

Material Science

Basic Course Specification					
Course Title	Course Code	Program on which the course is given			
Material Science	ME 274 T	Bachelor			
Academic Year	Specialization (hr/week)	Pre-Requisites			
2020 - 2021	Theoretical 2hr./week Application 2hr./week Credit 3	BA 114 - BA 142			
Overall Course Objectives					
<ul style="list-style-type: none"> This syllabus covers the requirements of the STCW-78, as amended. In particular Chapter III, Section A-III/2 for the function “Marine Engineering at the Management Level”, STCW-78, as amended. The syllabus is so designed with the guide of IMO Model course 7.02, version 2014, and function1. It also covers the relationship between the structure & properties of engineering materials. How to modify the structure to achieve specific properties with emphasis on some typical applications. 					
Course Learning Outcomes. By successful completion of the course each student will be able to:					
Topic	Linking to PLOs	7th Week Assessment	12 th Week Assessment	Class Activities	Final Exam
1. Apply Essential facts, fundamentals, concepts, principles & theories relevant to mechanical engineering	b,c	√	√		√
2. Explain engineering design principles and techniques and their applications to mechanical power and energy engineering.	b,f	√	√		
3. Explain Characteristics & properties of materials relevant to mechanical engineering applications	a,f			√	√
4. Communicate with others, present ideas and findings and lead a group	f,j,k		√		
Course Content					
Lec./ Week #	Topic	Hrs. #	Theoretical	Application	
1	- Classification of Engineering Material - General Introduction - Atomic Bonding in Solids	4	2	2	
2	- Atomic Bonding in Solids - Atomic Bonding in Solids.	4	2	2	
3	- The Crystalline structure of materials. - The crystalline structure	4	2	2	
4	- The Crystalline structure of materials - The crystalline structure	4	2	2	
5	- The Crystalline structure of materials - The crystalline structure	4	2	2	
6	- Properties, Testing, and Inspection of Engineering Materials - Properties of Materials	4	2	2	

Course Content				
Lec./ Week #	Topic	Hrs. #	Theoretical	Application
7	Properties, Testing, and Inspection of Engineering Materials+ 7th week exam Properties of Materials	4	2	2
8	Properties, Testing, and Inspection of Engineering Materials.	4	2	2
9	- Introduction to thermal Equilibrium Diagrams. - Destructive Testing of Materials.	4	2	2
10	- Introduction to thermal Equilibrium Diagrams - Destructive Testing of Materials	4	2	2
11	- Non-Destructive Testing - Non-Destructive Testing of Materials	4	2	2
12	- Heat Treatment of Metals + 12th week exam - - Non-Destructive Testing of Materials	4	2	2
13	- Heat Treatment of Metals - Thermal Equilibrium Diagrams	4	2	2
14	- Corrosion : An Introduction - Thermal Equilibrium Diagrams	4	2	2
15	- General Revision - Miscellaneous Exam problems	4	2	2
16	Final Assessment			
Total Hours		60	30	30

Teaching & Learning Methods	Facilities Required for Teaching & Learning Methods	
<ul style="list-style-type: none"> Lectures Tutorials Assignments & sheets 	<ul style="list-style-type: none"> White board & Data Show Power Point Presentation Videos 	
Students Assessment Methods		
Assessment Schedule		
Assessment#1	Week 7	
Assessment#2	Week 12	
Assessment#3	Week 16	
Grading Method		
7th Week Assessment	Written Exam	30%
12 th week Assessment	Written Exam	20%
Class Activities	Participation and Quiz	10%
Final Exam	Written Exam	40%
Total		100 %
Assessment criteria meets the standards of the STCW 78 convention "as amended"; and in the light of the related IMO model courses.		
Staff Requirements		
Marine Chief Engineer/ Ph.D.		

List of References	
Course Notes	Essential Books
None	<ul style="list-style-type: none"> "Materials science & engineering : an introduction, 978118319222"
Additional References	Periodicals and Publications
<ul style="list-style-type: none"> J.Shackelford "Introduction to Materials Science for Engineering", 2nd edition, Macmillan, 1990 R.Flinn & P.Trojan "Engineering Materials and their Applications " 4th edition , Houghton Mifflin, 1990 B.Hull & V. John "Non-Destructive testing", Macmillan, 1988 	None
Others (Websites, E-books, Etc....)	
None	

Accreditation Bodies
<ul style="list-style-type: none"> *Egyptian Authority for Maritime Safety (EAMS) European Commission (EC) *ISO (9001 – 2015) DNV-GL *Central Evaluation and Accreditation Agency Hanover, Germany (ZEVA) *Ministry of Education (KSA) *Ministry of Higher Education (Greece) *Ministry of Higher Education (Oman) *Commission for Academic Accreditation (CAA), Ministry of higher Education (UAE) *University of Plymouth, United Kingdom (dual degree)

Prepared by: Course Coordinator

Reviewed by: Head of Department




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