



STATICS

Course code: 28261
Credits: 3
Course Type: Theoretical
Prerequisites: Mathematics 1, Physics 1
Course Length: 51 hours

Outlines:

Revision on scalar and vector quantities, Newton's laws, systems of units, force, moment of force, couple. Various force systems and their resultants, free body diagrams, equilibrium of rigid bodies and their equations of equilibrium and reactions determination, static indeterminacy and partial constraints.

1-Structures

Trusses (method of joints, method of sections), frames and machines.

2-Distributed forces

Centers of gravity, mass, volume of rigid bodies, composite volumes, areas and lines and their centers.

3-Beams

Equations of axial and shear forces and bending moment and their diagrams for the beams under concentrated and distributed loads.

4-Cables

Flexible cables under concentrated and distributed transverse loads. Parabolic cables, catenary cables.

5-Area moments of inertia

Definitions of rectangular and polar moments of area, radius of gyration, product of area. Transfer of axes, rotation of axes, principal axes, Mohr's circle.



6-Friction

Dry friction laws, friction angle, friction in wedges, screws, bearings, dry disk clutches and belts. Rolling resistance.

7-Virtul work

Method of virtual work and its application in machines. Method of potential energy.

References

- 1- Merim. J. L. "Engineering mechanics-STATICS" John WILEY
- 2-Shames. I. H "Engineering Mechanics (STATICS)"