Zarqa University

Faculty of Engineering
Department: Architecture engineering
Course title: construction mechanices

Prerequisite: Calculs2
Instructor: Eng.Eiman Al-rawashdeh
Lecture's time: 10-11
Semester: second
Office Hours:11-1 St,Tu,Th

Course description:

Introduction to the subject of static and considers basic understanding of the force vectors, resultant and regulation of a force; Determine the moment of a force about a point and axis; Determine the reaction of a rigid body; Analysis of trusses and frames; Drawing shear force and bending moment diagram a beam; Determine the centroid and moment of inertia of a composite area.
Introduction to mechanics of deformable bodies. Concepts of stress and strain. Mechanical properties of materials. Axially loaded members.

Aims of the course:

1. Basic understanding of the force vectors
2. Basic understanding resultant and regulation of a force
3. Ability to determine the moment of a force about a point and axis
4. Ability to determine the reaction of a rigid body
5. Structure analysis of trusses and frames
6. Drawing shear force and bending moment diagram a beam
7. Determine the centroid and moment of inertia
8. Ability to calculate stresses in member subjected to axial and transverse forces and to bending and torsional moments.
9. Ability to calculate stresses in member subjected transverse forces and torsional moments

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Intended Learning Outcomes (ILOs):

1) Ability to apply knowledge of mathematics, science, and engineering (a)
2) Ability to identify, formulate, and solve general engineering problems (e)

Course structures:

Week	C. Hrs	ILOs	Topics	Teaching Procedure	Assessment methods
1	6	1+2	**General Principles** Mechanics Fundamental Concepts Units of Measurement - Analysis supply engineering. **Force Vector** Scalars and vectors	Lecture and presentation (PDF)	Quiz

			Vector Operations Vector Addition of forces Addition of system of coplanar Forces Cartesian Vectors Addition Cartesian Vectors Position Vectors Force Vector Directed along line Dot product		
3	3	1+2	**Equilibrium of a Practical** Condition for Equilibrium of a Practical The Free Body Diagram Coplanar Force System Three – Dimensional Force System**Force System Resultant** Moment of a Force System Formulation Cross Product Moment of a Force Vector Formulation Principle of Moments Moment of a Force About a Specified Axis Moment of a Couple Simplification of a Force and Couple System Reduction of Simple Distributed Loading	Lecture and presentation (PDF)	quiz
4	3	1+2	**Force System Resultant** Moment of a Force System Formulation Cross Product Moment of a Force Vector Formulation Principle of Moments Moment of a Force About a Specified Axis Moment of a Couple Simplification of a Force and Couple System Reduction of Simple	Lecture and presentation (PDF)	quiz

			Distributed Loading		
5	3	1+2	**Equilibrium of Rigid Body** Equations of Rigid Body Equilibrium Free Body Diagrams Equations of Equilibrium Two and Three –Force Member **Equilibrium in Three – Dimensions** Free Body Diagram Equation of Equilibrium Constraints and Statical Determinacy	Lecture and presentation (PDF)	**Exam I**
6+7	6	1+2	**Equilibrium of Rigid Body** Equations of Rigid Body Equilibrium Free Body Diagrams Equations of Equilibrium Two and Three –Force Member **Equilibrium in Three – Dimensions** Free Body Diagram Equation of Equilibrium Constraints and Statical Determinacy	Lecture and presentation (PDF)	quiz
8+9	6	1+2	**Internal Forces** Internal Forces Developed in Structural Members Shear and Moment Equations and Diagrams Relation Between Distributed load, Shear and Moment Cables	Lecture and presentation (PDF)	

10+11	6	1+2	**Center of Gravity and Centroid** Center of Gravity of Mass and Centroid of a Body Composite Bodies	Lecture and presentation (PDF)	**Exam II**
12+13	6	2	**Moment of Inertia** Definition of Moment of Inertia for Areas Parallel Axis Theorem for the Area Radius of Gyration of Area Moment of Inertia for Composite Area	Lecture and presentation (PDF)	quizzes
14+15	6	2	**Stress** Introduction Equilibrium of a Deformable Body. Problem Solving Stress Average normal Stress in an Axially Loaded Bar Average Shear Stress	Lecture and presentation (PDF)	
16			Review Final Exam		

References:

Textbook: R. C. Hibbeler, Engineering Mechanics STATIC, 12th Edition in SI Units, Prenting Hall, Pearson Education, , 2010, Mechanics of Materials 9th Edition, Pearson Education, 2013

References and Resources:

1. Meriam, L. G, Engineering Mechanics Static, 4th edition, N.YORK: John Willy & sons, 1998
2. Englewood Cliffs (NJ), Statics and Strength, Prenting Hall, 1979
3. Loney S.L., Elements od Sstatics and Dynamics, New Delhi, S Chand company,1993
4. Mechanics of Materials, 2nd metric edition. McGraw-Hill 1992

Assessment Methods:

Methods	Grade	Date
First exam	20	13/4/2017
Second exam	20	11/5/2017
Homeworks and quizzes	10	
Final exam	50	Not specified date