amplifier), 3. Series derived – Series fed (Trans-resistance amplifier), 4. Series derived – Shunt fed (Current amplifier), Effect of negative feedback on the gain, Effect of negative feedback on the bandwidth, Effect of negative feedback on the noise and distortion, Effect of negative feedback on the Ri and Ro, Examples. [10 hrs.] Chapter Three: Oscillators - Sinusoidal oscillators: 1. Positive feedback oscillators: A. Phase shift oscillators, B. Wien bridge oscillators, C. Twin-T bridge oscillators 2. Resonant oscillators: A. Hartly oscillators, B. Collpitts oscillators, C. Armstrong oscillators 3. Pierce crystal oscillators. [8 hrs.]

	- Non-sinusoidal oscillators 1. Saw tooth wave oscillators 2. Square wave oscillators. [8 hrs.] Chapter Four: Multivibrators - 1. Astable multivibrator (square wave) - 2. Monostable multivibrator (one shot) - 3. Bistable multivibrator (Flip-Flop) Examples foe each types. [8 hrs.]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	This subject will be delivered to students through a series of lectures, tutorials, and hands-on activities. Lecture notes and technical demos will be included in the learning materials. Students should study both analogue and digital electronics concurrently throughout the year so that they are exposed to the differences and similarities in both domains and may better reflect on their experiences.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	75	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	75	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6.5
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**
	Quizzes	2	10% (10)	5, 10	LO #1, 2, 10 and 11

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction about energy levels, Conductors, insulator, semiconductor, intrinsic semiconductor, Extrinsic Semiconductors, N-type and P-type semiconductors, Semiconductor P-N junction diode, Energy Band Diagram of a P-N Junction, Reverse biased diode, Forward biased diode, Diode applications
Week 2	Transistor (or Bipolar Junction Transistors (BJTs)), Transistor symbols, Common Emitter – dc analysis, Characteristic curves, Hybrid parameters, Equivalent circuit, Properties of the common emitter (CE) amplifier, Drawing the load line: (Determination of quiescent point Q-point). Transistor biasing, Biasing aims
Week 3	Bias circuits, Fixed bias circuit, Emitter feedback bias circuit, Collector feedback bias circuit, Voltage divider bias circuit, Voltage divider self-bias bias circuit, examples, Common collector circuit, Common base circuit.
Week 4	Field Effect Transistor (FET), Junction FET (JFET), The output characteristic curves of the JFET, JFET small signal parameters, 1. Low frequencies model, 2. High frequencies model
Week 5	The purposes of biasing, Biasing circuits, Gate bias circuit, Self-bias circuit, Voltage divider self-bias circuit, Source bias circuit, Current source bias, A. Using one power supply, B. Using two power supplies, Self-bias common source amplifier,
Week 6	Calculation the gain of the amplifier 1. without RL, 2. with RL, JFET amplifier 1. Common source amplifier, 2. Common drain amplifier, 3. Common gate amplifier, Applications of JFET at the Ohmic region: 1. Analog switch (A. Shunt switch and B. Series switch), 2. Voltage variable resistance, examples
Week 7	Metal Oxide Semiconductor Field Effect Transistor, 1. Depletion MOSFET (D-MOSFET), D-MOSFET symbols in electric circuits, Characteristic curves of D-MOSFET, Transconduction

	curve, Biasing circuits, 2. Enhancement MOSFET (E-MOSFET), Characteristic curves and transcoduction curve of E-MOSFET, E-MOSFET symbols in electric circuits, Biasing circuits, Examples.
Week 8	Properties of ideal voltage amplifiers, Frequency response curve, Multistage amplifier, Bandwidth of a multistage amplifier, Ways of coupling in multistage amplifier: 1. RC coupling, 2. Transformer coupling, 3. Direct coupling, Classes of voltage amplifiers, 1. Class A, 2. Class B, 3. Class AB, 4. Class C
Week 9	Efficiency of amplifier, Power distribution of class A amplifier, Efficiency of class B amplifier, Power amplifier (class A), Power amplifier (class B) (push-pull power amplifier), Tuned amplifier, Examples.
Week 10	Feedback, Classification of amplifiers: 1. Voltage amplifier, 2. Current amplifier, 3. Trans-resistance amplifier, 4. Trans-conductance amplifier, Feedback configuration: 1. Shunt derived – Series fed (Voltage amplifier), 2. Shunt derived – Shunt fed (Trans-conductance amplifier), 3. Series derived – Series fed (Trans-resistance amplifier), 4. Series derived – Shunt fed (Current amplifier),
Week 11	Effect of negative feedback on the gain, Effect of negative feedback on the bandwidth, Effect of negative feedback on the noise and distortion, Effect of negative feedback on the Ri and Ro, Examples.
Week 12	Sinusoidal oscillators: 1. Positive feedback oscillators: A. Phase shift oscillators, B. Wien bridge oscillators, C. Twin-T bridge oscillators
Week 13	2. Resonant oscillators: A. Hartly oscillators, B. Collpitts oscillators, C. Armstrong oscillators 3. Pierce crystal oscillators.
Week 14	Non-sinusoidal oscillators: 1. Saw tooth wave oscillators 2. Square wave oscillators.
Week 15	Multivibrators: 1. Astable multivibrator (square wave 2. Monostable multivibrator (one shot) 3. Bistable multivibrator (Flip-Flop). Examples foe each types.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Electronics Lab Safety Information. Electric and electronic symbols and its meaning

Week 2	Lab 2: Static characteristics of diode
Week 3	Lab 3: Rectifier circuits
Week 4	Lab 4: Zener diode characteristics
Week 5	Lab 5: Diode limiter circuits
Week 6	Lab 6: Diode voltage multiplier
Week 7	Lab 7: Characteristics of transistor in common emitter connection. Characteristics of transistor in common base connection

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1- T. Floyd, Electronic Devices, Pearson Prentice Hall, Inc., 7th Edition 2005. 2- Electronic Principles, A. Malvino & D.J. Bates, McGraw Hill (2007).	Yes
Recommended Texts		
Websites		

Grading Scheme
مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف مادة الطب الفيزياء النووية

Module Information معلومات المادة الدراسية					
Module Title	**Nuclear Physics**			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☐ **Lecture** ☒**Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MPH31030				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		3	**Semester of Delivery**		1
Administering Department		Medical Physics	**College**	Science	
Module Leader	Dr. Ali Abdulamear Rasheed		**e-mail**	ali.abdulamear@kus.edu.iq	
Module Leader's Acad. Title		Assistant Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor	Non		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		151/6/2025	**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 Aims أهداف المادة الدراسية	1. Understand the basic concepts of nuclear physics, with an emphasis on nuclear structure and the interactions of radiation with matter. Nuclear forces; the structure of the nuclear shell; alpha, beta, and gamma radioactive decays; interactions of nuclear radiation (charged particles, gamma rays, and neutrons) with matter; nuclear reactions; fission and fusion. 2. Learn about the designs and technologies of fission and fusion reactors, the types of nuclear accelerators and their main components, some applications of nuclear energy, and the techniques for producing electrical energy from fusion reactors, in addition to the concepts of elementary particles and the fundamental forces of nature.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Graduates should be able to: (a) Infer the existence and smallness of an atomic nucleus. (b) Distinguish between the number of nucleons (mass number) and the number of protons (atomic number). (c) show an understanding of how the conservation laws for energy and momentum in β decay were used to predict the existence of the neutrino (knowledge of antineutrino and antiparticles is not required) (d) define the terms activity and decay constant and recall and solve problems using the equation $A = \lambda N$ and demonstrate an understanding that an element can exist in different isotopic forms, each with a different number of neutrons in the nucleus. (e) Formulate the concept of conservation of nucleon number, charge, and mass-to-energy ratio in nuclear processes, and apply it to problem solving. (f) Demonstrate your understanding of the concept of mass defect. (h) Demonstrate your understanding of the concept of nuclear binding energy and its relationship to mass defect.

	(i) Draw a diagram showing the variation of binding energy per nucleon with the number of nucleons. (c) Explain the importance of binding energy per nucleon in nuclear fusion and nuclear fission. (k) Demonstrate an understanding of the spontaneous and random nature of nuclear decay. (l) Infer the random nature of radioactive decay from fluctuations in the count rate. (m) Demonstrate an understanding of background radiation. (n) Demonstrate an understanding of the nature of alpha, beta, and gamma radiation (knowledge of positron emission is not required). (q) infer and sketch the exponential nature of radioactive decay and solve problems using the relationship $x = x_0 \exp(-\lambda t)$ where x could represent activity, number of undecayed particles or received count rate (r) define and use half-life as the time taken for a quantity x to reduce to half its initial value. (s) Understand fission and fusion techniques and how to control nuclear reactions. (t) Study the conversion of nuclear energy into electrical energy. (u) Learn about nuclear accelerators.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A</u> Nuclear constituents, nuclear sizes and shapes, nuclear radii, nuclear masses. [10 hrs] binding energy /nucleon, nuclear moments, nuclear force. [10 hrs] Nuclear models, radioactivity, radiation decay [10 hrs] Interaction of radiation with matter, fission and fusion reactions. [10 hrs] <u>Part B</u> Nuclear fission and fusion reactors. [10 hrs] Acceleration and accelerators, radiation detectors. [10 hrs] Elementary particles, nuclear phys. Applications, introduction to nuclear medicine. [12 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**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, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	1 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Week	Material Covered
Week 1	An Introduction to Nuclear Physics
Week 2	Constituents Of The Nucleus
Week 3	Binding Energy
Week 4	Nuclear Moments and Nuclear Force
Week 5	Stability of the Nucleus & Nuclear Models
Week 6	Radioactivity
Week 7	Nuclear Radiation decay
Week 8	Interaction of Radiations with Matter
Week 9	Nuclear fission reactions and reactors
Week 10	Nuclear Fusion reactions and reactors
Week 11	Acceleration &Accelerators
Week 12	Radiation Detectors
Week 13	Elementary particles
Week 14	Nuclear physics applications
Week 15	Introduction to nuclear medicine
Week 16	Final Examination

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
Week	Material Covered
Week 1	Lab 1: Introduction to radiation protection & sources of radiation
Week 2	Lab 2: Plotting a GM Plateau
Week 3	Lab 3: Geiger Tube Efficiency
Week 4	Lab 4: Beta Absorption
Week 5	Lab 5: Background detection
Week 6	Lab 6: Inverse Square Law
Week 7	Lab 7: Examination

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Introductory nuclear physics, Kenneth S. Krane 1987. Fundamentals in nuclear physics, Jean-Louis Basdvant, James Rich, 2005.	Yes
Recommended Texts	Nuclear Physics, BY IRVING KAPLAN 1962.	No
Websites	https://nap.nationalacademies.org/read/6288/chapter/3 https://en.wikipedia.org/wiki/Nuclear_physics https://en.wikipedia.org/wiki/Nuclear_reactor https://en.wikipedia.org/wiki/Fusion_power	

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

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Scientific Research Methodology			**Module Delivery**	
Module Type	B			☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	MPH32037				
ECTS Credits	3				
SWL (hr/sem)	25				
Module Level	٣		**Semester of Delivery**	2	
Administering Department	Medical Physics department		**College**	SC	
Module Leader	Dr. Sabah I. Abbas		**e-mail**	sabahibrahim@kus.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	1/12/2026		**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 Aims أهداف المادة الدراسية	١- تعليم الطالب بأساليب وأخلاقيات البحث العلمي ليستفيد من قدرته في كتابة البحوث العلمية وأيجاد الحلول المناسبة لحل المشكلات والمعضلات التي تواجه المجتمع . ٢- العمل على زيادة القدرة في كتابة البحوث العلمية و أيجاد الحلول لمشكلة البحث. ٣- معالجة المعضلات والمشكلات التي تواجه المجتمع ٤- جمع المعلومات بشكل دقيق وبالتالي دراستها فيما يخص المشكلة المبحوثة .
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	١- تعريف الطالب بأساليب ومفاهيم اخلاقيات البحث العلمي والحفاظ على الامانة العلمية. ٢- التعرف على التطبيقات المنهجية التي يدرسها الباحث والعمل على اتخاذ الاجراءات الصحيحة لحل المشاكل التي تواجه الفرد والمجتمع. ٣- بناء القدرات والمهارات العلمية للطالب في كتابة البحوث العلمية . ٤- تهدف المادة المعرفية الى تطبيق المنهجية العلمية ذات العلاقة بأسس ومتطلبات مناهج البحث العلمي. ٥- تهدف المادة المعرفية الى ألتزام الباحث وعلى وجه التحديد الطالب بنزاهة وأدراك اهمية المنهج العلمي. ٦ - تهدف المادة المعرفية الى معالجة مشاكل واقعية والعمل على ايجاد الحلول لها .
Indicative Contents المحتويات الإرشادية	معنى العلم والبحث العلمي، تعريف المنهج (مناهج البحث العلمي). أهمية تحديد منهج البحث العلمي، الأسس التي يبنى عليها اختيار منهج البحث العلمي. مناهج البحث : البحث التاريخ، البحوث الوصفية، البحث التجريبي، البحث النوعي. (ساعة واحدة) هيكلية البحث وتشمل: عنوان البحث ،المقدمة. مشكلة البحث . فرضيات البحث، اهمية البحث ، أهداف البحث.(ساعة واحدة) امتحان نصف فصلي. (ساعة واحدة) الدراسات السابقة ،منهجية وإجراءات البحث ادوات ووسائل جمع البيانات ، الملاحظة، المقابلة، الاستبيان (ساعة واحدة) كتابة تقرير البحث: كتابة مشكلة البحث: وتتضمن: مقدمة البحث ، تحديد المشكلة وأسئلتها، الغرض من البحث (مبررات البحث)، أهمية البحث، وفرضيات البحث وأسئلته مراجعة أدبيات الدراسة: الإطار النظري، والدراسات السابقة ،(ساعة واحدة) إجراءات البحث: وتشمل منهج البحث وتصميمه، والعينة، ومواد وأدوات البحث والإجراءات، والضبط التجريبي للبحث، وتحليل البيانات نتائج البحث: التحليل الإحصائي وقراءة النتائج وتفسيرها.(ساعة واحدة) خلاصة البحث. قائمة المراجع. الملاحق الصفحات التمهيدية والختامية يكتب الطالب تقريرا حول تقيم بحث(ساعة واحدة) مناقشة عناوين مقترحة. يراجع الطالب المنهج الدراسي والتهيؤ للامتحان النهائي.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	يُعد هذا المقرر من أهم المقررات الدراسية كونه يمكن الطالب الجامعي من المهارات التي تساعده على انجاز بحث التخرج، وهو يعمل على إكسابه مجموعة من المعلومات والمعارف حول العلم والمعرفة، والبحث العلمي ومناهجه، وينمي الاتجاهات الإيجابية لدى المتعلم تجاه البحث العلمي، ويتحقق ذلك من خلال مجموعة من الأنشطة الفاعلة (طرائق وأساليب تدريس، ووسائل) كطريقة الحوار والمناقشة، والتعلم الذاتي، والبحث، والتطبيقات، مع استخدام الباوربوينت عند العرض، وتقييم الطالب من خلال المشاركة الصفية والتكليفات المصاحبة - الصفية واللاصفية - والاختبار النصفي والنهائي.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	١٨	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	١,٢
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	٧	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	٠,٤٦
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	٢٥		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	١	١٠% (١٠)	٥	
	Assignments	١	10% (10)	5, 10	
	Projects / Lab.	1	١٠٪ (١٠)	Continuous	
	Report	1	١٠% (١٠)	13	
Summative assessment	**Midterm Exam**	1 hr	10% (10)	7	
	Final Exam	3 hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	معنى العلم والبحث العلمي، تعريف المنهج (مناهج البحث العلمي).
Week 2	أهمية تحديد منهج البحث العلمي، الأسس التي يبنى عليها اختيار منهج البحث العلمي.
Week 3	مناهج البحث : البحث التاريخ، البحوث الوصفية، البحث التجريبي، البحث النوعي .
Week 4	هيكلية البحث وتشمل: عنوان البحث ،المقدمة.
Week 5	مشكلة البحث.
Week 6	فرضيات البحث، اهمية البحث ، أهداف البحث.
Week 7	امتحان نصف فصلي.
Week 8	الدراسات السابقة ،منهجية وإجراءات البحث.
Week 9	ادوات ووسائل جمع البيانات ، الملاحظة، المقابلة، الاستبيان.
Week 10	كتابة تقرير البحث: كتابة مشكلة البحث: وتتضمن: مقدمة البحث ، تحديد المشكلة وأسئلتها، الغرض من البحث (مبررات البحث)، أهمية البحث، وفرضيات البحث وأسئلته.
Week 11	مراجعة ادبيات الدراسة: الإطار النظري، والدراسات السابقة ، إجراءات البحث: وتشمل منهج البحث وتصميمه، والعينة، ومواد وأدوات البحث والإجراءات، والضبط التجريبي للبحث، وتحليل البيانات.
Week 12	نتائج البحث: التحليل الإحصائي وقراءة النتائج وتفسيرها. خلاصة البحث. قائمة المراجع. الملاحق. الصفحات التمهيدية والختامية.
Week 13	يكتب الطالب تقريرا حول تقيم بحث.
Week 14	مناقشة عناوين مقترحة.
Week 15	يراجع الطالب المنهج الدراسي والتهيؤ للامتحان النهائي.
Week 16	امتحان نهائي

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

Week 5	
Week 6	
Week 7	

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	- منهجية البحث العلمي (د.عبد القادر مندو) - مناهج البحث العلمي (عبد الرحمن بدوي) - محمد سعيد ابو طالب ، علم مناهج البحث - موفق الحمداني وآخرون ، مناهج البحث العلمي : اساسيات البحث العلمي - جمال زكي والسيد يسين ، اسس البحث الاجتماعي - أسس البحث العلمي (د.مروان عبد المجيد إبراهيم) - منهج البحث بين النظرية والتطبيق (د.حامد طاهر) - مناهج البحث العلمي د.محمد سرحان علي المحمداوي	
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
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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

Physics of Medical Instruments I

Module Information معلومات المادة الدراسية					
Module Title	**Physics of Medical Instruments I**			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☐ **Lecture** ☐**Lab** ☐ **Tutorial** ☐**Practical** ☒ **Seminar**	
Module Code	MPH31026				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	3		**Semester of Delivery**	1	
Administering Department	Medical Physics		**College**	Science	
Module Leader	Nihad K. Ali		**e-mail**	nihad@kus.edu.iq	
Module Leader's Acad. Title	Assoc. Prof.		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	nihad@kus.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	15/06/2025		**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 Aims أهداف المادة الدراسية	This course introduces students to various medical devices that can be found in hospitals and medical institutions. The objective of this subject is to describe the principles, applications and the design of the medical instruments most commonly used in hospitals. Fundamental principles of operation and quantitative analysis and design of medical instrumentation systems for diagnostic and therapeutic medical applications are taught.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	***At the end of the course, students are expected to learn:*** 1. The basic theorem and laws to explain concepts, functions, behavior and characteristics of biomedical circuits and devices. 2. Formulate and solve electrical and mechanical problems related to biomedical devices. 3. Distinguish between therapeutic, diagnostic and analytical medical devices. 4. Work on device calibration and work on some devices directly in the examination.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Introduction to Biomedical Instrumentation. Biopotential Electrodes. (9 hrs) Sensors: Electrocardiography. Blood Pressure, Heart Sounds and Blood Flow. (6 hrs) Respiratory System Measurements. (10 hrs) Defibrillator, Pacemaker. (9) Electroencephalogram (EEG) (9 hrs) Respiratory system measurements. (9 hrs)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to acquaint the students with the physical principles on which medical devices depend how to deal with them in an accurate scientific method. Encouraging students to discover for themselves how medical devices work by understanding the general laws of physics. This is done through scientific discussions in the classroom and in the laboratory as well as through practical application in hospitals and medical clinics.

Student Workload (SWL) الحمل الدراسي للطالب			
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)	5, 10	LO #1, 2, and 3
	Assignments	2	10% (10)	2, 12	LO # 3, 4
	Projects	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 4
Summative assessment	**Midterm Exam**	1 hr	10% (10)	7	LO # 1-3
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Biopotential electrodes: Electrode-electrolyte interface, polarization,
Week 2	Polarization; polarizable and non-polarizable electrodes, electrode circuit models. Biopotential electrodes: skin interface and motion artifact.
Week 3	Types of electrodes; body surface recording electrodes, internal electrodes, micro electrodes, practical hints in using electrodes.
Week 4	Sensors: Oxygen sensor for blood, Carbon dioxide sensor for blood.
Week 5	Heart sound sensor. Piezoelectric heart sound sensor, Fetus heart sound sensor. Blood flow sensor: Respiration sensor, Blood pressure sensor.
Week 6	Enzyme sensor and microbial sensor.

Week 7	Defibrillator, Lown Defibrillator Circuit.
Week 8	Pacemaker, Types of pacemaker, Operating modes.
Week 9	Electroencephalogram (EEG).
Week 10	EEG Rhythms and Waveforms.
Week 11	Electroencephalogram (EEG) components.
Week 12	Respiratory system measurements.
Week 13	Mechanic of breathing.
Week 14	Respiratory transducer and instruments.
Week 15	. Intensive, coronary care units and operating rooms.
Week 16	Preparatory week before the final Exam.

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Webster John G and Clark John W, Medical Instrumentation: Application and Design, 4th Edition, John Wiley, 2010.	No
Recommended Texts	Carr, Joseph J and Brown John M, Introduction to Biomedical Equipment Technology, 4th Edition, Prentice Hall 2001.	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

الفيزياء الطبية II

Module Information معلومات المادة الدراسية					
Module Title	Medical Physics II			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☐ **Lecture** ☒ **Lab** ☒**Tutorial** ☐**Practical** ☐ **Seminar**	
Module Code	MPH31027				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	3rd		**Semester of Delivery**	1st	
Administering Department	Medical Physics		**College**	Science	
Module Leader	Dr. Bassma Hussain Hamad		**e-mail**	dr.bassmahussain@kus.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	15/06/2025		**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 Aims أهداف المادة الدراسية	Cognitive objectives A1- That the student understands the fundamental physics ideas connected to medicine. A2- To comprehend the physical relationship and how to medically communicate it. A 3- Relationship between physical attributes and medical device uses. A4- Develop pupils' clinical skills. The fundamental aims. B1 - Recognize the fundamental physical rules and their application to the human body. B2 - Understanding of physical aspects influencing the human body and their relationship to the appearance of disease indications on the body. B3- Integration of fundamental principles and medical devices
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Obtaining a prominent scientific staff that tries to understand the nature of the physical work of the human body by being acquainted with each of 1- The influence of gravity forces on bone formation and blood circulation 2- The electrical influence on the nature of the body's work 3- The impact of heat on the nature of the body's work 4- Investigating mathematical physical relationships and their computerized diagnosis in illnesses caused by these impacts.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – medical physics, basics : Electricity Within the Body: Potential difference between inside and outside the cell, electrical and magnetic effects generated inside the body, applications of electricity and magnetism to the surface of the body. [12 hrs].

