MODULE DESCRIPTION FORM

Module Information				
Module Title	Medical physics		Module Delivery	
Module Type	Basic		☒Lecture	
Module Code	MP301		☒Practical	
ECTS Credits	7			
SWL (hr/sem)	175			
Module Level	UG III	Semester of Delivery	1	
Administering Department	Medical physics	College	College of Science	
Module Leader	Dr. Ahmed Mousa Jaafar	e-mail	ahmed.mo@uowa.edu.iq	
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	PhD	
Module Tutor	Dr. Saif Mohammed Neamah	e-mail	saif.m.n@uowa.edu.iq	
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Scientific Committee Approval Date	1 – 9 - 2025	Version Number	V01	

Relation with other Modules			
Prerequisite module	-	Semester	-
Co-requisites module	-	Semester	-

جامعة وارث الانبياء
كلية العلوم
قسم الفيزياء الطبية

أ.م.د. شهاد حسين نوئل
٢٠٢٥ – ٢٠٢٦

جامعة وارث الانبياء

Department Head Approval

Dean of the College Approval

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	1. Explain the fundamental physical concepts (mechanics, fluids, waves, sound, electricity, magnetism, optics, radiation). 2. Apply physics to human physiology – e.g., blood circulation (fluid dynamics), breathing (pressure), hearing (sound), vision (optics). 3. Understand the basic principles of radiation and its interaction with biological tissues. 4. Recognize the role of medical imaging (X-ray, ultrasound, MRI, CT) in diagnosis. 5. Describe simple medical instruments (stethoscope, sphygmomanometer, ECG, hearing aids, etc.). 6. Develop problem-solving skills by applying equations and models to medical examples. 7. Appreciate the importance of physics in medicine and the safe use of physical technologies in healthcare.
Module Learning Outcomes	1. Explain the fundamental principles of mechanics, fluids, waves, sound, electricity, magnetism, optics, and radiation relevant to medicine. 2. Describe the physical basis of physiological processes such as circulation, respiration, hearing, and vision. 3. Identify the interactions of radiation with matter and biological tissues. 4. Discuss the principles of medical imaging techniques (X-ray, CT, MRI, Ultrasound, Nuclear Medicine). 5. Outline the physical concepts behind therapeutic applications such as radiotherapy and laser treatment. 6. Demonstrate an understanding of the operation and calibration of common medical instruments (e.g., ECG, EEG, sphygmomanometer, pulse oximeter, ultrasound machine). 7. Apply safety protocols in handling radiation and electrical medical equipment. 8. Interpret diagnostic information obtained from physics-based medical devices. 9. Appreciate the importance of lifelong learning in medical physics and related technologies.

Indicative Contents	Theory Lectures Learning concepts of each theoretical lecture or groups of lectures. [SSWL= hrs] Lab.Lectures Learning concepts of each laboratory lecture or groups of lectures. [SSWL= hrs] • Mid Exam = 1hr • Final Exam = 3hrs • Total hrs = 175

Learning and Teaching Strategies	
Strategies	1. Lecture 2. Workshops 3. Laboratory sessions 4. Flipped classroom 5. Problem-based learning (PBL) 6. Peer teaching and collaborative learning 7. Reflective practice

Student Workload (SWL)			
Structured SWL (h/sem)	78	**Structured SWL (h/w)**	5.2
Unstructured SWL (h/sem)	97	**Unstructured SWL (h/w)**	**6.4**
Total SWL (h/sem)	175		

Module Evaluation

		Time/Number		Weight (Marks)		Week Due	Relevant Learning Outcome
		TH	LAB	TH	LAB		
Formative assessment	Quizzes	2	2	4	10	5,11	1,2,3,4,5,6
	Outsite assignment	1	2	2	10	6,12	All
	Insite Assignments	-	-	-	-	11	All
	Projects	1	6	4	10	14	All
Summative assessment	Midterm Exam	1		10		6	
	Final Exam	3hr		50		15	
Total assessment				100 Marks			

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	Introduction to medical physics
Week 2	Light in Medicine
Week 3	The Physics of Eyes and Vision
Week 4	Electricity within the body (Part-1)
Week 5	Electricity within the body (Part-2)
Week 6	Applications of electricity in Medicine
Week 7	Mid. Exam
Week 8	Pressure in Medicine
Week 9	Sound and Ultrasound in Medicine
Week 10	Mechanism of ultrasound imaging
Week 11	Physics of the ear as a sound detection system
Week 12	Physics of the Skeleton (Part-1)
Week 13	Physics of the Skeleton (Part-2)
Week 14	Physics of the lungs and breathing (part-1)
Week 15	Physics of the lungs and breathing (part-2)

Delivery Plan (Weekly Lab. Syllabus)	
	Material Covered
Week 1	Introduction and Safety
Week 2	Interaction of light with blood hemoglobin (Oximeter)
Week 3	Determine blood glucose levels
Week 4	The electrical signals in the heart.
Week 5	Fibrillation treatment
Week 6	The electrical signals in the brain.
Week 7	exam
Week 8	Blood flow (laminar and turbulent)
Week 9	Blood Pressure measurement
Week 10	Ultrasound Imaging-1 (Measurement of ultrasound velocity in different media)
Week 11	Ultrasound Imaging -2 (B-mode imaging demonstration)
Week 12	Ultrasound Imaging -3 (Effect of frequency and intensity on resolution).
Week 13	Hearing tests
Week 14	Pulmonary Function Testing
Week 15	Project Presentations and Review

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	Fundamentals of Medical Physics: Principles and Applications, 1st,2024, AkiNik Publications.	
Recommended Texts	*The Essential Physics of Medical Imaging*, 3rd,2012, Lippincott Williams & Wilkins.	

Grading Scheme				
Group	**Grade**	Mark	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	Excellent	90 - 100	Outstanding Performance
	B - Very Good	Very Good	80 - 89	Above average with some errors
	C - Good	Good	70 - 79	Sound work with notable errors
	D - Satisfactory	Fair / Average	60 - 69	Fair but with major shortcomings
	E - Sufficient	Pass / Acceptable	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	Fail (Pending)	(45-49)	More work required but credit awarded
	F – Fail	Fail	(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.