
	Ministry of Higher Education and Scientific Research - Iraq Al-Mustaqbal University College of Engineering Department of Prosthetics and Orthotics Engineering	
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MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	المواد الحيوية		Module Delivery
Module Type	CORE		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	UOMU013034		
ECTS Credits	3		
SWL (hr/sem)	75		
Module Level	2	Semester of Delivery	
Administering Department	UOMU013	College	UOMU01
Module Leader	Mariam Ghassan Ghaffar	e-mail	mariam.ghassan.ghaffar@uomus.edu.iq
Module Leader's Acad. Title	Asst. Lec.	Module Leader's Qualification	MSc.
Module Tutor			
Peer Reviewer Name		e-mail	
Review Committee Approval	01/06/2023	Version Number	1.0

Relation With Other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Material science	Semester	2
Co-requisites module	Orthotics & prosthetics	Semester	7
Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية			
Module Aims أهداف المادة الدراسية	1. To understand the primary classifications of materials that used in biomedical application. 2. Make a distinction between bioinert, bioactive and biodegradable materials. 3. This course deals with the basic concept or criteria that are important in the biomaterial's selection. 4. Identify the mechanical properties of each biomaterial. 5. To understand the biological response of biomaterials by human body. 6. Discuss the Electromyography (EMG) measures muscle response. 7. To Identify types of forces that exposed on the body		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize types of biomaterials that used in orthotics and prosthetics application. 2. Knowledge the student how to sterilize the biomaterials before using it. 3. Identify the mechanical properties of each biomaterial. 4. Summarize what is meant by a bone graft. 5. Discuss how to deal with biomaterials in the laboratory. 6. Describe the biological response of biomaterials by human body. 7. Identify the type of biomaterials failure. 8. Discuss the Physics of the Cardiovascular System. 9. Discuss the Physic of the skeleton. 10. Explain Mechanical properties of bone. 11. Identify types of forces that exposed on the body. 12. Describe Pressure in the Body. 13. Discuss the Electromyography (EMG) measures muscle response		
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: Part A – introduction to biomaterials Types of natural biomaterials, Requirements of Biomaterials, Classification of bone graft, sterilization methods, Surface Modifications for Improving Bio-compatibility. [10 hrs] Part B – Ceramic biomaterials Types of Bio-ceramics: bioinert (alumina, zirconia and Carbone), bioactive(bioglass, hydroxyapatite) and bioresorbable(calcium carbonate). Bio-ceramic coatings , scaffold application of bio-ceramic.[15 hrs]		

	<p>Part C– Metals biomaterials</p> <p>Introduction to bio-metals, Steel biomaterials, CO-Cr ,Ti alloy, Ti-Ni alloy, dental metals, Biological response , corrosion of metals, types of metals that used in orthotics and prosthetics engineering. [15 hrs]</p>
	<p>Part D-Polymer biomaterials</p> <p>Introduction to biopolymers, natural polymers: Collagen, Chitosan& Alginate, synthetic polymers: PE, PP, PMMA, Epoxy, APS, PVC, PS,PU, Polyamides (Nylons) Polyesters, Silicone rubber, Biomedical applications, External Prosthetics and Orthotics Biomaterials. [10 hrs]</p>
	<p>Part E medical physics</p> <p>Introduction to medical physics, Physics of the Cardiovascular System, Physics of the skeleton, Mechanical properties of bone, forces on the body , Pressure in the Body, Efficiency of the human Body; Heat losses from the Body ; Electricity Within the Body Energy, Work, and Power of the Body[14 hrs]</p>
<p>Learning and Teaching Strategies</p> <p>استراتيجيات التعلم والتعليم</p>	
Strategies	<p>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 thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.</p>

<p>Student Workload (SWL)</p> <p>الحمل الدراسي للطالب</p>			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	42	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

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	2hr.	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	Introduction to biomaterials, Requirements of Biomaterials, Classification of bone graft
Week 2	sterilization methods, Surface Modifications for Improving Bio-compatibility
Week 3	Types of Bio-ceramics: bioinert, bioactive and bioresorbable
Week 4	Bio-ceramic coatings , scaffold
Week 5	Introduction to bio-metals, Steel biomaterials, CO-Cr ,Ti alloy, Ti-Ni alloy
Week 6	Corrosion of bio-metals
Week 7	Mid-term Exam , Biological response , MID
Week 8	Introduction to biopolymers, natural polymers: Collagen, Chitosan& Alginate
Week 9	synthetic polymers: PE, PP, PMMA, Epoxy, APS, PVC
Week 10	synthetic polymers: PS,PU, Polyamides (Nylons) Polyesters, Silicone rubber,
Week 11	Biomedical applications, External Prosthetics and Orthotics Biomaterials
Week 12	Introduction to medical physics, Physics of the Cardiovascular System, Physics of the skeleton Mechanical properties of bone.
Week 13	forces on the body , Pressure in the Body
Week 14	Electricity Within the Body; Energy, Work, and Power of the Body
Week 15	Efficiency of the human Body; Heat losses from the Body

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Fundamentals of biomaterials ; An introduction to biomaterials, second edition	No
Recommended Texts	Basics of Medical physics	No
Websites	https://www.coursera.org/search?query=biomedical%20engineering&=null&index=prod_all_launched_products_term_optimization	

APPENDIX:

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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

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.



ملاحظة: هذا النموذج تم وضعه وتقديمه من قبل مديرية ضمان الجودة في وزارة التعليم العالي والبحث العلمي