



Philadelphia University
Faculty of Engineering
Department of Mechatronics Engineering

Second Semester, 2012/2013

Course Syllabus

Course Title: Mechanics of Engineering Materials	Course code: 0640235
Course Level: 2 nd Year	Course prerequisite(s): 0620211
Lecture Time: 11:10-12:00 Sun, Tues and Thu	Credit hours: 3
Office Hours: 12:00-14:00 Sun, Tues and Thu	

Academic Staff Specifics

Name	Rank	Office No.	E-mail Address
Dr. Mohammad Al-Shabi	Assistant Prof.	406	mshabi@philadelphia.edu.jo

Course module description:

The course includes the following:

- An introduction to mechanics of deformable bodies; concepts of stress and strain.
- Classification of material behavior, Stress-strain relations and generalized Hook's Law.
- Study the behavior of members under axial load, and torsion stress, and beams under bending, shear and combined stresses.
- Analyzing the stresses by Mohr's circle.
- Studying special types of deformation; i.e. thin wall cylinders, deflection of beams and buckling of columns.
- Studying the basics of material properties and material science.

Course module objectives:

At completing this module the student should be able to:

- Understand the basics of strength of material and design by calculating stresses and deformation under various loading condition.
- Be able to analyze the machine's mechanical components as first step to design them.
- Understand the basic concepts of material properties
- Understand the basic concepts of material science .

Course/ module components:

- **Books (title , author (s), publisher, year of publication):**
 - "Mechanics of Material" - Ferdinand P. Beer and E. Russell Johnston JR., 5th edition
 - "Manufacturing processes for engineering materials" - Serope Kalpakjian, 4th Edition, Printice Hall, 2003.

- **Support material (s) (vcs, acs, etc).**
- **Study guide (s) (if applicable)**
- **Homework and laboratory guide (s) if (applicable).**

Teaching methods:

Lectures, discussion groups, tutorials, problem solving, etc.

Learning outcomes:

- **Knowledge and understanding:** Understanding the analysis of the deformation under various type of loads. Understanding the materials behavior due to its structures.
- **Cognitive skills (thinking and analysis):** Analyzing the body deformation for different type of loads.
- **Communication skills (personal and academic).**
- **Practical and subject specific skills (Transferable Skills).**

Assessment instruments

- **Homework.** One long assignment will be given throughout the semester. This assignment is due to the last lecture before the Second exam. The assignments could be handled in groups. The assignment should be printed.
- **Presentation.** The student will be divided into groups. Each group will give a brief presentation that covers a topic from material science.
- **Quizzes.** Three 10-minute quizzes will be given to the students throughout the semester. These quizzes will cover material discussed during the previous lecture. These quizzes will be considered as bonus to the other categories if the conditions are satisfied.
- **Final examination:** 40 marks

Allocation of Marks	
Assessment Instruments	Mark
1 st examination	20%
2 nd examination	20%
Homework	10%
Presentation	10%
Final Examination:	40%
Total	100%

Documentation and academic honesty

- Documentation style (with illustrative examples)
- Protection by copyright
- Avoiding plagiarism.
- **Ethics and Disability Act:**
 - Students may consult with one another on solutions, but copying another student's code is strictly prohibited.
 - Students should write their own code. Using code found on books or internet is prohibited.
 - The Instructor follows general university “Academic Dishonesty/Cheating Policy”.

Course/module academic calendar

week	Basic and support material to be covered	Homework
(1)	Introduction	
(2)	Axial Load	
(3)	Torsion	
(4)	Pure Bending	Q1
(5)	Beams	
(6)	Shearing Stress	
(7)	Mohr's Circle	
(8)	Special Types of Deformation	Q2
(9)	Introduction to Materials Science & Engineering	HW
(10)	Atomic Structure and Interatomic Bonding The Structure of Crystalline Solids	
(11)	Imperfections in Solids	
(12)	Mechanical Properties	
(13)	Dislocations & Strengthening Mechanisms	Q3
(14)	Mechanical Failure	
(15)	Phase Diagrams	

Expected workload:

On average students need to spend 2 hours of study and preparation for each 50-minute lecture/tutorial.

Attendance policy:

Absence from lectures and/or tutorials shall not exceed 15%. Students who exceed the 15% limit without a medical or emergency excuse acceptable to and approved by the Dean of the relevant college/faculty shall not be allowed to take the final examination and shall receive a mark of zero for the course. If the excuse is approved by the Dean, the student shall be considered to have withdrawn from the course.

The student is responsible for all assignments on a weekly basis.

No make-up will be given for missed quizzes, tests or assignments, unless a case is made in advance with Instructor's approval.

Module references

Books

- “**Mechanical Engineering Design**” Joseph Edward Shigley 5th edition.
- “**Manufacturing processes and materials for engineers**”, Lawrence E., Printice Hall, 3rd edition.
- “**Materials for Engineering**”, by Van Vlack, Addison Wesley 1982.