

STATICS 1 – PROPOSED MAIN SUBJECTS FOR THEORY:

1. Material schemes and models
2. Structural schemes and models
3. Main hypothesis in linear elastic structural analysis
4. Differential relations between loads and internal forces
5. Gerber beams (general discussion, hinge positioning)
6. Planar frames
7. Use of symmetry and anti-symmetry by planar frames
8. Arches (characteristics and classification)
9. Analytical solving of planar three-hinged arches
10. Graphical solving of planar three-hinged arches
11. Coincidental shapes in case of horizontally or radially uniform distributed load by planar three-hinged arches
12. Planar trusses (general discussion, assumptions, classification)
13. Methods for solving planar trusses
14. Matrix formulation of the node isolation method
15. Virtual mechanical work (general discussion)
16. The use of virtual mechanical work for the calculation of reactions and inner forces in case of a simple supported beam
17. Influence diagrams (general discussion, case of a simple supported beam solved analytically and through virtual displacements)
18. Influence diagrams in case of planar three-hinged arches
19. Influence diagrams in case of common plane trusses
20. Influence diagrams in case of composed plane trusses
21. Calculation of the maximum shear force and bending moment in a given cross-section of a simple supported beam considering fixed or moving loads
22. Determining the most highest possible value of the bending moment (" $M_{max, max}$ ") and the position of the dangerous cross-section in case of a simple supported beam subjected to mobile loads
23. Betti's theorem and consequences (reciprocity relations)
24. Calculation of point displacements in case of planar structures (the Mohr-Maxwell formulation, Vereshchagin's rule)