	Electromyography (EMG): technique of recording electric activity, EMG signal, EMG electrodes [6 hrs]. Electrocardiograph (ECG):, Electrical signals from the heart, atrial depolarization and contraction, The QRS complex, Six frontal plane ECG s for a normal subject . [8hrs]. Electroencephalograph (EEG): electrical activity of the brain, Electrodes and potential, the frequency of the EEG signals, EEG as investigation method of brain activity, Electrodes used, type and characteristics [10 hrs]. The sound: Physics of Sound Wave, Sonic spectrum, Speed of Sound, Sound wave intensity, acoustic impedance, [8hrs]. Sound in medicine: Sound Intensity Level [Ratio] , Sound Reflection and transmission, General Properties of Sound. [6 hrs]. Sound in Medicine: Infrasound, ultrasound, Pulsed ultrasound, Scattering, Absorption, US attenuation coefficient, examples and solved problems [8 hrs]. Light in medicine: properties used for medicine, Measurement of light and units. [6 hrs]. Applications of visible light in medicine, medical uses of visible light, Transillumination, [6 hrs]. Applications of ultraviolet and infrared light in medicine [6 hrs]. <u>Part B -</u> Eye and vision: The Human Eye, The Retina –The light detector of the eye, [6 hrs]. Eye and vision: Detective vision and its corrections, Physics of eyes vision [6 hrs]. Eye and vision: Difference effects on the eye, Myopia Farsightedness Hyperemia Nearsightedness [8 hrs]. Eye and vision: How sharp are your eyes? Presbyopia (old sight) [6 hrs]. Eye and vision: Astigmatism, examples and solved problems. [4 hrs].

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in introducing this unit is to introduce students to the physical principles upon which medical physics depends and how to deal with them in a scientifically rigorous manner. Encouraging students to discover how the human body works with physical laws and its physiological and therapeutic effects by themselves through understanding the general laws of physics. This is done through scientific discussions in class as well as through practical application in hospitals and medical clinics.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.8
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	20% (20)	5, 10	LO #1.2
	Assignments	2	10% (10)	2, 9,12	LO # 3, 4, and 5
	Projects / Lab.	15	10% (10)	continuous	
	Report				
Summative assessment	**Midterm Exam**	1hr	10% (10)	7	LO # 1-5
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**Electricity Within the Body:** Potential difference between inside and outside the cell, electrical and magnetic effects generated inside the body, applications of electricity and magnetism to the surface of the body.
Week 2	**Electromyography (EMG)**: technique of recording electric activity, EMG signal, EMG electrodes
Week 3	**Electrocardiograph (ECG):,** Electrical signals from the heart, atrial depolarization and contraction, The QRS complex, Six frontal plane ECG s for a normal subject .
Week 4	**Electroencephalograph (EEG):** electrical activity of the brain, Electrodes and potential, the frequency of the EEG signals, EEG as investigation method of brain activity, Electrodes used, type and characteristics
Week 5	**The sound:** Physics of Sound Wave, *Sonic spectrum,* Speed of Sound, Sound wave intensity, acoustic impedance,
Week 6	**Sound in medicine:** Sound Intensity Level [Ratio] , Sound Reflection and transmission, General Properties of Sound**.**
Week 7	**Sound in Medicine:** Infrasound, ultrasound, Pulsed ultrasound, Scattering, Absorption, US attenuation coefficient, examples and solved problems
Week 8	**Light in medicine:** properties used for medicine, Measurement of light and units.
Week 9	Applications of visible light in medicine, medical uses of visible light, Transillumination,
Week 10	Applications of ultraviolet and infrared light in medicine
Week 11	**Eye and vision:** The Human Eye, The Retina –The light detector of the eye,
Week 12	**Eye and vision:** Detective vision and its corrections, Physics of eyes vision
Week 13	**Eye and vision:** Difference effects on the eye, Myopia Farsightedness Hyperemia Nearsightedness
Week 14	**Eye and vision:** How sharp are your eyes? Presbyopia (old sight)
Week 15	**Eye and vision:** Astigmatism, examples and solved problems.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	تجربة المسارات الكهربائية لجهاز ECG
Week 2	تجربة قياس ضربات القلب بالمحاكاة
Week 3	تجربة لدراسة شكل الموجات الصوتية المنبعثة من القلب
Week 4	تجربة لدراسة شكل الإشارات الكهربائية حسب امراض القلب المختلفة
Week 5	تجربة تأثير العلاج بالتحفيز الكهربائي
Week 6	تجربة محاكاة تخطيط الدماغ
Week 7	تجربة محاكاة تخطيط الاعصاب
Week 8	امتحان Mid
Week 9	تجربة الـPacemaker
Week 10	تجربة تأثير العلاج بالموجات الفوق الصوتية
Week 11	تجربة قياس فولتيات كهربائية القلب
Week 12	
Week 13	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1.Medical Physics by John R. Cameron, International Publication. 2. Elements of Biophysics Randall 1998 3. Medical Physics Data Book, Thomas N. Padikal, Editor MD 20205 and Sherman P. Fivozinsky, Associate Editor Office of Standard Reference Data National Bureau of Standards Washington, DC 20234 4- A Wiley-interscience publication JOHN WILEY & SONS	Yes
Recommended Texts	1. Brown B H, Medical Physics and Biomedical Engineering, Institute Of Physics, 1999. (R895.M489).	yes

	2. Bushberg Jerrold T, Seibert J A, Leidholdt E M and Boone J M, The Essential Physics of Medical Imaging, 2nd Edition, Lippincolt Williams & Wilkins, 2002. (RC78.7.D53E78). 3. Ganong William F, Ganong's Review of Medical Physiology, 24th Edition, McGraw-Hill Medical, 2012.	
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	**Biostatistics**			**Module Delivery**	
Module Type	**S.**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MPH31025				
ECTS Credits	**3**				
SWL (hr/sem)	75				
Module Level	3rd		**Semester of Delivery**	1st	
Administering Department	Medical Physics		**College**	Science	
Module Leader	Dr. Arkan jebur saeed		**e-mail**	arkan.jebur@kus.edu.iq	
Module Leader's Acad. Title	Asst. Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	15/06/2025		**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 Aims أهداف المادة الدراسية	Biostatistics provides the basic framework for thinking about data in a rigorous fashion. This course is intended both as a refresher course and as a first course in the application of statistical thinking to biological problems. Descriptive and inferential statistics will be covered, with topics including confidence intervals, basic probability, discrete and continuous distributions, t-tests, correlation, regression, chi-square tests.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	· define, explain the scope and concepts of Biostatistics and its applications. · define data, know the common sources of data and understand the various methods of data collection and presentation. discuss to a reasonable level the probability theories and population distribution and their applications in health and health related fields. · define and explain the various commonly used test statistics and their applications in analyzing data in public health · acquire the necessary knowledge and skills for data analysis and interpretation of test statistic results.
Indicative Contents المحتويات الإرشادية	Module 1 Introduction to Biostatistics and Data Management 1- Definition and Application of Biostatistics 2- Data, Data Sources 3- Methods of Data Collection Module 2 Organization and Presentation of Data 1- Tabular Presentations 2- Diagrammatic Presentation of Data 3- Graphs Module 3 Numerical Measures 1- Measures of Central Tendency 2- Measures of Dispersion or Variability 3- regression and correlation Module 4 Inferential Biostatistics 1- Hypothesis Testing 2- Test of Significance and Statistical Errors Module 5 Non-Parametric Tests 1-Chi-Square Test (X2)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in presenting this model is theoretical lectures and encouraging students to participate in the lectures effectively to know the basics of the subject and its vocabulary. Improving thinking skills and encouraging them to participate critically and interactively in the topics raised during the academic weeks in the theoretical and practical parts.

	This will be achieved through theoretical and practical classes, tutorials, and interactive tutorials by thinking about the type of simple experiments that include some sampling activities that are of interest to the students.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	42	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.8
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	20% (20)	4, 8	LO #1, 2, 3, 5,6, and 7
	Assignments	2	10% (10)	5, 10	LO # 2, 4, 6, 8, and 9
	Projects / Lab.				
	Report	1	10% (10)	13	LO # 12
Summative assessment	**Midterm Exam**	1 hr	10% (10)	7	LO # 1-9
	Final Exam	3 hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Statistics
Week 2	Variables
Week 3	Frequency Distributions
Week 4	Frequency Distributions
Week 5	Types of Graphs
Week 6	Measures of Central Tendency
Week 7	Measures of Central Tendency
Week 8	Measures of dispersion
Week 9	Measures of dispersion
Week 10	Midterm Exam
Week 11	Regression
Week 12	Correlation
Week 13	Hypothesis
Week 14	Chi-Square Test (X2)
Week 15	General review of the previous lessons
Week 16	Final Exam

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

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

Biosensor

المتحسسات الحيوية- المستوى الثالث

Module Information معلومات المادة الدراسية					
Module Title	Biosensor			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☒**Lecture** ☐**Lab** ☒**Tutorial** ☐**Practical** ☒**Seminar**	
Module Code	MPH32032				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	3th		**Semester of Delivery**	2nd	
Administering Department	Medical Physics		**College**	College of Science	
Module Leader	Dr. Abdulmohaimen W Fakhri		**e-mail**	mohamenw2@kus.edu.iq	
Module Leader's Acad. Title	Lec..Dr		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Non		**e-mail**	E-mail	
Peer Reviewer Name	Non		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To understand the principles of biosensors and their applications in various fields. 2. To learn about the different types of biosensors and their working mechanisms. 3. To analyze the performance characteristics of biosensors, such as sensitivity, selectivity, and stability. 4. To evaluate the challenges associated with biosensor development, such as biocompatibility and signal interference. 5. To apply knowledge gained from biosensor studies to real-world problems in healthcare, environmental monitoring, food safety, and other fields.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**1. Enabling students to obtain knowledge and understanding of the topics of principles of biosensors.** **2. Obtaining a prominent scientific staff that tries to understand the biosensors and its applications** **3. Enable students to obtain knowledge and understanding of biosensors applications and conduct various practical experiments.** **4. Enable students to obtain knowledge and understanding of the use of basic**
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Biosensors: Description of biosensors, Biomolecules used in biosensors, Types of biosensor, Define of immobilization and methods, bio-receptors, Characteristic of biosensor performance factors, enzymatic biosensors, Biosensors Technology, Using of biosensor [8 hrs]. Biomolecules used in biosensors, these biomolecules are typically enzymes, antibodies, nucleic acids, or other proteins and types of biosensors is electrochemical biosensors, optical biosensors, piezoelectric biosensors,, ion-sensitive field-effect transistors, etc [10 hrs]. Immobilization methods are techniques used to attach biomolecules as well Bio-receptors are biomolecules used to bind target molecules in biosensors as well Characteristic of biosensors include high sensitivity, selectivity, and specificity, Performance factors affecting the performance of biosensors include the choice of bio-

	receptors, immobilization method and Enzymatic biosensors use enzymes as bio-receptors to catalyze a reaction between the target molecule and a substrate. Biosensors technology involves the integration of bio-receptors, immobilization methods, transducing elements, and electronics[10 hrs]. There are many different types of biosensors, but they all generally work by using a biological sensing element [8 hrs]. <u>Part B -</u> One important application of biosensors is in the field of immune-biosensor [8 hrs]. In conclusion, biosensors are powerful tools with a wide range of applications in fields such as medicine, environmental monitoring, and food safety [8 hrs].

