**Topics - Strength of Materials (part I and II)**

1. Internal actions and stresses for straight bars subject axial traction, simple bending and torsion (circular and ring-shaped cross-sections). Displacements of straight bars subject to axial force (traction), simple bending and rotation of straight bars subject to free torsion (circular and ring-shaped cross-sections). Verification, design and bearing capacity for bars subject to axial traction, simple bending and torsion (circular and ring-shaped cross-sections).
2. Verification of strength conditions for straight bars, with constant cross-section, subject to compound actions: skew bending, skew bending with axial force, eccentric compression (including the case of materials with weak tensile strength).
3. Behavior of bent beams beyond the limit of elasticity: formation of the plastic hinge and structural consequences of its occurrence. Failure mechanism for static determined and undetermined straight beams.
4. Definition of buckling for straight bars axially loaded. Determination of the critical force for the hinged-simply supported bar axially compressed (Euler’s formula).

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