

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Quantum Mechanics for Medical Physics		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code			
ECTS Credits	٣		
SWL (hr/sem)	٧٥		
Module Level	1	Semester of Delivery	
Administering Department	Physics Department	College	College of Science
Module Leader	Assist.Prof.Dr. Mezher Baker Saleh	e-mail	mezher69@uomustansiriyah.edu.iq
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Assist.Prof. Dr. Mezher Baker Saleh	e-mail	mezher69@uomustansiriyah.edu.iq
Peer Reviewer Name	Assist.Prof.Dr. Mezher Baker Saleh	e-mail	mezher69@uomustansiriyah.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 Objectives أهداف المادة الدراسية	1. Teaching students the basic principles of physics. 2. Preparing specialists in the field of medical physics and its practical applications, which bears the responsibility of studying the country's need for development and progress and capable of meeting the needs of the job market in state institutions and medical sectors. 3. Preparing an educated generation and adopts it as a sound basis to bring about radical changes and assign scientific knowledge and scientific methods in thinking, analysis and adaptation with the development of technologies, to keep up with the expansion of medical needs. 4. Effective contribution for deepening and documenting the connection of the university with the society through the implementation of advisory counseling, training and development of teaching and administrative staff. 5. The service of preparing graduates specialized in medical physics who contribute to development in the medical institutions. 6. Meeting the needs of medical institutions with highly qualified persons in the field of medical physics. 7. Encouraging the distinguished in this field to work as teaching assistants in the department to be part of the academic teaching staff in the future.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	A. Cognitive goals 1. To enable the student to know and understand the basics of medical physics. 2. To make students able to understand medical physical concepts from a medical point of view. 3. Making the student able to know and understand the basics of physics through the use of modern software and keeping pace with scientific development. 4. Enable students to obtain knowledge, understand the scientific laws of physics and its practical applications, logical and scientific analysis, and the interpretation of medical physical concepts. B. The skills goals special to the program 1. Sound scientific research skills and constructive scientific discussions and expressing of opinions. 2. Usage and development skills. 3. Thinking skills and enabling the student to understand and solve scientific problems related to the laws of physics. 4. Skills and ability to apply the theoretical and practical scientific experience, gained from his studies, in the areas of practical life; taking into account a medical constraints.
Indicative Contents	The course aims to teach the student one of the most important theory in physics which is

المحتويات الإرشادية	quantum mechanics. Quantum theory is one of the most important sciences in physics that have emerged since the end of the nineteenth century to the present day. Its importance lies in its ability to explain natural phenomena, particularly those related to microscopic and non-microscopic phenomena. This subject presents the basic concepts of quantum theory and its relevant mathematical formulism, so as to enable the student to study and describe the sub-microscopic physical phenomena (of the order of atomic scales). The subject describes the historical development of quantum theory, presenting the reasons that led to its emergence, the postulates that preceded its mathematical formulation, and the solution of Schrodinger equation in one dimension for simple systems to clarify the principle of energy quantization as one of the most essential elements of quantum theory, which has wide applications in medical physics.
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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 some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل		Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل		Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	750		

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

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduce the subject. Principles of Quantum Mechanics (Energy quanta, Einstein interpretation for , photoelectric effect, Wave particle duality, De Broglie Hypothesis.
Week 2	Blackbody Radiation and Plancks Formula, Rayleigh – Jeans formula, Plancks Formula for Blackbody.
Week 3	De Broglie Hypothesis and total energy, Basic development, time dependent Schrodinger equation, Solution of relevant examples. Time independent Schrodinger equation.
Week 4	Time independent Schrodinger equation, Solution of relevant examples,
Week 5	Time independent Schrodinger equation, Conditions for wave function, Solution of relevant examples.
Week 6	Exam1.
Week 7	The Probability interpretation and normalization, Probabilities must to 1 , Solution of relevant examples.
Week 8	Definition Normalizing the wavefunction, Normalized constant not change with time, Solution of relevant examples.
Week 9	probability current density, Normalized constant not change with time, Solution of relevant examples.
Week 10	Mid exam.
Week 11	probability current density, Square Potential Barrier, Solution of relevant examples ,
Week 12	Hermitian operator, properties of Heraitian operator, Solution of relevant examples ,
Week 13	Commutation Relation, Raising and Lowering operator, Solution of relevant examples
Week 14	Gnerral equations about the Medical Quantum
Week 15	Exam 2
Week 16	Preparatory week before the final Exam

التعليق [WU1]:

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1. Quantum Mechanics , David, McMahon, 2006	Available
Recommended Texts	Basic Quantum Mechanics , Cassels J. M., 1970	No but it is available as PDF
Required Texts	Quantum Mechanics , Dvaydov A. S. , 1976	No but it is available as PDF
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.				