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Providing students with basics and specifications 2. Encouraging students to discover how the understand biosensor works with physical laws and its physiological and therapeutic effects by themselves through 3. Understanding the general laws of physics. This is done through scientific discussions in class as well as through practical application in hospitals and medical clinics. 4. Forming discussion groups during the lectures to discuss the topics raised during the lecture 5. Explanation and clarification 6. Thinking questions such as what, how, when and why for specific topics

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.4
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	15% (10)	5, 10	LO #1, 2, 9 and 10
	Assignments	2	15% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.				
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	1 hr	10% (10)	8	LO # 1-8
	Final Exam	3hr	50% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Description of biosensors
Week 2	Biomolecules used in biosensors
Week 3	Types of biosensor
Week 4	Define of immobilization
Week 5	immobilization methods
Week 6	Bio-receptors
Week 7	Characteristic of biosensor performance factors
Week 8	Enzymatic biosensors
Week 9	Biosensors Technology
Week 10	Using of biosensor
Week 11	Applications of biosensor
Week 12	Immune-biosensors
Week 13	Introduction of DNA
Week 14	DNA biosensors
Week 15	Electrochemical sensors
Week 16	Final Exam duration

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Biosensors fundamentals and application, antony P.F.Turner ,Isao K. and George S. Wilson ,Oxford Scince Puplication 1987	Yes
Recommended Texts	Essentials (lecture nots in chemistry V84) Gennady Evtugyn , Springer 2014	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

Quantum Mechanic in Medical

ميكانيك الكم في الطب – المستوي الثالث

Module Information معلومات المادة الدراسية					
Module Title	Quantum Mechanics			**Module Delivery**	
Module Type	**Elective**			☒**Theory** ☒**Lecture** ☐ **Lab** ☒**Tutorial** ☒ ☒**Practical** ☒**Seminar**	
Module Code	MPH32033				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	3th		**Semester of Delivery**	2nd	
Administering Department	Medical Physics		**College**	Science	
Module Leader	Assit. Prof.Dr. Fadhil K. Farhan		**e-mail**	Dr.fadhil1966@kus.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	non		**e-mail**	non	
Peer Reviewer Name	non		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1- Providing the student with a cognitive skill about the basic concepts of physics in general. 2- Introducing students to the most important principles of quantum mechanics. 3- Introducing the student to the wave properties included in the Schrödinger equation and the wave function. 4- Providing the student with knowledge of how to calculate the wave function and the time-dependent and non-time-dependent Schrödinger equation. 5- Introducing the student to the expected value and variance and deriving the mathematical relations for these phenomena. 1. 6- Introducing the student to the mathematical laws and relations that relate to the constant of motion and the Hermitian influences.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	A- Cognitive goals A1- That the student understand the basic concepts of spectrum science. A2- To describe the relationship between the incident energy and the absorption spectrum. A 3- The link between material properties and their emission spectrum. A 4- To recognize the most important laws and relationships that link the spectrum of molecules. B - The soft skills objectives of the course. B1 - The applied side in practical hours B2 - Comprehension, comprehension and cognitive analysis. B3 - Observation and perception.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A - **An introduction to the principles and fundamentals of quantum mechanics** An introduction to the atom and the hypotheses that describe particle motion, The most important hypotheses that dealt with the nature of the atom,[8 h/w], Wave nature and matter, wave function, Definition and description of the wave function from quantum mechanics, properties of wave functions,[7 h/w], Comparison of quantum mechanics and classical mechanics on the behavior of particles within an

	atom, Physical phenomena and their interpretation of energies and wave motion according to quantum mechanics and clas Schrödinger sical mechanics, [10 h/w], Part B - **Wave functions and the Schödienger equation** The mathematical formula for the wave function, wave function equation , Derivation of the wave function with respect to energy and momentum [10h/w], Solve the time dependent Schödienger equation, Derivation of the position dependent Schrödinger equation , Applications to the Schrödinger equation [8 h/w], Hermetic influences, Characteristics of Hermetic Effects in Quantum Mechanics, Characteristics of Hermetic Effects in Quantum Mechanics , Variance and covariance in quantum mechanics , [7 h/w], Equation of motion and motion constant , Self and non-self-functions in quantum mechanics , [7 h/w], Applications of eigenvectors and motion constants[7 h/ w].

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 educational programs and by thinking about linking the course content with the devices and equipment that depend on the principles and laws of the course for their work.

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Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	61	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	64	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem)	125		

الحمل الدراسي الكلي للطالب خلال الفصل	

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	4, 9	LO #1, 2, 9 and 10
	Assignments	2	10% (10)	2, 10	LO # 3, 4, 6 and 7
	Projects	1	10% (10)	Continuous	
	Report	1	10% (10)	12	LO # 5, 8 and 10
Summative assessment	Midterm Exam	1 hr	10% (10)	8	LO # 1-8
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to the wave function
Week 2	The wave field of the function
Week 3	Operators Types
Week 4	Absorber quantities
Week 5	Schrödinger equation
Week 6	Solve the time dependent Schrödinger equation
Week 7	Solve the position-dependent Schrödinger equation
Week 8	expected values in quantum mechanic
Week 9	Variation in values and The kinematic equation
Week 10	solve problems
Week 11	Properties of Hermetic operators
Week 12	Applications of Hermetic operators
Week 13	hydrogen atom
Week 14	Angular momentum and linear momentum
Week 15	**Calculate the power and wave function of a voltage barrier**

Week 16	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1- A.C. Philips and John Wiley 2- Introduction to Quantum Mechanics	NO
Recommended Texts	1- Mohammad Reza Pahlavani 2- Theoretical Concepts of Quantum Mechanics 2012	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

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.

Modules Description Form

نموذج وصف المادة الدراسية

الالكترونيات الرقمية

Modules description Information معلومات المادة الدراسية				
Modules Title	**Digital Eectronics**		**Modules Delivery**	
Type	**Core**		☒Theory ☒ Lecture ☒Lab ☒ Tutorial ☐Practical ☐Seminar	
Course Code	MPH32035			
ECTS Credits	**6**			
SWL (hr/sem)	**150**			
Modules Level	3rd		**Semester of Delivery**	2nd
Administering Department	Medical Physics		**College**	Science
Modules Leader	Assit. Prof. Dr. Jafer F. Odah Assit. Prof. Dr. Akeel M. Kadim		**e-mail**	Dr.akeelm.kadim@kus.edu.iq
Modules Leader's Acad. Title	Assistant Professor		**Modules Leader's Qualification**	Ph.D.
Modules Tutor	non		**e-mail**	
Peer Reviewer Name	non		**e-mail**	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite course	The course to develop the student's ability to understand and apply a number of issues based on basic digital electronics principles, and to provide the student with the ability to interpret some applications, and to build the basic for understanding the subsequent courses.	**Semester**	
Co-requisites course	Analoge Electronics	**Semester**	1st

Aims of a Cource, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Aims Course أهداف المادة الدراسية	1- Providing the student with a cognitive skill about the basic concepts of digital electronics. 2- Introduce the student to the digital logic gates properties and methods of their application. 3- Providing the student with knowledge of how to calculate the laws of logic algebra and solving 4- Introducing the student to digital logic conversion systems.
Course Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Enabling students to obtain knowledge and understanding of the topics of digital electronics. 2- Enable students to obtain knowledge and understanding of logic gates practical experiments. 3- Enable students to obtain knowledge and understanding of the use of basic algebra laws in digital logic and their use in solving problems.

Indicative Contents	Indicative content includes the following. Part A – Introduction in digital logic gates and Conversion systems [12 hrs] Applications of Conversion systems [10 hrs] Types of Logic Gates [12 hrs] Boolean algebra and De Morgan Theorems [15 hrs] Application of Boolean algebra and DeMorgan theorems [15hrs] Subtraction and Addition System [12 hrs] Networks [15 hrs] Part B- Types of Flib-Flop and Applications [15hrs] Counter and Registration [10 hrs] Solve Applications [10hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1- Method of giving lectures, explanation and clarification. 2- Student groups. 3- E-learning within the university. 4- Application of education. 5- Experiential learning.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**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, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10 % (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	1 hr	10% (10)	7	LO # 1-7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

Week no.	Material Covered
Week 1	Introduction, Fundamental of Digital Electronics
Week 2	Conversion Systems, Decimal and Binary Systems
Week 3	Conversion Systems, Octal and Hexadecimal Systems
Week 4	Logic Gates Basic Logic Gates NOT, OR, AND
Week 5	Exclusive Logic Gates, EX-OR and EX-NOR
Week 6	Universal Logic Gates NAND and NOR

Week 7	**Boolean algebra and De Morgan Theorem**
Week 8	**Applications Boolean algebra and De Morgan Theorem in Simplifications equation logic gates**
Week 9	**Substraction and Addition Operation in Logic Gates**
Week 10	**Karnaugh Maps and Application to Simplification equations**
Week 11	**NAND-NAND and NOR-NOR networks**
Week 12	**Types of Flip-Flop (D flip-flop, RS flip-flop and K flip-flop)**
Week 13	**Counter and their applications**
Week 14	**Rigestration and their applicatios**
Week 15	**Solve Applications**
Week 16	**Final Exam duration**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
Week no.	**Material Covered**
Week 1	**Lab 1: Basic Logic Gate**
Week 2	**Practical Application**
Week 3	**Lab 2: Exclusive and Universal logic gates**
Week 4	**Practical Application**
Week 5	**Lab 3: Boolean al gebra and De Morgan Theorems**
Week 6	**Practical Application**
7	**Lab 4: Coding and Decoding Systems**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Digital Electronics: Principles, Devices and Applications by Anil K. Maini, 2007**	Yes
Recommended Texts	**1. Digital Electronics Logic and Design by Cherry Bhargava, 2019.**	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

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Wave physics**			**Module Delivery**	
Module Type	**Basic**			☒**Theory** ☐ **Lecture** ☐**Lab** ☐**Tutorial** ☐**Practical** ☒**Seminar**	
Module Code	MPH32031				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	3rd		**Semester of Delivery**	2nd	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Name: Kauakib Jafar Rasheed		**e-mail**	E-mail : kewakib.jafar.rasheed@kus.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	M.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

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 Aims أهداف المادة الدراسية	The module aims to develop students' understanding of : a) Compare between particle motion and wave motion in different types of waves. b) Distinguish between pulse waves and periodic waves. c) Distinguish between Longitudinal and Transverse waves. d) Relate the speed, frequency and length of a wave. e) Relate the energy carried by a wave to the amplitude of the wave. f) Describe the interaction of sound and soft tissues. g) Explain sound production and propagation. h) Summarize the basic principles and techniques of ultrasound
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• 1: The student should be able to describe the nature of a wave and explain the distinction between wave motion and particle motion. • 2: The student should be able to identify and distinguish between contrasting types of waves. • 3: The student should be able to describe the basic characteristics of waves such as frequency, wavelength, amplitude, period, and speed. • 4: The student should be able to utilize mathematical relationships related to wave characteristics. • 5: The student should be able to define wave speed and identify the variables which effect wave speed. • 6: The student should be able to utilize the definition of wave speed to solve simple computational problems involving speed, distance and time. • 7: The student should be able to perform straight-forward calculations using the wave equation. • 8: The student should be able to interpret textual information and diagrams in order to perform mathematical analyses using the wave equation. • 9: The student should be able to predict how alterations in the medium through which a wave is traveling will affect the properties of that wave. • 10: The student should be able to predict the orientation of the reflected pulse at the boundary between two media. • 11: The student should be able to recognize the distinction between constructive and destructive interference.

	• 12: The student should be able to utilize the principle of superposition to predict the shape and amplitude of a wave form resulting from the interference of two waves. ○ 13: The student should be able to identify Pulsed wave ultrasound. Pulse duration , PRP, PRF and duty factor, Spatial pulse length, Intensities , Methods for measuring intensities
Indicative Contents المحتويات الإرشادية	○ 1)Types of Waves ○ a) Wave - Transmission of energy without transmission of mass. ○ b) Mechanical Wave - A wave that travels through an elastic medium. ○ c) Electromagnetic Wave - Waves that transmit energy without a medium. ○ d) Pulse Wave - Wave consisting of a single energy pulse. ○ e) Periodic Wave - Waves composed of numerous periodic pulses. ○ f) Medium - Material through which a wave travels. ○ 2) Mechanical Wave Forms ○ a) Transverse Wave - Energy transmitted as vibrations of medium at right angles to direction of wave movement (vibrate up and down or side to side). ○ b) Longitudinal Wave - Transmission of energy by vibration of medium particles parallel to wave motion (vibrate back and forth). ○ i) Compression – Ares where medium particles are compressed together ○ ii) Rarefaction – Area where medium particles are spread apart ○ iii) Wavelength – Beginning of one compression or rarefaction to the next ○ iv) Amplitude – Is related to how compacted the medium particles are ○ v) Example – Sound waves ○ 3) Electromagnetic Waves ○ a) Produced by energy given off by high energy electrons ○ b) Composed of oscillating electric and magnetic fields ○ c) Electric and magnetic fields vibrate perpendicular to each other ○ d) Transverse but not mechanical waves ○ e) Do not require a medium for transmission ○ f) Can travel through space ○ g) May carry large amounts of energy (enough to destroy living tissue) ○ h) X-rays, gamma rays, UV light all will damage or destroy living tissue ○ 4) Particle and Wave Motion ○ a) Wave Motion - As waves travels through a medium, the direction of travel is away from the source. ○ i) In a linear medium (rope) the wave travels along the medium (in a line). ○ ii) In a planer medium (water surface) the wave travels as an ever widening circle. ○ iii) In a 3 dimensional medium (air) the wave travels as an ever widening sphere. ○ b) Motion of Medium Particles ○ i) Transverse (Linear waves) - Medium particles vibrate perpendicular to the wave. ○ ii) Longitudinal - Medium particles vibrate back and forth parallel to the direction of wave movement. ○ 5) Wave Characteristics ○ a) Amplitude - The amount of energy carried by the wave is related to the size of the wave squared. ○ b) Speed – Speed that the wave travels through the medium ○ i) Electromagnetic Waves – 3x108 m/s or 186,000 miles/s ○ ii) Sound – 340m/s or 1100ft/s

	○ iii) Other waves – Varies c) Speed, frequency and length of a wave are related by the following formula: V = f x λ V - Speed f - Frequency λ - Wavelength Wave Interference ○ 6) Learning Objectives a) Differentiate between constructive and destructive interference. ○ b) Combine multiple waves using the “Superposition” principle. ○ c) Describe how waves reflect. ○ d) Explain how “Standing” waves are produced. ○ e) Label the parts of a standing wave. ○ 7) Wave Interference a) several waves can be superimposed (occupy the same space at the same time). ○ b) When multiple waves occur in the same space and time the interaction is called interference. ○ i) Positive Interference - The crests of two or more waves occupy the same space and time. The amplitudes are added together to produce the resulting amplitude. ○ ii) Negative Interference - The crest of one wave interferes with the trough of another wave. Addition of the two tends to cancel out. ○ iii) Superposition Principle - When 2 waves occupy the same space and time, their amplitudes are added together to produce a resulting amplitude. ○ 8) Reflected Waves ○ a) When waves strike a surface, they are reflected in the opposite direction. i) Reflected wave is a mirror image of the original. ○ b) The superposition of an original and reflected wave produces a standing wave. ○ i) Waves appear to stand in place while medium vibrates up and down. ○ ii) Composed of alternating nodes and antinodes. ○ (1) Node - An area of destructive interference. ○ (2) Antinode - An area of constructive interference. ○ 9) Standing Waves ○ a) When a wave reflects back over itself a standing wave is produced b) Standing Wave Characteristics ○ i) Wave appears to be stationary ○ ii) Superposition of the forward and reverse waves produce a standard wave form ○ (1) Node – Area where the medium does not vibrate ○ (2) Antinode – Area of greatest medium deflection ○ c) Standing waves are commonly produced by musical instruments ○ i) Wind instruments produce standing waves inside the tube ○ ii) String instruments produce standing waves in their strings ○ 10) Key Concepts Review ○ a) Explain the concept of Superposition. ○ b) Know the characteristics of constructive and destructive interference. ○ c) Know how waves are reflected. d) Know how standing waves are produced. ○ e) Be able to label the parts of a standing wave. ○ 11) Describing sound waves ○ a. Parameters ○ i. Period and frequency ○ ii. Amplitude, power and intensity ○ iii. Speed of sound ○ 1. Tissue type ○ 2. Stiffness

	○ 12). Density ○ iv. Wavelength ○ E. Pulsed wave ultrasound ○ i. Pulse duration ii. PRP, PRF and duty factor ○ iii. Spatial pulse length ○ F. Intensities a. Methods for measuring intensities ○ i. Spatial ○ ii. Temporal ○ iii. Pulsed ○ b. The ten commandments of intensity ○ 13) . Interaction of Sound and Media

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب			
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	20% (10)	5, 10	LO #1, 2, 3,4,6,7,8 and 9
	Assignments	2	10% (10)	7, 12	LO # 6, 7, 8 and 10
	Report	1	10% (10)	13	LO #11, 12 and 13
	Midterm Exam	1 hr.	10% (10)	8	LO # 1-7

Summative assessment	**Final Exam**	3hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction - Waves and wave equation Waves, Transverse and Longitudinal waves. The 1-D wave equation. Phase velocity. Travelling wave on a spring
Week 2	Transmission and reflection of waves on media discontinuities. Power transmission/reflection coefficients.
Week 3	Superposition principle. Standing waves and beats. Group velocity. Fourier decomposition of waves.
Week 4	Doppler effect in sound and electromagnetic waves
Week 5	Doppler ultrasound ,continuous wave Doppler system-pulsed wave Doppler systems
Week 6	Definition of Sound waves and ultrasound waves properties and propagation of ultrasonic waves
Week 7	ultrasound waves Production, Piezoelectric effect, transducer probes
Week 8	Mid-term Exam
Week 9	Specific acoustic impedance , Acoustical characteristics of human body
Week 10	Interaction ultrasound with tissues
Week 11	Ultrasonic Dosimetry ,safety of diagnostic ultrasound
Week 12	High power ultrasound in therapy
Week 13	Biological effect of ultrasound waves
Week 14	Discussion
Week 15	**Preparatory week before the final Exam**
Week 15	**final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Tim Freegarde (2012). *Introduction to the Physics of Waves*. Cambridge: Cambridge University Press. nd 2. W. M. McDicken, Diagnostic Ultrasonic principles and use of Instrument, 2 edition, John Wiley and Sons, New York, 1992 .	Yes
Recommended Texts	Michiel Postema, Fundamentals of Medical Ultrasonics, Taylor & Francis, 2011	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	**Basic Physiology**			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☐**Lecture** ☒**Lab** ☒**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	MPH32036				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	3rd		**Semester of Delivery**	2nd	
Administering Department	Medical Physics		**College**	SC	
Module Leader	Dr. Mahdi Haider		**e-mail**	Mahdi.h@kus.edu.iq	
Module Leader's Acad. Title	Assist professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	-------		**e-mail**	--------	
Peer Reviewer Name	Dr. Saad Hussein		**e-mail**	saad_2019@ku.edu.iq	
Scientific Committee Approval Date	18/06/2023		**Version Number**	ق/أ.م/ 508	

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 Aims أهداف المادة الدراسية	1. To acquaint the students with the components of the body cells and blood in order to prepare them for the practical life 2. To learning how the body organs work togather and what the physiological aspect of it 3. To learning the students to perform some blood physiological markers tests 4. Training the students to check some human body vital signs and how to check the human body organs functions
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Identify what the meaning of physiology science and what the other sciences related with it 2. Identify how the body organs work and what the physiological function of it 3. Study the physiology of the hematopoiesis in human body 4. Study the cardiovascular system and iits components 5. Identify how the Central nerve system work and its components 6. Stud the Endocrinology of human body 7. Study how the muscular system works and what the physiological function of its
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - Circuit Theory</u> Physiology science- the tools of physiology science, the branches of physiology science, the different between anatomy and physiology , blood components. [12 hrs] <u>Part B - Hematopoiesis</u> Blood - blood components, maturation of blood cells, function of blood and blood cells ,Hematocrit, the diseases related with hematocrit. [14 hrs] Revision problem classes. [6 hrs] <u>Part C Cardiovascular system</u> The components of cardiovascular system - the heart, Structure of the heart, How the heart work, the types of cardiac muscle cells, The Action potential role of cardiomyocyte , the blood vessels. [18 hrs] <u>Part D – Cells in Life</u> Neurons – Types of neurons, components of nerve system, the brain components ,

	The spinal nerve, Types of spinal nerves, the cranial nerve, the types of cranial nerves , the meninges and its layers.[12 hrs] Part D – Muscular system The types of muscles - the function of muscular systems , how the muscle works, the contraction and relaxation of muscles, the muscle tetanus and the disease related with muscle disorders.[10 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.8
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, 8	LO #1, 2, 10 and 11
	Assignments	1	5% (5)	6, 10	LO # 3, 4, 6 and 7
	Projects / Lab.	1	20% (20)	Continuous	
	Report	1	5% (5)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	1 hr	10% (10)	8	LO # 1-5
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction – the Branches of physiology , the different between the physiology and anatomy
Week 2	The tools use in study the human body physiology and types of blood tests
Week 3	Blood components RBC , WBC, Platelet maturation
Week 4	The blood synthesis and maturations of blood cell
Week 5	The blood, functions, components, plasma, functions and serum.
Week 6	The hematocrit and the diseases related with it
Week 7	Introduction in Cardiovascular system
Week 8	The components of Cardiovascular system and its functions
Week 9	Blood red cells, shape, count, function, origin, the hemoglobin, constituents, normal value, function.
Week 10	Blood white cells, type, number, function, blood groups. Platelets, number, function, blood clotting, anti-coagulants, origin of blood clots.
Week 11	The cardiovascular system, the heart, structure, heart valves, the cardiac cycle, cardiac conductive system, factors affecting heart rate.
Week 12	The heart sounds and murmurs, blood supply to the heart, electrical properties of cardiac muscles E.C.G.
Week 13	The blood vessels, functional classification, structure of the vessels wall, the systemic circuit, pulmonary circuit, regulation of the blood vessels.
Week 14	The nervous system, the nerve cell and its function, the nerve impulse, the synapses, the nerves.
Week 15	The muscular system, types of muscles, characteristics of each type**,** The skeletal muscle, excitation, contraction coupling in the muscle fatigue, the muscle pain. The endocrine system, the hormone, chemistry, action, types of endocrine glands and their secretion.
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1,2	Lab 1,2: Introduction to physiology lab
Week 3,4	Lab 3,4: Blood Draw
Week 5,6	Lab 5,6: ECG TEST

Week 7,8	Lab 7,8: EEG test
Week 9,10	Lab 9,10: Cardiac markers
Week 11,12	Lab 11,12: Troponin test
Week 13,14	Lab 13,14: CK-MB TEST
Week 15	Lab 15: Revision

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Human physiology , Berne & Levy Physiology 8th Edition 2019	Yes
Recommended Texts	BRS Physiology (Board Review Series) 7th Edition, 2018	No
Websites	https://www.coursera.org/browse/physiiologicl-science	

