

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Introduction to BME		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	MDER224		
ECTS Credits	3		
SWL (hr/sem)	75		
Module Level	2	Semester of Delivery	4
Administering Department	Biomedical engineering	College	College of Engineering
Module Leader	Dr basem	e-mail	
Module Leader's Acad. Title	Assistant Lecturer	Module Leader's Qualification	M.SC
Module Tutor	Muntadher Hasan Naeemah	e-mail	Muntadhar.HassanNaeema@alayen.edu.iq
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date		Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	The lectures were conducted to address all the different roles that the biomedical engineer can have in the life cycle of the technology, from research and development, and innovation, mainly undertaken in academia; the regulation of devices entering the market; the assessment or evaluation in selecting and prioritizing medical devices (usually at national level); to the role they play in the management of devices from selection and procurement, to safe use in health-care facilities. In addition, the students will be subjected with current issues in the healthcare system to be analyzed and offer suggested solutions according to advanced international healthcare systems.		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Knowledge	A2	A2-1 Identify the main career opportunities and professional roles available in biomedical engineering fields such as research, healthcare institutions, industry, and regulatory agencies. A2-2 Explain the interdisciplinary nature of biomedical engineering and the integration of concepts from biology, medicine, engineering, and physics in developing healthcare technologies. A2-3 Apply basic research skills including literature review, experimental design, and data analysis in biomedical engineering studies and projects. A2-4 Analyze the design principles and functional components of biomedical devices and healthcare technologies used in diagnosis and treatment.
		B1	B1.1 Function efficiently as an individual B1.2 Function as a member of multidisciplinary and multicultural teams
			B2.1 Communicate effectively – graphically with a range of audiences using contemporary tools. B2.2 Communicate verbally and in writing with a range of audiences using contemporary tools.
Indicative Contents المحتويات الإرشادية	Ethics	C2	C2-1: Commit to quality standards. C2-2: Adhere to deadlines. C2-3: Strive for continuous improvement.
			A: General Introduction to Biomedical Engineering Overview of biomedical engineering as an interdisciplinary field combining

engineering, biology, and medicine. Introduction to the objectives of the course and the role of biomedical engineers in healthcare systems and medical technology development.

[3 hrs]

B: Education and Training of Biomedical Engineers

Study of the academic pathways, educational requirements, and professional training necessary for biomedical engineers. Discussion of core scientific and engineering skills required for the profession.

[4 hrs]

C: Professional Associations in Biomedical Engineering

Overview of international and regional professional organizations in biomedical engineering, their roles in supporting professionals, promoting research, setting standards, and fostering collaboration in the field.

[4 hrs]

D: Regulation of Medical Devices

Introduction to regulatory frameworks governing medical devices, including safety standards, approval processes, and the role of biomedical engineers in ensuring compliance with national and international regulations.

[5 hrs]

E: Management of Medical Devices in Healthcare Institutions

Principles of medical equipment management in hospitals and healthcare facilities, including procurement, installation, maintenance, calibration, and lifecycle management of medical technologies.

[5 hrs]

F: Evolution of Medical Devices and Technologies

Historical development and technological progress of medical devices, highlighting key innovations that have transformed diagnosis, treatment, and patient care.

[3 hrs]

G: Biomedical Engineering in Disaster Management

Role of biomedical engineers in emergency response and disaster management, including medical equipment readiness, healthcare infrastructure support, and technological solutions during crises.

[3 hrs]

H: Career Opportunities and Professional Development in Biomedical Engineering

Review of the professional roles of biomedical engineers in research, industry, healthcare institutions, regulatory agencies, and entrepreneurship, with emphasis on career pathways after graduation.

[3 hrs]



Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Lectures Brainstorming strategy Practical demonstrations Research projects Rapid tests Interactive learning strategy Indirect learning strategy.

Student Workload (SWL) الحمل الدراسي للطلاب (15 اسبوع)			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	1.78
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	42	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	2.27
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	75		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	A2
	Attendance	2	%10(10)		A2
	Projects	1	10% (10)	Continuous	A2
	seminar		10% (10)		
Summative assessment	Midterm Exam	1 hr	10% (10)	7	A2
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		



Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered	LOs
Week 1	General Introduction to Biomedical Engineering	A2-1, B1.1, C2-1
Week 2	Education Pathways for Biomedical Engineers	A2-1, B2.1, C2-3
Week 3	Professional Training for Biomedical Engineers	A2-3, A3-1, C2-1
Week 4	Professional Associations in Biomedical Engineering	A2-2, A3-1
Week 5	Regulation of Medical Devices (Part 1)	A2-4, A2-3, A3-1, B2.2
Week 6	Regulation of Medical Devices (Part 2)	A2-1, A2-3, A3-1, B2.2
Week 7	Management of Medical Devices (Part 1)	A2-1, A3-1, C2-2
Week 8	Management of Medical Devices (Part 2)	A2-4, A2-3, A3-2
Week 9	Midterm Examination	A2
Week 10	Evolution of Medical Devices (Part 1)	A2-3, B2.1, C2-1
Week 11	Evolution of Medical Devices (Part 2)	A2
Week 12	Advanced Management of Medical Devices	A2-2, A2-3, A3-2, B1.2, C2-3
Week 13	Roles of Biomedical Engineers in Device Management	A2-2, A3-2, B1.1
Week 14	Biomedical Engineering in Disaster Management	A2-2, A3-2, C2-2
Week 15	Review and Career Opportunities and Preparatory week before the final Exam	A2



Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Introduction to Biomedical Engineering- Third Edition, John Ederel, Joseph Bronzino, 2012.	yes
Recommended Texts	Medical Instrumentation Application and Design- Fourth Edition, John G Webster, 2000.4- Medical Imaging Physics, By William Hendee, E. Russell Ritenour WHO guideline and updated Boimedical Engineering professional regulations. CDC and FDA updated Boimedical Engineering guidelines and regulations.	No
Websites	https://eng.alayen.edu.iq//colleges/e/42	

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.				



