



Arab Academy for Science, Technology & Maritime Transport
College of Engineering & Technology
Mechanical Engineering (Mechatronics) Program

University/Academy: Arab Academy for Science, Technology & Maritime Transport
Faculty/Institute: College of Engineering & Technology
Program: B.Sc. Mechanical Engineering

Form no. (12)
Course Specification

1- Course Data

Course Code: ME 274	Course Title: Materials Science	Academic Year/Level: 2nd year / 3th semester	
Specialization: Mechanical	No. of Instructional Units 3 credits	Lecture 2 hrs.	Practical 2 hrs.

2- Course Aim

To give the student a sound background in the science of engineering materials

3- Intended Learning Outcomes

w-Knowledge and Understanding	Through knowledge and understanding, students will be able to: K3) Characteristics of engineering materials related to the discipline K4) Principles of design including elements design, process and/or a system related to specific disciplines. K5) Methodologies of solving engineering problems, data collection and interpretation.
x- Intellectual Skills	Through intellectual skills, students will be able to: I12) Create systematic and methodic approaches when dealing with new and advancing technology.
y- Professional Skills	Through professional and practical skills, students will be able to: P6) Use a wide range of analytical tools, techniques, equipment, and software packages pertaining to the discipline and develop required computer programs. P11) Exchange knowledge and skills with engineering community and industry P12) Prepare and present technical reports.
z- General Skills	Through general and transferable skills, students will be able to: G3) Communicate effectively G9) Refer to relevant literature

4- Course Content

Week No.1	Classification of Engineering Materials – General Introduction
Week No.2	Atomic Bonding in Solids
Week No.3	The Crystalline Structure of Materials
Week No.4	The Crystalline Structure of Materials
Week No.5	The Crystalline Structure of Materials

Week No.6	Thermal Equilibrium Diagrams
Week No.7	Tthermal equilibrium diagrams / 7th week evaluation
Week No.8	Properties, Testing, and Inspection of Engineering Materials (Tension and Compression)
Week No.9	Properties, Testing, and Inspection of Engineering Materials (Bending and Torsion)
Week No.10	Properties, Testing, and Inspection of Engineering Materials (Impact, Hardness and Fatigue)
Week No.11	Non-Destructive Testing
Week No.12	Heat Treatment of Metals . / 12 th week evaluation
Week No.13	Heat Treatment of Metals
Week No.14	Corrosion: An Introduction
Week No.15	General Revision
Week No.16	Fina examination

5- Teaching and Learning Methods

- Lectures
- Tutorials
- Reports & sheets
- Laboratories
- Seminars

6-Teaching and Learning Methods for Students with Special Needs

- Lectures
- Tutorials
- Reports & sheets
- Laboratories
- Seminars

Engineering Requirements and Design Considerations in college Buildings and its Leading Passages

- The design of college buildings and pedestrian passages leading to it are sloppy to allow the transportation of the handicapped;
- Doors are wide enough to let wheel chairs pass through easily and conveniently.
- Lifts are provided for movement between floors.
- Doors are made from light weight materials to make it easy for the handicapped suffering from weakness in limb muscles or those handicapped using prosthetic limbs to deal with them with the least muscular effort.
- Class floors are made from non-slippery materials to prevent falls on the part of the handicapped.
- Sudden changes in the floor level are prevented.

Design Considerations of the Classes

- Class boards are placed at 60 cm high to allow wheeled chair users or those suffering from limited arm mobility use them.
- Enough spaces are left between seats and benches to prevent hindering the movement of wheeled chairs between them.
- Handicapped students sit among normal people in class to be able to interact with them. Nevertheless, in urgent cases according to the nature of the disability, the handicapped students sit in fixed suitable places whether at the front or the back of the class.
- Handicapped students sit close to the main exits of the class to be able to evacuate in case of

emergencies.

Academic Support:

- The general academic advisor appoints an academic supervisor for handicapped students.
- Continuous follow ups are made for handicapped students after each assessment to evaluate their academic level of achievement

7- Student Assessment

a-Procedures used	1-Written Examinations to assess The Intended Learning Outcomes.	
	2-Class Activities (Reports, Discussions, -----) to assess The Intellectual Skills.	
b- Schedule:	Assessment 1	7 th Week Assessment
	Assessment 2	12 th Week Assessment
	Assessment 3	Continuous Assessments
	Assessment 4	16 th Week Final Written Exam
c- Weighing of Assessment	7 th Week Evaluation	30 %
	12 th Week Evaluation	20 %
	Final-term Examination	40 %
	Oral Examination	00 %
	Practical Examination	00 %
	Semester Work	10 %
	Total	100%

8- List of References:

a- Course Notes	N/A
b- Required Books (Textbooks)	• W.D Callister “ Materials Science and Engineering - an Introduction” , 4th edition , Wiley, Latest Edition
c- Recommended Books	• 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
d- Periodicals, Web Sites, etc.	N/A

Course coordinator:

Program Manager: