

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Medical physics		Module Delivery
Module Type	B		<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	BME-121		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	1	Semester of Delivery	2
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Kawthar Ali Hasan		e-mail: Kawthar.ali@uowa.edu.iq
Module Leader's Acad. Title	Assist. Lecture	Module Leader's Qualification	
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

<p>Module Aims أهداف المادة الدراسية</p>	<ol style="list-style-type: none"> 1. To introduce students to the fundamental concepts of physics and their applications in the medical field. 2. To explain physical phenomena related to light, sound, heat, electricity, and magnetism and their effects on the human body. 3. To enable students to understand the physical principles behind various medical devices and techniques such as UV light, ultrasound, and heat therapy 4. To develop students' analytical skills in interpreting biological and physiological processes through physics 5. To connect theoretical physics principles with practical clinical applications and medical equipment.
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<p>By the end of this module, the student will be able to:</p> <ol style="list-style-type: none"> 1. Identify basic physical units and precise measurements used in medicine. 2. Explain the properties of light and its medical applications in diagnostics and therapy. 3. Describe the physical properties of sound and its usage in medical tools like ultrasound. 4. Interpret the concepts of pressure and temperature and their physiological relevance. 5. Understand modes of heat transfer and their therapeutic use in medical practice. 6. Analyze basic electricity and magnetism concepts and how they are applied medically. 7. Apply basic electrical circuit principles to understand the function of medical devices. 8. Interpret the forces acting on and within the human body in biomechanical contexts. 9. Describe the physics of the human skeleton, including force distribution and mechanical behavior of bones.
<p>Indicative Contents المحتويات الإرشادية</p>	<p>The module covers the following topics:</p> <ol style="list-style-type: none"> 1. Units and Measurement – SI units, conversions, precision, and accuracy. 2. Light in Medicine – Properties of light, reflection, refraction, and optical instruments (e.g., microscopes, endoscopes). 3. Applications of Light – Use of visible, ultraviolet, and infrared light in medical diagnostics and therapy. 4. Sound in Medicine – Sound properties, units, and medical applications like stethoscopes and ultrasound. 5. Pressure and Fluids – Boyle's law, Pascal's principle, Archimedes' principle, and blood pressure measurement.

	6. Temperature and Heat – Heat transfer methods (conduction, convection, radiation) and their effects on the human body. 7. Electricity and Magnetism – Electric charges, potential, magnetic fields, and their medical applications. 8. Simple Electrical Circuits – Resistance, capacitance, inductance, series and parallel configurations. 9. Biomechanics – Forces on and in the human body and their applications. 10. Skeletal Physics – Mechanical properties of bones and the physics of skeletal support.
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The teaching strategy for this module emphasizes linking physical concepts with real-life medical applications. Students will engage through lectures, demonstrations, and problem-solving sessions that connect theory with diagnostic and therapeutic tools used in healthcare. Laboratory experiments and simulations will help students observe physical phenomena relevant to medical practice, such as ultrasound, heat therapy, and blood pressure measurements. Active participation and critical thinking will be encouraged to reinforce understanding and application of biomedical physics

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	109	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	91	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

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

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Units and Physical Quantities, S.I units, non-S.I units, standard prefixes, conversion factors, precision & accuracy.
Week 2	Light in Medicine, light as array, properties of light, reflection and refraction, multiple element system (microscope, endoscope),
Week 3	Application of visible light in medicine, application of ultraviolet light (UV) in medicine, application of infrared light (IR) in medicine.
Week 4	Sound in Medicine, general properties of sound, units, the intensity of the sound wave,
Week 5	Doppler effects, application in medicine (stethoscope, ultrasound)
Week 6	Pressure, definition, units, Boyle's law, Pascal principle,
Week 7	Archimedes principle, buoyant force, pressure in the human body, measurement of blood pressure
Week 8	Temperature and Heat, temperature and phases of matter, temperature scales and thermometer, method of heat transfer (conduction, convection, radiation),
Week 9	Heat and the human body, effects of heat on the body, diagnostic and therapeutic uses of heat.
Week 10	Electricity within the body
Week 11	Cardiovascular system
Week 13	Forces on and in body

Week 14	Applications of Forces on and in body
Week 15	Physics of skeleton
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Hook law
Week 2	Lab 2: Boyle's Law
Week 3	Lab 3: viscosity law
Week 4	Lab 4: The simple pendulum
Week 5	Lab 5: Principles and methods of blood pressure measurement

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Medical physics	
Recommended Texts	Advanced of medical physics and applications	
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	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
<p>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.</p>				