



Ministry of Higher Education and
Scientific Research - Iraq
University of Diyala
College of Engineering
Department of Materials Engineering



MODULE DESCRIPTION

وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Principles of materials science II		Module Delivery
Module Type	Core		<input type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input checked="" type="checkbox"/> Seminar
Module Code	MATE102		
ECTS Credits	8		
SWL (hr/sem)	200		
Module Level	1	Semester of Delivery	
Administering Department	Materials Engineering	College	College of Engineering
Module Leader		e-mail	
Module Leader's Acad. Title		Module Leader's Qualification	
Module Tutor		e-mail	
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	13/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module (MATE102)	MATE101	Semester	1
Co-requisites module	None		

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Objectives أهداف المادة الدراسية</p>	<p>This module aims to</p> <ol style="list-style-type: none"> 1. Provide an understanding of the of ceramic, polymers and composite materials. 2. Develop an understanding of the principal properties of engineering materials and the factors which affect their performance in use. 3. The course discusses the Principles of biomaterials and nanomaterials. 4. Gain a clear understanding of laboratory tests and practices.
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> 1. Describe ceramic materials. 2. Describe clay and refractory materials. 3. Get information about polymer-based materials and properties. 4. Describe composite materials. 5. Describe the principle of strengthening in composite materials. 6. Compare among materials according to their properties and applications. 7. Follow new developments in materials application field. 8. Identify the biomaterials and nano materials properties. 9. Get information about conductive materials 10. Get information about semiconductor materials. 11. Get information about insulator materials. 12. Compare among materials in term of conductivity. 13. Identify the nano materials properties. 14. Describe the applications of nano materials.
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Basic concepts: Mechanical properties (elastic and plastic behaviour), mechanisms of deformation, toughness, ductility and brittleness. Phase equilibria, one and two-component systems. Atom movements and diffusion. Phase transformations: concepts of driving force, nucleation and growth.</p>

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

<p>Strategies</p>	<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 critical thinking skills. This will be achieved through classes, interactive seminars and by considering types of simple experiments involving some sampling activities that are interesting to the students.</p>
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ 15 اسبوعا

<p>Structured SWL (h/sem)</p>	<p>75</p>	<p>Structured SWL (h/w)</p>	<p>5</p>
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الحمل الدراسي المنتظم للطالب خلال الفصل		الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	125	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	8.3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	6	5% (5)	2, 4, 6, 8, 10, 12	LO #1 to #11
	Assignments	3	5% (5)	3, 7, 13	LO #1 to #10
	Projects / Lab.	2hrs.	10% (10)	Continuous	All
	Group Presentation	1	10% (10)	15	LO #1 - #14
Summative assessment	Midterm Exam	2hrs.	20% (20)	6 and 11	LO #1 - #14
	Final Exam	3hrs.	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)		المنهاج الاسبوعي النظري
		Material Covered
Week 1, 2		Introduction to ceramics, glass, glass-ceramics, wood.
Week 3		Clay Products, Refractories
Week 4, 5		Introduction to polymers: thermoplastic and thermoset
Week 6		1st Exam.
Week 7, 8		Introduction to composite materials. Large-Particle Composites, Dispersion-Strengthened Composites

Week 9	Introduction to Nanomaterials: Introduction to nanotechnology, physics of low-dimensional materials, 0D, 1D, 2D and 3D confinement.
Week 10	Applications of nano-materials.
Week 11	2 nd Exam.
Week 12	Introduction to: conductors, semiconductors, insulators.
Week 13	Introduction to biomaterials.
Week 14	Applications of biomaterials.
Week 15	Group Presentation (Seminar).
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1, 2	Lab 1: Preparation of specimen by pressing
Week 3, 4	Lab 2: Drying and firing, Loss on ignition
Week 5,6	Lab 3: Density and porosity
Week 7, 8	Lab 4: Viscosity of polymers

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1- Materials Science and Engineering: An Introduction. W. D. Callister, D. G. Rethwisch. 9th Ed., John Wiley and Sons, New York (ISBN 978-0-470-41997-7). 2- C. Kittel, Introduction to Solid State Physics, 8th ed., Wiley, 2005. 3- V. Raghavan, "Materials Science and Engineering: A First Course".	Yes
Recommended Texts	1- Prentice Hall, 2006 2- D.R. Askeland, P.P. Phule, W.J. Wright, The Science and Engineering of Materials, 6th ed., Cengage Learning, 2010.	No

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.