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	MPH35027				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	3		**Semester of Delivery**	1st.	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Dr. Jafer Fahdel Odah		**e-mail**	hajasafa@kus.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	10/08/2025		**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 Aims أهداف المادة الدراسية	1. To develop problem solving skills and understanding of analog electronic circuits through the application of techniques. 2. To understand voltage, current, power in the transistors and diodes from a given circuit. 3. This course deals with the basic concept of analog electronics circuits. 4. This is the basic subject for all electrical and electronic circuits. 5. To understand and construct all voltage amplifiers problems. 6. To perform amplifiers types analysis.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Explain the energy levels, conductors, insulator and semiconductors 1. Recognize how semiconductors devices are built. 2. List the various terms associated with electronics circuits. 3. Summarize what is meant by a basic electronics circuit. 4. Discuss the reaction and involvement of atoms in semiconductors types. 5. Describe transistors, diodes, and how they work. 6. Define donors and acceptors atoms in semiconductors. 7. Identify the basic circuit elements and their applications. 8. Discuss the operations of voltage amplifiers circuit. 9. Discuss the various properties of transistors and diodes. 10. Explain the efficiency of voltage amplifiers with deep analysis. 11. Identify the oscillators circuit analysis.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Chapter One: Introduction - Introduction about energy levels, Conductors, insulator, semiconductor, intrinsic semiconductor, Extrinsic Semiconductors, N-type and P-type semiconductors, Semiconductor P-N junction diode, Energy Band Diagram of a P-N Junction, Reverse biased diode, Forward biased diode, Diode applications . [10 hrs.] - Transistor (or Bipolar Junction Transistors (BJTs)), Transistor symbols, Common Emitter – dc – analysis, Characteristic curves, Hybrid parameters, Equivalent circuit, Properties of the common emitter (CE) amplifier, Drawing the load line: (Determination of quiescent point Q-point). [8 hrs.] - Transistor biasing, Biasing aims, Bias circuits, Fixed bias circuit, Emitter feedback bias circuit, Collector feedback bias circuit, Voltage divider bias

	circuit, Voltage divider self-bias bias circuit, examples, Common collector circuit, Common base circuit. [10 hrs.] - Field Effect Transistor (FET), Junction FET (JFET), The output characteristic curves of the JFET, JFET small signal parameters, 1. Low frequencies model, 2. High frequencies model, The purposes of biasing, Biasing circuits, Gate bias circuit, Self-bias circuit, Voltage divider self-bias circuit, Source bias circuit, Current source bias, A. Using one power supply, B. Using two power supplies, Self-bias common source amplifier, Calculation the gain of the amplifier 1. without R_L, 2. with R_L, JFET amplifier 1. Common source amplifier, 2. Common drain amplifier, 3. Common gate amplifier, Applications of JFET at the Ohmic region: 1. Analog switch (A. Shunt switch and B. Series switch), 2. Voltage variable resistance, examples [10 hrs.] - Metal Oxide Semiconductor Field Effect Transistor, 1. Depletion MOSFET (D-MOSFET), D-MOSFET symbols in electric circuits, Characteristic curves of D-MOSFET, Transconduction curve, Biasing circuits, 2. Enhancement MOSFET (E-MOSFET), Characteristic curves and transcoduction curve of E-MOSFET, E-MOSFET symbols in electric circuits, Biasing circuits, Examples. [10 hrs.] Chapter Two: Amplifiers - Properties of ideal voltage amplifiers, Frequency response curve, Multistage amplifier, Bandwidth of a multistage amplifier, Ways of coupling in multistage amplifier: 1. RC coupling, 2. Transformer coupling, 3. Direct coupling, Classes of voltage amplifiers, 1. Class A, 2. Class B, 3. Class AB, 4. Class C, Efficiency of amplifier, Power distribution of class A amplifier, Efficiency of class B amplifier, Power amplifier (class A), Power amplifier (class B) (push-pull power amplifier), Tuned amplifier, Examples. [10 hrs.] - Feedback, Classification of amplifiers: 1. Voltage amplifier, 2. Current amplifier, 3. Trans-resistance amplifier, 4. Trans-conductance amplifier, Feedback configuration: 1. Shunt derived – Series fed (Voltage amplifier), 2. Shunt derived – Shunt fed (Trans-conductance amplifier), 3. Series derived – Series fed (Trans-resistance amplifier), 4. Series derived – Shunt fed (Current amplifier), Effect of negative feedback on the gain, Effect of negative feedback on the bandwidth, Effect of negative feedback on the noise and distortion, Effect of negative feedback on the Ri and Ro, Examples. [10 hrs.] Chapter Three: Oscillators - Sinusoidal oscillators: 1. Positive feedback oscillators: A. Phase shift oscillators, B. Wien bridge oscillators, C. Twin-T bridge oscillators 2. Resonant oscillators: A. Hartly oscillators, B. Collpitts oscillators, C. Armstrong oscillators 3. Pierce crystal oscillators. [8 hrs.]

	- Non-sinusoidal oscillators 1. Saw tooth wave oscillators 2. Square wave oscillators. [8 hrs.] Chapter Four: Multivibrators - 1. Astable multivibrator (square wave) - 2. Monostable multivibrator (one shot) - 3. Bistable multivibrator (Flip-Flop) Examples foe each types. [8 hrs.]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	This subject will be delivered to students through a series of lectures, tutorials, and hands-on activities. Lecture notes and technical demos will be included in the learning materials. Students should study both analogue and digital electronics concurrently throughout the year so that they are exposed to the differences and similarities in both domains and may better reflect on their experiences.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	75	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	75	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6.5
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**
	Quizzes	2	10% (10)	5, 10	LO #1, 2, 10 and 11

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction about energy levels, Conductors, insulator, semiconductor, intrinsic semiconductor, Extrinsic Semiconductors, N-type and P-type semiconductors, Semiconductor P-N junction diode, Energy Band Diagram of a P-N Junction, Reverse biased diode, Forward biased diode, Diode applications
Week 2	Transistor (or Bipolar Junction Transistors (BJTs)), Transistor symbols, Common Emitter – dc analysis, Characteristic curves, Hybrid parameters, Equivalent circuit, Properties of the common emitter (CE) amplifier, Drawing the load line: (Determination of quiescent point Q-point). Transistor biasing, Biasing aims
Week 3	Bias circuits, Fixed bias circuit, Emitter feedback bias circuit, Collector feedback bias circuit, Voltage divider bias circuit, Voltage divider self-bias bias circuit, examples, Common collector circuit, Common base circuit.
Week 4	Field Effect Transistor (FET), Junction FET (JFET), The output characteristic curves of the JFET, JFET small signal parameters, 1. Low frequencies model, 2. High frequencies model
Week 5	The purposes of biasing, Biasing circuits, Gate bias circuit, Self-bias circuit, Voltage divider self-bias circuit, Source bias circuit, Current source bias, A. Using one power supply, B. Using two power supplies, Self-bias common source amplifier,
Week 6	Calculation the gain of the amplifier 1. without RL, 2. with RL, JFET amplifier 1. Common source amplifier, 2. Common drain amplifier, 3. Common gate amplifier, Applications of JFET at the Ohmic region: 1. Analog switch (A. Shunt switch and B. Series switch), 2. Voltage variable resistance, examples
Week 7	Metal Oxide Semiconductor Field Effect Transistor, 1. Depletion MOSFET (D-MOSFET), D-MOSFET symbols in electric circuits, Characteristic curves of D-MOSFET, Transconduction

	curve, Biasing circuits, 2. Enhancement MOSFET (E-MOSFET), Characteristic curves and transcoduction curve of E-MOSFET, E-MOSFET symbols in electric circuits, Biasing circuits, Examples.
Week 8	Properties of ideal voltage amplifiers, Frequency response curve, Multistage amplifier, Bandwidth of a multistage amplifier, Ways of coupling in multistage amplifier: 1. RC coupling, 2. Transformer coupling, 3. Direct coupling, Classes of voltage amplifiers, 1. Class A, 2. Class B, 3. Class AB, 4. Class C
Week 9	Efficiency of amplifier, Power distribution of class A amplifier, Efficiency of class B amplifier, Power amplifier (class A), Power amplifier (class B) (push-pull power amplifier), Tuned amplifier, Examples.
Week 10	Feedback, Classification of amplifiers: 1. Voltage amplifier, 2. Current amplifier, 3. Trans-resistance amplifier, 4. Trans-conductance amplifier, Feedback configuration: 1. Shunt derived – Series fed (Voltage amplifier), 2. Shunt derived – Shunt fed (Trans-conductance amplifier), 3. Series derived – Series fed (Trans-resistance amplifier), 4. Series derived – Shunt fed (Current amplifier),
Week 11	Effect of negative feedback on the gain, Effect of negative feedback on the bandwidth, Effect of negative feedback on the noise and distortion, Effect of negative feedback on the Ri and Ro, Examples.
Week 12	Sinusoidal oscillators: 1. Positive feedback oscillators: A. Phase shift oscillators, B. Wien bridge oscillators, C. Twin-T bridge oscillators
Week 13	2. Resonant oscillators: A. Hartly oscillators, B. Collpitts oscillators, C. Armstrong oscillators 3. Pierce crystal oscillators.
Week 14	Non-sinusoidal oscillators: 1. Saw tooth wave oscillators 2. Square wave oscillators.
Week 15	Multivibrators: 1. Astable multivibrator (square wave 2. Monostable multivibrator (one shot) 3. Bistable multivibrator (Flip-Flop). Examples foe each types.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Electronics Lab Safety Information. Electric and electronic symbols and its meaning

Week 2	Lab 2: Static characteristics of diode
Week 3	Lab 3: Rectifier circuits
Week 4	Lab 4: Zener diode characteristics
Week 5	Lab 5: Diode limiter circuits
Week 6	Lab 6: Diode voltage multiplier
Week 7	Lab 7: Characteristics of transistor in common emitter connection. Characteristics of transistor in common base connection

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1- T. Floyd, Electronic Devices, Pearson Prentice Hall, Inc., 7th Edition 2005. 2- Electronic Principles, A. Malvino & D.J. Bates, McGraw Hill (2007).	Yes
Recommended Texts		
Websites		

Grading Scheme
مخطط الدرجات

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

Module Information معلومات المادة الدراسية					
Module Title	**Nuclear Physics**			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☐ **Lecture** ☒**Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MPH31030				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		3	**Semester of Delivery**		1
Administering Department		Medical Physics	**College**	Science	
Module Leader	Dr. Ali Abdulamear Rasheed		**e-mail**	ali.abdulamear@kus.edu.iq	
Module Leader's Acad. Title		Assistant Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor	Non		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		151/6/2025	**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 Aims أهداف المادة الدراسية	1. Understand the basic concepts of nuclear physics, with an emphasis on nuclear structure and the interactions of radiation with matter. Nuclear forces; the structure of the nuclear shell; alpha, beta, and gamma radioactive decays; interactions of nuclear radiation (charged particles, gamma rays, and neutrons) with matter; nuclear reactions; fission and fusion. 2. Learn about the designs and technologies of fission and fusion reactors, the types of nuclear accelerators and their main components, some applications of nuclear energy, and the techniques for producing electrical energy from fusion reactors, in addition to the concepts of elementary particles and the fundamental forces of nature.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Graduates should be able to: (a) Infer the existence and smallness of an atomic nucleus. (b) Distinguish between the number of nucleons (mass number) and the number of protons (atomic number). (c) show an understanding of how the conservation laws for energy and momentum in β decay were used to predict the existence of the neutrino (knowledge of antineutrino and antiparticles is not required) (d) define the terms activity and decay constant and recall and solve problems using the equation $A = \lambda N$ and demonstrate an understanding that an element can exist in different isotopic forms, each with a different number of neutrons in the nucleus. (e) Formulate the concept of conservation of nucleon number, charge, and mass-to-energy ratio in nuclear processes, and apply it to problem solving. (f) Demonstrate your understanding of the concept of mass defect. (h) Demonstrate your understanding of the concept of nuclear binding energy and its relationship to mass defect.

