

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Engineering of Radiation instrument		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	MIE40003		
Credits	4		
SWL (hr/sem)	100		
Module Level	UG IV	Semester of Delivery	
Administering Department	MIE	College	MUC
Module Leader	Zahraa Amer	e-mail	Zahraamer8866@gmail.com
Module Leader's Acad. Title	Lect. Dr.	Module Leader's Qualification	Ph.D.
Module Tutor		e-mail	
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	8/11/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Signals and systems _ MIE3104		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	Studying the composition of the atom and atomic and nuclear radiation and their effect on the human body and their uses in medical devices.
Module Learning Outcomes	✓ A- Knowledge and Understanding - A1. The student enumerates the study of radiation technology techniques - A2. The student distinguishes the difference between different radiation devices - A3. The student learns about the applications of radiation devices in general and the radiation used in medicine in particular - A4. The student learns to study the structure of the atom and the molecule - A5. The student learns how to operate radiation devices - A6. The student learns about avoiding radiation hazards and the safe use of radiation B. Subject-specific skills - B1. The student uses radioactive equipment - B2. The student uses other materials accompanying the radiation devices to carry out the experiments - B3. The student acquires the skills of properties and applications of radiation - B4. The student writes the results obtained in the laboratory from the radiation devices C. Thinking Skills - C1. The student listens to the lecture with attention - C2. The student recognizes the impact of science and scientist in life. - C3. The students describe the importance of laser and its applications. - C4. The students are calm and care about the system of the class.
Indicative Contents المحتويات الإرشادية	✓ Characteristics of medical data, physiological signals analyzer, medical care system, nature of biomedical signals, signal acquisition [7 hrs]. ✓ Random physiological signals, signal as stochastic process, averaging techniques [10 hrs]. ✓ Sampling theorem, windowing, Efficient computation of discrete Fourier transform [11 hrs]. ✓ Implementation of discrete time systems, digital filters (FIR, IIR) [17 hrs].

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Discussions and speaks with the students
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Student Workload (SWL)			
الحمل الدرايس للطالب			
Structured SWL (h/sem) الحمل الدرايس المنتظم للطالب خلال الفصل	74	Structured SWL (h/w) الحمل الدرايس المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدرايس غرت المنتظم للطالب خلال الفصل	36	Unstructured SWL (h/w) الحمل الدرايس غرت المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدرايس الكيل للطالب خلال الفصل	100		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	15%(15)	5 and 10	LO #4 and #9
	Assignments	2	10%(10)	2 and 12	LO #5 and #10
	Projects / Lab.	4	10%(10)	Continuous	All
	Report	1	5%(5)	13	LO #8
Summative assessment	Midterm Exam	2hr	10%(10)	7	LO #1 - #6
	Final Exam	4hr	50%(50)	16	All
Total assessment			100%		

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1,2	Theory 4 + practical 4	The student understands the lesson	Atomic structure and atomic radiation.	Theory + practical (lectures)	Direct questions

3, 4	Theory 4 + practical 4	The student understands the lesson	The nuclear and nuclear radiation.	Theory + practical (lectures)	Direct questions
5, 6	Theory 4 + practical 4	The student understands the lesson	<i>Interaction of radiation with matter.</i>	Theory + practical (lectures)	Quick quiz
7,8,9	Theory 4 + practical 4	The student understands the lesson	<i>Radiation detection & engineering of radiation detectors.</i>	Theory + practical (lectures)	Direct questions
10,11,12	Theory 4 + practical 4	The student understands the lesson	<i>Engineering of radiation dosimetry and dosimeters.</i>	Theory + practical (lectures)	Quick quiz
13, 14	Theory 4 + practical 4	The student understands the lesson	<i>Radiation protection.</i>	Theory + practical (lectures)	Direct questions
15, 16	Theory 4 + practical 4	The student understands the lesson	<i>Engineering of body scanners.</i>	Theory + practical (lectures)	Quick quiz
17,18	Theory 4 + practical 4	The student understands the lesson	<i>Production of x-rays.</i>	Theory + practical (lectures)	Direct questions
19,20	Theory 4 + practical 4	The student understands the lesson	<i>Clinical radiation generators.</i>	Theory + practical (lectures)	Quick quiz
21,22	Theory 4 + practical 4	The student understands the lesson	<i>Dose distribution and scatter analysis.</i>	Theory + practical (lectures)	Direct questions
23,24	Theory 4 + practical 4	The student understands the lesson	<i>A system of dosimetric calculations.</i>	Theory + practical (lectures)	Direct questions
25,26	Theory 4 + practical 4	The student understands the lesson	<i>Treatment planning.</i>	Theory + practical (lectures)	Quick quiz
27,28	Theory 4 + practical 4	The student understands the lesson	<i>Engineering of electron beam therapy.</i>	Theory + practical (lectures)	Direct questions
29,30	Theory 4 +	The student	<i>Brachy therapy</i>	Theory +	Direct

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Physics for scientists and engineers with the modern physics, eighth edition. By Raymond A. Serway and John w. Jewett, jr Classiced radition therapy pants by faiz khan	621.382 1920
Recommended Texts	The physics and radiation therapy by faiz khan. Ed. 3,4 Principle of radiological physics Donald T. Granham, paul coke martin vosper.	
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.