

UNIVERSITATEA TEHNICĂ “GHEORGHE ASACHI” DIN IAȘI

Facultatea de Construcții și Instalații

Departamentul de Mecanica Structurilor

Concurs pentru ocuparea postului de șef de lucrări poz. 18 din Statul de funcții

Disciplinele postului: Strength of Materials 1 / Rezistența materialelor 1

Rezistența materialelor 2

Teoria Elasticității și Plasticității

TEMATICA DE CONCURS

pentru postul de șef de lucrări (perioada nedeterminată)

PROBA: PRELEGERE DIN ARIA TEMATICĂ A POSTULUI

Tematica pentru disciplina: Strength of Materials 1

1. Introduction. Classification and Idealized Representation of Structural Elements - Strength of Materials Objectives. Classification of Structural Elements. Idealized Representation of Structural Elements. Reference Systems. Supports.

2. Loads. Equilibrium of Structural Elements - Classification of Loads. Equilibrium Equations Expressed in Vector and Scalar Forms.

3. Internal Forces and Moments - Internal Resistant Wrench. Diagrams of Internal Forces and Moments. Differential Relations between Loads and Internal Forces and Moments. States of Loading.

4. Stresses. Strains. Displacements - Total Stress. Normal Stress. Shear Stress. Stress Tensor. Equivalence Relations. Axial Strains. Shear Strains. Strain Tensor. Displacements.

5. Strength of Materials Background - Hypotheses. Characteristic Diagram of the Specimen. Characteristic Diagram of the Material. Mechanical Properties of Materials. Hooke's Law. Work and Strain Energy. Design Methods in Strength of Materials.

6. Plane Stress. Plane Strain - Stresses on Inclined Planes. Principal Stresses. Extreme Shear Stresses. Mohr's Circle for Plane Stress. Isostatics. Strains along Different Directions. Principal Strains. Mohr's Circle for Plane Strain. Hooke's Law for Plane Stress and Strain.

7. Concentric Tension or Compression - General Considerations. Normal Stresses Formula. Strains and Displacements. Stress Concentration. Own Weight Effect. Member of Constant Strength. Stepped and Tapered Members. Statically Indeterminate Structural Elements and Systems. Strain Energy. Design Aspects.

8. Pure Shear. Joints. - General Considerations. Shear Stress Formula. Strains and Displacements. Strain Energy. Design of Joints (by using rivets, bolts, welding).

9. Free Torsion - General Considerations. Shear Stress Formula (for Circular Sections, Rectangular Sections, Thin – Walled Open Sections, Thin – Walled Closed Sections). Strains. Displacements. Strain Energy. Design Aspects.

10. Pure Bending - General Considerations. Normal Stress Formula (Navier's Formula). Extreme Normal Stresses. Beam of Constant Strength. Arm of the Internal Resisting Couple. Strains. Strain Energy. Design Aspects.

11. Combined Bending and Shear - General Considerations. Shear Stress Formula (Juravski's Formula). Plane Stress at a Point of a Beam Subjected to Combined Bending and Shear. Isostatics. Longitudinal Shear Force. Shear Center. Strain Energy. Design Aspects.

Bibliografie

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2. Ibănescu M., Toma I.O., (2013), *Strength of Materials – Advanced*, Ed. Societății Academice „Matei Teiu Botez”, 978-606-972-046-3.
3. Timoshenko S.P., (2010), *History of Strength of Materials*, Dover Publications Inc., ISBN: 0-486-61187-6.
4. Murărașu V., (2010), *Rezistența materialelor, vol. 1*, Ed. Societății Academice „Matei-Teiu Botez”, Iași, ISBN: 978-973-8955-90-5.
5. Precupanu D., Ibănescu Mihaela, *Strength of materials - theoretical synthesis and engineering applications*, Ed. Ștef, Iași, 2006.
6. Ioana Missir Vlad, *Strength of materials – selected problems*, Tehnopress Iași, 2004.
7. Vlad Missir I., Boazu R., (2001), *Rezistența materialelor (Résistance de matériaux)*, Ed. „Gh. Asachi” Iași.
8. Precupanu D., (2000), *Fundamente de Rezistența construcțiilor*, Ed. Corson, Iași.
9. Ungureanu N., Vrabie M., (1999), *Rezistența materialelor, vol. 1*, Ed. „Gh. Asachi”, Iași.
10. Gere M.J., Timoshenko P.St., *Mechanics of Materials*, Stanley Thornes (Publishers) Ltd, 1999.
11. Diaconu M., (1998), *Rezistența materialelor * Aide-mémoire*, Ed. CERMI, Iași.
12. Vlad I., Ibănescu M., (1998), *Strength of Materials*, Ed. CERMI Iași.

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