

## Module (Course Syllabus) Catalogue

### 2023-2024

College/ Institute	Erbil Technology Collage		
Department	ATE		
Module Name	PROPERTICE OF MATERIALS		
Module Code	POM606		
Degree	Technical Diploma <input type="checkbox"/>	Bachelor <input checked="" type="checkbox"/>	* <input type="checkbox"/>
	High Diploma	Master <input type="checkbox"/>	PhD <input type="checkbox"/>
Semester	6 <sup>ST</sup>		
Qualification	Bachelor degree		
Scientific Title	Lecture		
ECTS (Credits)	3		
Module type	Prerequisite <input checked="" type="checkbox"/>	Core <input type="checkbox"/>	Assist. <input type="checkbox"/>
Weekly hours	2		
Weekly hours (Theory)	( 2 )hrs Class	( )Total hrs Workload	
Weekly hours (Practical)	( )hr Class	( )Total hrs Workload	
Number of Weeks	14		
Lecturer (Theory)	Salim Azeez Kako		
E-Mail & Mobile NO.	<a href="mailto:salim.kako@epu.edu.iq">salim.kako@epu.edu.iq</a> 07504491085 07802763313		
Lecturer (Practical)			
E-Mail & Mobile NO.			
Websites			

# Course Book

<p style="text-align: center;"><b>Course Description</b></p>	<p>The design of this module includes establishing improving the student's knowledge and understanding about the engineering mechanics to provide the student realistic applications encountered in professional practice. The topics of this module includes : basic concepts of engineering mechanics, forces systems and an force analysing, Drawing of free body diagrams and determine the resultant of forces and/or moments. Draw complete and correct free-body diagrams and write the appropriate equilibrium equations from the free-body diagram. Determine the support reactions on a structure. Determine the connection forces in trusses and in general frame structures. Determine the centroid. Analyse statically determinate planar frames. The module will be delivered via lectures and tutorials (supported by problem-solving classes</p>
<p style="text-align: center;"><b>Course objectives</b></p>	<ol style="list-style-type: none"> <li>1. To become familiar with the types, and their designations, the heat treatment, and properties of two important classes of alloys - steels and aluminum alloys.</li> <li>2. To understand the crystal structure and microstructures of metals and alloys, including solid solutions and multiple phase alloys.</li> <li>3. To understand the principles behind heat treatment of metals and alloys in terms of diffusion and phase diagrams.</li> <li>4. To understand the principles behind the mechanical behavior of metals and alloys in terms of dislocation motion.</li> <li>5. To understand the electrochemical nature of corrosion of metals and alloys.</li> <li>6. To become familiar, in a general way, with the properties and behavior of different classes of materials, particularly, strength, ductility, and densities.</li> <li>7. To become familiar with the basic methods of polymer synthesis and how these affect microstructure and morphology.</li> <li>8. To understand that polymers can be amorphous (glassy or rubbery) or semi-crystalline and how this affects thermal and mechanical properties.</li> <li>9. To become familiar with the basic mechanical properties of polymers (strength, stiffness, toughness) and how these properties compare to other materials.</li> </ol>
<p style="text-align: center;"><b>Student's obligation</b></p>	<p>The student must attendance the hall 2 hour ,abidance the lecturer instruction. And also student should be ready to:</p>

	<ul style="list-style-type: none"> <li>To pass this module the students should attend all lectures and complete all tests, exams and assignments</li> <li>Daily quiz</li> <li>Seasonal exams</li> <li>Make weekly reports</li> <li>Arranging group reports</li> <li>Presence in scientific trips</li> </ul>																																																									
<b>Required Learning Materials</b>	<ul style="list-style-type: none"> <li>* Textbooks.</li> <li>* Relevant reading <b>materials</b>.</li> <li>* Videos.</li> <li>* Recordings. <ul style="list-style-type: none"> <li>Materials</li> <li>Oral presentations lectures, Group discussions, Seminars, Problem-solving based learning.</li> </ul> </li> </ul>																																																									
<b>Evaluation</b>	<table border="1"> <thead> <tr> <th colspan="2">Task</th> <th>Weight (Marks%)</th> <th>Due Week</th> <th>Relevant Learning Outcome</th> </tr> </thead> <tbody> <tr> <td colspan="2">Paper Review</td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="6">Assignments</td> <td>Homework</td> <td>10</td> <td></td> <td></td> </tr> <tr> <td>Class Activity</td> <td>4</td> <td></td> <td></td> </tr> <tr> <td>Report</td> <td rowspan="4">6</td> <td></td> <td></td> </tr> <tr> <td>Seminar</td> <td></td> <td></td> </tr> <tr> <td>Essay</td> <td></td> <td></td> </tr> <tr> <td>Project</td> <td></td> <td></td> </tr> <tr> <td colspan="2">Quiz</td> <td>4</td> <td></td> <td></td> </tr> <tr> <td colspan="2">Lab.</td> <td></td> <td></td> <td></td> </tr> <tr> <td colspan="2">Midterm Exam</td> <td>16</td> <td></td> <td></td> </tr> <tr> <td colspan="2">Final Exam</td> <td>40</td> <td></td> <td></td> </tr> <tr> <td colspan="2">Total</td> <td>100</td> <td></td> <td></td> </tr> </tbody> </table>	Task		Weight (Marks%)	Due Week	Relevant Learning Outcome	Paper Review					Assignments	Homework	10			Class Activity	4			Report	6			Seminar			Essay			Project			Quiz		4			Lab.					Midterm Exam		16			Final Exam		40			Total		100		
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<b>Specific learning outcome:</b>	<p>On completion of this course, the student will be able to:</p> <ol style="list-style-type: none"> <li>Understand basic concepts of material properties and material structures.</li> </ol>																																																									

	<p>2. Have knowledge of specific material classes: metals, polymers and ceramics; and how to extend this to hybrid material classes e.g. composites and foams.</p> <p>3. Be familiar with concepts in materials of: selection, processing, applications in engineering, behaviour in use including: degradation, fracture and failure.</p> <p>Think about and link concepts in materials: from everyday knowledge, the underpinning science, and engineering applications; and appreciate the importance of materials understanding in all engineering disciplines.</p>	
<b>Course References:</b>	<p><b>Engineering and metallurgy . R A Higgins 6<sup>th</sup> edition</b></p> <p><b>The science and engineering of materials . Donald R. , Pradeep P. 4<sup>th</sup> edition</b></p>	
<b>Course topics (Theory)</b>	<b>Week</b>	<b>Learning Outcome</b>
Introduction	1	
Crystalline and non crystalline materials , structure , crystal lattice , body centre cubic face centre cubic , closed packed hexagonal	2	
Types of Bonding ( ionic –covalent , metallic )	3	
Static and dynamic tests Hardness tests ( Vickers , Rockwell , Brine, sure )	4	
Static and dynamic tests Hardness tests ( Vickers , Rockwell , Brine, sure )	5	
Tensile test	6	
Impact tests (Izod and Charpy )	7	
Midterm Examination	8	
Creep and fatigue test	9	
Machining and deformations	10	
Iron –stainless steel	11	
Non ferrous alloys (metals and alloys )	12	
Heat treatment	13	
Carburizing	14	

## Extra notes:

External Evaluator

The course catalogue carried out is directly involved the subjects ,materials and scientific information about material inspection so I wrote this recommendation .

D. Abudulkalik M. Kadir  
Erbil Engineering collage