Final exam questions

Subject group name: **Continuum Mechanics**

Neptun code: ZVEGEMMNWCM

Credit points: 5

Subject in this subject group:

Continuum Mechanics (BMEGEMMNWCM)

Program: Mechanical Engineering Modelling, MSc (2N-MW0)

Specialization: Solid Mechanics

Responsible person: Dr. Attila Kossa, kossa@mm.bme.hu
Department of Applied Mechanics
Faculty of Mechanical Engineering

You can check the current subject forms at the Educational Portal of the Faculty of Mechanical Engineering.

https://oktatas.gpk.bme.hu/

Always check the for updates at edu.gpk.bme.hu before preparing for the exam, especially if the subject group contains at least one subject from your final semester!

Valid from 01 September 2024

Dr. Attila Kossa
associate professor

Continuum Mechanics (BMEGEMMNWCM)

1. General description of motion. Interpretation of configurations. Derivation of the deformation gradient.
2. Stretch ratio. Standard deformation and strain tensors.
3. Description of area and volume changes.
4. Description of finite rotations.
5. Polar decomposition of the deformation gradient.
6. Derivation and description of the Hencky strain tensor.
7. Velocity and acceleration fields. Material time derivative.
8. Velocity gradient tensor. Rate of deformation and spin (vorticity) tensors.
9. Cauchy, first and second Piola-Kirchhoff stresses.
10. Objectivity. Objective stress rates.
11. Conservation of mass. Continuity equation.
12. Balance of linear and angular momentum. Cauchy's equations of motion.
13. Balance of mechanical energy.
14. Different forms of Hooke’s law.
15. Basic concept and fundamental equations of hyperelastic material models.
16. Kinematic description of standard homogeneous loading modes.