University of Engineering and Technology Lahore, KSK campus
Department of Mechanical, Mechatronics and Manufacturing Engineering
B.SC. Mechanical Engineering course skeleton

Course: ME-231 (Mechanics of Materials-I)	Name of Instructor: Mr. Muhammad Farooq	Session 2011	Semester 3rd	Duration Sep,2012–Jan,2013
Credit hours:	**Part 1 (Theory)**		**Part 2 (Lab)**	
	3		**1**	

Books and references:
1. Mechanics of Materials by F.P.Beer & E.R.Johnstona ha
2. Mechanics of Engineering Materials by P.P.Benham & R.J.Crawford
3. Mechanics of Solids & Strength of Materials by F.V.Warnock.
4. Strength of Materials by William Nash.

Objectives: To comprehend the understanding of mechanics of materials methods that can be used in any industrial setup.

Course coaching method: Class Lectures and Lab sessions

Assessment method: Assignments, Quizzes, Vivas, Presentations, Group Discussions, Written examinations.

Week	Part 1 (Theory)	Part 2 (Lab work)
1	Introduction & Review of Mechanics, Stress Strain Diagram, Mechanical Properties of Materials	Lab introduction, work plan & layout.
2	Stress concept, types & explanation. Stresses in composite bars. Problem Sheet	To draw the load-extension curve of a metallic wire and hence to determine the modulus of elasticity of the material of the wire.
3	Design concentration, Factor of safety, Selection of appropriate F.O.S. Problem Sheet	
4	Strain concept, types & explanation. Young's modulus, Shear modulus,	To find the support reactions and central moment for a simply supported continuous beam with the different combination of loadings.
5	Poisson ratio, Volumetric strain & bulk modulus. Problem Sheet	
	First Quiz and Assignment-I	
6	Torsion, Assumption & Derivation of torsion formula. Solid & hollow shafts, Comparison b/w solid & hollow shafts. Problem Sheet	To investigate the relationship between shear stress and shear strain for rubber and to determine the modulus of rigidity of the material.
7	Compound shafts. Design of transmission shafts. Polar moment of inertia. Problem Sheet & Application	
8	Geometrical Properties of Area, Parallel axis theorem, Perpendicular axis theorem, Problem Sheet	To measure the Young's modulus by using Four Point Bending Test method with deflection of beam apparatus.
9	**Mid Term Examination (written)**	
10	Pure Bending, Bending stress, flexure formula for bending, Analysis of deformation, Section modulus, Problem Sheet & Applications.	To determine the modulus of rigidity of the given material of circular shaft.
11	Beams, Load, reaction, support—types, applications & explanation, Relation among load, shear & bending moment. Problems Applications.	To determine the central deflection of a simply supported beam loaded by a concentrated load at mid point and hence determine the modulus of elasticity of the material of the beam.
12	Shear force (S.F) & bending moment (B.M) diagrams. Problems & Applications.	
13	Deflection of beams, Deflection equation of elastic curve, Double integration method, Problem Sheet	To verify the laws of shearing force and bending moment on a beam.
	Second Quiz and Assignment-II	
14	Column. Type of failure of column. Critical load. Long columns by Euler's formula. Limitations of Euler's formula. Problems & Applications	To determine the central deflection of a fixed ended beam loaded at mid-span by Concentrated loads and to compare with theoretical value.
15	Energy Theorem, Strain Energy for Normal & Shear stress, Strain Energy in Torsion & bending. Applications & Problem Sheet.	Group Discussions. Industrial Applications case studies.
16	Case Studies, Subject Review	
17	**Final Examination (written)**	