	(i) Draw a diagram showing the variation of binding energy per nucleon with the number of nucleons. (c) Explain the importance of binding energy per nucleon in nuclear fusion and nuclear fission. (k) Demonstrate an understanding of the spontaneous and random nature of nuclear decay. (l) Infer the random nature of radioactive decay from fluctuations in the count rate. (m) Demonstrate an understanding of background radiation. (n) Demonstrate an understanding of the nature of alpha, beta, and gamma radiation (knowledge of positron emission is not required). (q) infer and sketch the exponential nature of radioactive decay and solve problems using the relationship $x = x_0 \exp(-\lambda t)$ where x could represent activity, number of undecayed particles or received count rate (r) define and use half-life as the time taken for a quantity x to reduce to half its initial value. (s) Understand fission and fusion techniques and how to control nuclear reactions. (t) Study the conversion of nuclear energy into electrical energy. (u) Learn about nuclear accelerators.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A</u> Nuclear constituents, nuclear sizes and shapes, nuclear radii, nuclear masses. [10 hrs] binding energy /nucleon, nuclear moments, nuclear force. [10 hrs] Nuclear models, radioactivity, radiation decay [10 hrs] Interaction of radiation with matter, fission and fusion reactions. [10 hrs] <u>Part B</u> Nuclear fission and fusion reactors. [10 hrs] Acceleration and accelerators, radiation detectors. [10 hrs] Elementary particles, nuclear phys. Applications, introduction to nuclear medicine. [12 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**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, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	1 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Week	Material Covered
Week 1	An Introduction to Nuclear Physics
Week 2	Constituents Of The Nucleus
Week 3	Binding Energy
Week 4	Nuclear Moments and Nuclear Force
Week 5	Stability of the Nucleus & Nuclear Models
Week 6	Radioactivity
Week 7	Nuclear Radiation decay
Week 8	Interaction of Radiations with Matter
Week 9	Nuclear fission reactions and reactors
Week 10	Nuclear Fusion reactions and reactors
Week 11	Acceleration &Accelerators
Week 12	Radiation Detectors
Week 13	Elementary particles
Week 14	Nuclear physics applications
Week 15	Introduction to nuclear medicine
Week 16	Final Examination

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
Week	Material Covered
Week 1	Lab 1: Introduction to radiation protection & sources of radiation
Week 2	Lab 2: Plotting a GM Plateau
Week 3	Lab 3: Geiger Tube Efficiency
Week 4	Lab 4: Beta Absorption
Week 5	Lab 5: Background detection
Week 6	Lab 6: Inverse Square Law
Week 7	Lab 7: Examination

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Introductory nuclear physics, Kenneth S. Krane 1987. Fundamentals in nuclear physics, Jean-Louis Basdvant, James Rich, 2005.	Yes
Recommended Texts	Nuclear Physics, BY IRVING KAPLAN 1962.	No
Websites	https://nap.nationalacademies.org/read/6288/chapter/3 https://en.wikipedia.org/wiki/Nuclear_physics https://en.wikipedia.org/wiki/Nuclear_reactor https://en.wikipedia.org/wiki/Fusion_power	

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	Scientific Research Methodology			**Module Delivery**	
Module Type	B			☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	MPH32037				
ECTS Credits	3				
SWL (hr/sem)	25				
Module Level	٣		**Semester of Delivery**	2	
Administering Department	Medical Physics department		**College**	SC	
Module Leader	Dr. Sabah I. Abbas		**e-mail**	sabahibrahim@kus.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	1/12/2026		**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 Aims أهداف المادة الدراسية	١- تعليم الطالب بأساليب وأخلاقيات البحث العلمي ليستفيد من قدرته في كتابة البحوث العلمية وأيجاد الحلول المناسبة لحل المشكلات والمعضلات التي تواجه المجتمع . ٢- العمل على زيادة القدرة في كتابة البحوث العلمية و أيجاد الحلول لمشكلة البحث. ٣- معالجة المعضلات والمشكلات التي تواجه المجتمع ٤- جمع المعلومات بشكل دقيق وبالتالي دراستها فيما يخص المشكلة المبحوثة .
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	١- تعريف الطالب بأساليب ومفاهيم اخلاقيات البحث العلمي والحفاظ على الامانة العلمية. ٢- التعرف على التطبيقات المنهجية التي يدرسها الباحث والعمل على اتخاذ الاجراءات الصحيحة لحل المشاكل التي تواجه الفرد والمجتمع. ٣- بناء القدرات والمهارات العلمية للطالب في كتابة البحوث العلمية . ٤- تهدف المادة المعرفية الى تطبيق المنهجية العلمية ذات العلاقة بأسس ومتطلبات مناهج البحث العلمي. ٥- تهدف المادة المعرفية الى ألتزام الباحث وعلى وجه التحديد الطالب بنزاهة وأدراك اهمية المنهج العلمي. ٦ - تهدف المادة المعرفية الى معالجة مشاكل واقعية والعمل على ايجاد الحلول لها .
Indicative Contents المحتويات الإرشادية	معنى العلم والبحث العلمي، تعريف المنهج (مناهج البحث العلمي). أهمية تحديد منهج البحث العلمي، الأسس التي يبنى عليها اختيار منهج البحث العلمي. مناهج البحث : البحث التاريخ، البحوث الوصفية، البحث التجريبي، البحث النوعي. (ساعة واحدة) هيكلية البحث وتشمل: عنوان البحث ،المقدمة. مشكلة البحث . فرضيات البحث، اهمية البحث ، أهداف البحث.(ساعة واحدة) امتحان نصف فصلي. (ساعة واحدة) الدراسات السابقة ،منهجية وإجراءات البحث ادوات ووسائل جمع البيانات ، الملاحظة، المقابلة، الاستبيان (ساعة واحدة) كتابة تقرير البحث: كتابة مشكلة البحث: وتتضمن: مقدمة البحث ، تحديد المشكلة وأسئلتها، الغرض من البحث (مبررات البحث)، أهمية البحث، وفرضيات البحث وأسئلته مراجعة أدبيات الدراسة: الإطار النظري، والدراسات السابقة ،(ساعة واحدة) إجراءات البحث: وتشمل منهج البحث وتصميمه، والعينة، ومواد وأدوات البحث والإجراءات، والضبط التجريبي للبحث، وتحليل البيانات نتائج البحث: التحليل الإحصائي وقراءة النتائج وتفسيرها.(ساعة واحدة) خلاصة البحث. قائمة المراجع. الملاحق الصفحات التمهيدية والختامية يكتب الطالب تقريرا حول تقيم بحث(ساعة واحدة) مناقشة عناوين مقترحة. يراجع الطالب المنهج الدراسي والتهيؤ للامتحان النهائي.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	يُعد هذا المقرر من أهم المقررات الدراسية كونه يمكن الطالب الجامعي من المهارات التي تساعده على انجاز بحث التخرج، وهو يعمل على إكسابه مجموعة من المعلومات والمعارف حول العلم والمعرفة، والبحث العلمي ومناهجه، وينمي الاتجاهات الإيجابية لدى المتعلم تجاه البحث العلمي، ويتحقق ذلك من خلال مجموعة من الأنشطة الفاعلة (طرائق وأساليب تدريس، ووسائل) كطريقة الحوار والمناقشة، والتعلم الذاتي، والبحث، والتطبيقات، مع استخدام الباوربوينت عند العرض، وتقييم الطالب من خلال المشاركة الصفية والتكليفات المصاحبة - الصفية واللاصفية - والاختبار النصفي والنهائي.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	١٨	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	١,٢
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	٧	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	٠,٤٦
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	٢٥		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	١	١٠% (١٠)	٥	
	Assignments	١	10% (10)	5, 10	
	Projects / Lab.	1	١٠٪ (١٠)	Continuous	
	Report	1	١٠% (١٠)	13	
Summative assessment	**Midterm Exam**	1 hr	10% (10)	7	
	Final Exam	3 hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	معنى العلم والبحث العلمي، تعريف المنهج (مناهج البحث العلمي).
Week 2	أهمية تحديد منهج البحث العلمي، الأسس التي يبنى عليها اختيار منهج البحث العلمي.
Week 3	مناهج البحث : البحث التاريخ، البحوث الوصفية، البحث التجريبي، البحث النوعي .
Week 4	هيكلية البحث وتشمل: عنوان البحث ،المقدمة.
Week 5	مشكلة البحث.
Week 6	فرضيات البحث، اهمية البحث ، أهداف البحث.
Week 7	امتحان نصف فصلي.
Week 8	الدراسات السابقة ،منهجية وإجراءات البحث.
Week 9	ادوات ووسائل جمع البيانات ، الملاحظة، المقابلة، الاستبيان.
Week 10	كتابة تقرير البحث: كتابة مشكلة البحث: وتتضمن: مقدمة البحث ، تحديد المشكلة وأسئلتها، الغرض من البحث (مبررات البحث)، أهمية البحث، وفرضيات البحث وأسئلته.
Week 11	مراجعة ادبيات الدراسة: الإطار النظري، والدراسات السابقة ، إجراءات البحث: وتشمل منهج البحث وتصميمه، والعينة، ومواد وأدوات البحث والإجراءات، والضبط التجريبي للبحث، وتحليل البيانات.
Week 12	نتائج البحث: التحليل الإحصائي وقراءة النتائج وتفسيرها. خلاصة البحث. قائمة المراجع. الملاحق. الصفحات التمهيدية والختامية.
Week 13	يكتب الطالب تقريرا حول تقيم بحث.
Week 14	مناقشة عناوين مقترحة.
Week 15	يراجع الطالب المنهج الدراسي والتهيؤ للامتحان النهائي.
Week 16	امتحان نهائي

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

Week 5	
Week 6	
Week 7	

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	- منهجية البحث العلمي (د.عبد القادر مندو) - مناهج البحث العلمي (عبد الرحمن بدوي) - محمد سعيد ابو طالب ، علم مناهج البحث - موفق الحمداني وآخرون ، مناهج البحث العلمي : اساسيات البحث العلمي - جمال زكي والسيد يسين ، اسس البحث الاجتماعي - أسس البحث العلمي (د.مروان عبد المجيد إبراهيم) - منهج البحث بين النظرية والتطبيق (د.حامد طاهر) - مناهج البحث العلمي د.محمد سرحان علي المحمداوي	
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

Physics of Medical Instruments I

Module Information معلومات المادة الدراسية					
Module Title	**Physics of Medical Instruments I**			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☐ **Lecture** ☐**Lab** ☐ **Tutorial** ☐**Practical** ☒ **Seminar**	
Module Code	MPH31026				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	3		**Semester of Delivery**	1	
Administering Department	Medical Physics		**College**	Science	
Module Leader	Nihad K. Ali		**e-mail**	nihad@kus.edu.iq	
Module Leader's Acad. Title	Assoc. Prof.		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	nihad@kus.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	15/06/2025		**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 Aims أهداف المادة الدراسية	This course introduces students to various medical devices that can be found in hospitals and medical institutions. The objective of this subject is to describe the principles, applications and the design of the medical instruments most commonly used in hospitals. Fundamental principles of operation and quantitative analysis and design of medical instrumentation systems for diagnostic and therapeutic medical applications are taught.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	***At the end of the course, students are expected to learn:*** 1. The basic theorem and laws to explain concepts, functions, behavior and characteristics of biomedical circuits and devices. 2. Formulate and solve electrical and mechanical problems related to biomedical devices. 3. Distinguish between therapeutic, diagnostic and analytical medical devices. 4. Work on device calibration and work on some devices directly in the examination.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Introduction to Biomedical Instrumentation. Biopotential Electrodes. (9 hrs) Sensors: Electrocardiography. Blood Pressure, Heart Sounds and Blood Flow. (6 hrs) Respiratory System Measurements. (10 hrs) Defibrillator, Pacemaker. (9) Electroencephalogram (EEG) (9 hrs) Respiratory system measurements. (9 hrs)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to acquaint the students with the physical principles on which medical devices depend how to deal with them in an accurate scientific method. Encouraging students to discover for themselves how medical devices work by understanding the general laws of physics. This is done through scientific discussions in the classroom and in the laboratory as well as through practical application in hospitals and medical clinics.

Student Workload (SWL) الحمل الدراسي للطالب			
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)	5, 10	LO #1, 2, and 3
	Assignments	2	10% (10)	2, 12	LO # 3, 4
	Projects	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 4
Summative assessment	**Midterm Exam**	1 hr	10% (10)	7	LO # 1-3
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Biopotential electrodes: Electrode-electrolyte interface, polarization,
Week 2	Polarization; polarizable and non-polarizable electrodes, electrode circuit models. Biopotential electrodes: skin interface and motion artifact.
Week 3	Types of electrodes; body surface recording electrodes, internal electrodes, micro electrodes, practical hints in using electrodes.
Week 4	Sensors: Oxygen sensor for blood, Carbon dioxide sensor for blood.
Week 5	Heart sound sensor. Piezoelectric heart sound sensor, Fetus heart sound sensor. Blood flow sensor: Respiration sensor, Blood pressure sensor.
Week 6	Enzyme sensor and microbial sensor.

Week 7	Defibrillator, Lown Defibrillator Circuit.
Week 8	Pacemaker, Types of pacemaker, Operating modes.
Week 9	Electroencephalogram (EEG).
Week 10	EEG Rhythms and Waveforms.
Week 11	Electroencephalogram (EEG) components.
Week 12	Respiratory system measurements.
Week 13	Mechanic of breathing.
Week 14	Respiratory transducer and instruments.
Week 15	. Intensive, coronary care units and operating rooms.
Week 16	Preparatory week before the final Exam.

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Webster John G and Clark John W, Medical Instrumentation: Application and Design, 4th Edition, John Wiley, 2010.	No
Recommended Texts	Carr, Joseph J and Brown John M, Introduction to Biomedical Equipment Technology, 4th Edition, Prentice Hall 2001.	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

الفيزياء الطبية II

Module Information معلومات المادة الدراسية					
Module Title	Medical Physics II			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☐ **Lecture** ☒ **Lab** ☒**Tutorial** ☐**Practical** ☐ **Seminar**	
Module Code	MPH31027				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	3rd		**Semester of Delivery**	1st	
Administering Department	Medical Physics		**College**	Science	
Module Leader	Dr. Bassma Hussain Hamad		**e-mail**	dr.bassmahussain@kus.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	15/06/2025		**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 Aims أهداف المادة الدراسية	Cognitive objectives A1- That the student understands the fundamental physics ideas connected to medicine. A2- To comprehend the physical relationship and how to medically communicate it. A 3- Relationship between physical attributes and medical device uses. A4- Develop pupils' clinical skills. The fundamental aims. B1 - Recognize the fundamental physical rules and their application to the human body. B2 - Understanding of physical aspects influencing the human body and their relationship to the appearance of disease indications on the body. B3- Integration of fundamental principles and medical devices
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Obtaining a prominent scientific staff that tries to understand the nature of the physical work of the human body by being acquainted with each of 1- The influence of gravity forces on bone formation and blood circulation 2- The electrical influence on the nature of the body's work 3- The impact of heat on the nature of the body's work 4- Investigating mathematical physical relationships and their computerized diagnosis in illnesses caused by these impacts.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – medical physics, basics : Electricity Within the Body: Potential difference between inside and outside the cell, electrical and magnetic effects generated inside the body, applications of electricity and magnetism to the surface of the body. [12 hrs].

	Electromyography (EMG): technique of recording electric activity, EMG signal, EMG electrodes [6 hrs]. Electrocardiograph (ECG):, Electrical signals from the heart, atrial depolarization and contraction, The QRS complex, Six frontal plane ECG s for a normal subject . [8hrs]. Electroencephalograph (EEG): electrical activity of the brain, Electrodes and potential, the frequency of the EEG signals, EEG as investigation method of brain activity, Electrodes used, type and characteristics [10 hrs]. The sound: Physics of Sound Wave, Sonic spectrum, Speed of Sound, Sound wave intensity, acoustic impedance, [8hrs]. Sound in medicine: Sound Intensity Level [Ratio] , Sound Reflection and transmission, General Properties of Sound. [6 hrs]. Sound in Medicine: Infrasound, ultrasound, Pulsed ultrasound, Scattering, Absorption, US attenuation coefficient, examples and solved problems [8 hrs]. Light in medicine: properties used for medicine, Measurement of light and units. [6 hrs]. Applications of visible light in medicine, medical uses of visible light, Transillumination, [6 hrs]. Applications of ultraviolet and infrared light in medicine [6 hrs]. <u>Part B -</u> Eye and vision: The Human Eye, The Retina –The light detector of the eye, [6 hrs]. Eye and vision: Detective vision and its corrections, Physics of eyes vision [6 hrs]. Eye and vision: Difference effects on the eye, Myopia Farsightedness Hyperemia Nearsightedness [8 hrs]. Eye and vision: How sharp are your eyes? Presbyopia (old sight) [6 hrs]. Eye and vision: Astigmatism, examples and solved problems. [4 hrs].

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in introducing this unit is to introduce students to the physical principles upon which medical physics depends and how to deal with them in a scientifically rigorous manner. Encouraging students to discover how the human body works with physical laws and its physiological and therapeutic effects by themselves through understanding the general laws of physics. This is done through scientific discussions in class as well as through practical application in hospitals and medical clinics.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.8
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	20% (20)	5, 10	LO #1.2
	Assignments	2	10% (10)	2, 9,12	LO # 3, 4, and 5
	Projects / Lab.	15	10% (10)	continuous	
	Report				
Summative assessment	**Midterm Exam**	1hr	10% (10)	7	LO # 1-5
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**Electricity Within the Body:** Potential difference between inside and outside the cell, electrical and magnetic effects generated inside the body, applications of electricity and magnetism to the surface of the body.
Week 2	**Electromyography (EMG)**: technique of recording electric activity, EMG signal, EMG electrodes
Week 3	**Electrocardiograph (ECG):,** Electrical signals from the heart, atrial depolarization and contraction, The QRS complex, Six frontal plane ECG s for a normal subject .
Week 4	**Electroencephalograph (EEG):** electrical activity of the brain, Electrodes and potential, the frequency of the EEG signals, EEG as investigation method of brain activity, Electrodes used, type and characteristics
Week 5	**The sound:** Physics of Sound Wave, *Sonic spectrum,* Speed of Sound, Sound wave intensity, acoustic impedance,
Week 6	**Sound in medicine:** Sound Intensity Level [Ratio] , Sound Reflection and transmission, General Properties of Sound**.**
Week 7	**Sound in Medicine:** Infrasound, ultrasound, Pulsed ultrasound, Scattering, Absorption, US attenuation coefficient, examples and solved problems
Week 8	**Light in medicine:** properties used for medicine, Measurement of light and units.
Week 9	Applications of visible light in medicine, medical uses of visible light, Transillumination,
Week 10	Applications of ultraviolet and infrared light in medicine
Week 11	**Eye and vision:** The Human Eye, The Retina –The light detector of the eye,
Week 12	**Eye and vision:** Detective vision and its corrections, Physics of eyes vision
Week 13	**Eye and vision:** Difference effects on the eye, Myopia Farsightedness Hyperemia Nearsightedness
Week 14	**Eye and vision:** How sharp are your eyes? Presbyopia (old sight)
Week 15	**Eye and vision:** Astigmatism, examples and solved problems.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	تجربة المسارات الكهربائية لجهاز ECG
Week 2	تجربة قياس ضربات القلب بالمحاكاة
Week 3	تجربة لدراسة شكل الموجات الصوتية المنبعثة من القلب
Week 4	تجربة لدراسة شكل الإشارات الكهربائية حسب امراض القلب المختلفة
Week 5	تجربة تأثير العلاج بالتحفيز الكهربائي
Week 6	تجربة محاكاة تخطيط الدماغ
Week 7	تجربة محاكاة تخطيط الاعصاب
Week 8	امتحان Mid
Week 9	تجربة الـPacemaker
Week 10	تجربة تأثير العلاج بالموجات الفوق الصوتية
Week 11	تجربة قياس فولتيات كهربائية القلب
Week 12	
Week 13	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1.Medical Physics by John R. Cameron, International Publication. 2. Elements of Biophysics Randall 1998 3. Medical Physics Data Book, Thomas N. Padikal, Editor MD 20205 and Sherman P. Fivozinsky, Associate Editor Office of Standard Reference Data National Bureau of Standards Washington, DC 20234 4- A Wiley-interscience publication JOHN WILEY & SONS	Yes
Recommended Texts	1. Brown B H, Medical Physics and Biomedical Engineering, Institute Of Physics, 1999. (R895.M489).	yes

	2. Bushberg Jerrold T, Seibert J A, Leidholdt E M and Boone J M, The Essential Physics of Medical Imaging, 2nd Edition, Lippincolt Williams & Wilkins, 2002. (RC78.7.D53E78). 3. Ganong William F, Ganong's Review of Medical Physiology, 24th Edition, McGraw-Hill Medical, 2012.	
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	**Biostatistics**			**Module Delivery**	
Module Type	**S.**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MPH31025				
ECTS Credits	**3**				
SWL (hr/sem)	75				
Module Level	3rd		**Semester of Delivery**	1st	
Administering Department	Medical Physics		**College**	Science	
Module Leader	Dr. Arkan jebur saeed		**e-mail**	arkan.jebur@kus.edu.iq	
Module Leader's Acad. Title	Asst. Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	15/06/2025		**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 Aims أهداف المادة الدراسية	Biostatistics provides the basic framework for thinking about data in a rigorous fashion. This course is intended both as a refresher course and as a first course in the application of statistical thinking to biological problems. Descriptive and inferential statistics will be covered, with topics including confidence intervals, basic probability, discrete and continuous distributions, t-tests, correlation, regression, chi-square tests.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	· define, explain the scope and concepts of Biostatistics and its applications. · define data, know the common sources of data and understand the various methods of data collection and presentation. discuss to a reasonable level the probability theories and population distribution and their applications in health and health related fields. · define and explain the various commonly used test statistics and their applications in analyzing data in public health · acquire the necessary knowledge and skills for data analysis and interpretation of test statistic results.
Indicative Contents المحتويات الإرشادية	Module 1 Introduction to Biostatistics and Data Management 1- Definition and Application of Biostatistics 2- Data, Data Sources 3- Methods of Data Collection Module 2 Organization and Presentation of Data 1- Tabular Presentations 2- Diagrammatic Presentation of Data 3- Graphs Module 3 Numerical Measures 1- Measures of Central Tendency 2- Measures of Dispersion or Variability 3- regression and correlation Module 4 Inferential Biostatistics 1- Hypothesis Testing 2- Test of Significance and Statistical Errors Module 5 Non-Parametric Tests 1-Chi-Square Test (X2)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in presenting this model is theoretical lectures and encouraging students to participate in the lectures effectively to know the basics of the subject and its vocabulary. Improving thinking skills and encouraging them to participate critically and interactively in the topics raised during the academic weeks in the theoretical and practical parts.

	This will be achieved through theoretical and practical classes, tutorials, and interactive tutorials by thinking about the type of simple experiments that include some sampling activities that are of interest to the students.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	42	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.8
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	20% (20)	4, 8	LO #1, 2, 3, 5,6, and 7
	Assignments	2	10% (10)	5, 10	LO # 2, 4, 6, 8, and 9
	Projects / Lab.				
	Report	1	10% (10)	13	LO # 12
Summative assessment	**Midterm Exam**	1 hr	10% (10)	7	LO # 1-9
	Final Exam	3 hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Statistics
Week 2	Variables
Week 3	Frequency Distributions
Week 4	Frequency Distributions
Week 5	Types of Graphs
Week 6	Measures of Central Tendency
Week 7	Measures of Central Tendency
Week 8	Measures of dispersion
Week 9	Measures of dispersion
Week 10	Midterm Exam
Week 11	Regression
Week 12	Correlation
Week 13	Hypothesis
Week 14	Chi-Square Test (X2)
Week 15	General review of the previous lessons
Week 16	Final Exam

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts		
Recommended Texts		
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
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