



**PROPOSED SUBJECTS FOR
BACHELOR EXAM 2019**
for Study Program: *Mechanical Engineering in English*

1. Center of gravity. Definition, calculation procedure. The centroid of the composed surfaces. Examples.
2. Trusses. Analytical methods of calculation. Calculation Example.
3. Kinematics of the material point. The movement on the cylindrical helix, on the cycloid and on the involute.
4. Dynamical systems with 1 DDOF (dynamical degree of freedom). Operating regimes (free and forced). Transmissibility (vibro-insulation).
5. Dynamical systems with n DDOF (dynamical degrees of freedom). Free regime and forced regime.
6. Longitudinal vibrations of the continuous structures (free and forced).
7. Fundamental modes of propagation of the cracks in fracture mechanics. Comments.
8. Calculation of the safety coefficients in case of the simple variable loadings.
9. Calculation of the safety coefficients in case of the compound variable loadings.
10. The test program for determining of the operating strength (reliability).
11. Theoretical cycle of the internal combustion engines.
12. Heat transfer by conduction through the planar walls.
13. Heat global transfer between the fluids separated by planar walls.





14. Demonstrate the calculus relations used for the elastic characteristics $(E_1, E_2, G_{12}, \nu_{12})$ in case of a layer made of composite material unidirectionally reinforced with fibers.
15. Macro-mechanics and rigidity of the thin plate element made of laminated composite material. Constitutive equation of the plate element made of laminated composite material.
16. Cylindrical bending of the thin plates made of laminated composite material. Hypotheses. Stresses, strains and displacements.

References:

1. Balcu, I. - Vibrații ale sistemelor mecanice, Editura LUX LIBRIS, Brașov, 1996.
2. Bolfa Traian – Elemente avansate de rezistența materialelor, suport electronic, Editura Lux Libris, 2013
3. Bolfa Traian – Rezistența Materialelor, Editura Lux Libris, 2011.
4. Cerbu Camelia, Curtu Ioan, Mecanica și rezistența materialelor compozite (capitolele 3, 5, 7), Editura Universității Transilvania din Brașov, ISBN 978-973-598-614-8, 2009.
5. Costiuc Liviu - Termotehnica și mașini termice. Editura Universității Transilvania din Brașov, 2013.
6. Roșca I.C. – Vibrații mecanice. Concepte și aplicații. Editura Universității Transilvania din Brașov, 2015(CD)
7. Valcovici, V., Balan, St., Voinea R., Mecanica teoretică, Ed. Tehnica, 1963.
8. Vlase, S., Mecanica. Ed. Infomarket, Statica, 2007, Cinematica, 2005, Dinamica, 2004.
9. Voinea, R., s.a., Mecanica, Ed. Didactica și Ped., 1983.

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