

Tárgytematika / Course Description

Mechanics for Civil Engineering

EKNM_SETA035

Tárgyfelelős neve /

Teacher's name: dr. Movahedi Rad Majid

Félév / Semester: 2022/23/1

Beszámolási forma /

Assesment: Vizsga

Tárgy heti óraszám /

Teaching hours(week): 3/0/0

Tárgy féléves óraszám /

Teaching hours(sem.): 0/0/0

OKTATÁS CÉLJA / AIM OF THE COURSE

Mechanics for civil engineering is a branch of mechanics that deals with the analysis of the kinematics and the mechanical behavior of materials modeled as a continuous mass rather than as discrete particles. Materials, such as solids, liquids and gases, are composed of molecules separated by "empty" space. On a microscopic scale, materials have cracks and discontinuities. However, certain physical phenomena can be modeled assuming the materials exist as a continuum, meaning the matter in the body is continuously distributed and fills the entire region of space it occupies.

TANTÁRGY TARTALMA / DESCRIPTION

SCHEDULE

1. Basic variables, equations of motions, gradient tensor.
2. Strain tensors. Principal strains.
3. Stress tensors. Stress-strain pairs.
4. Material model, modeling of elastic behavior.
5. Plastic- and time-dependent material behavior.
6. The basic equations of mechanics, strong- and weak forms.
7. Test I.

8. Work theorems, interchangeability theorems.
 9. Energy theorems.
 10. Connection between the boundary value- and variational problems. Basic solution methods of mechanics.
 11. Stress functions.
 12. Different mechanical models of beams.
 13. Test II.
 14. Repetition Test (Repetition of either Test I. or Test II).
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SZÁMONKÉRÉSI ÉS ÉRTÉKELÉSI RENDSZERE / ASSESMENT'S METHOD

Task

Tests score between 0 and 80 points, home work score between 0 and 20 points.

Final exam: written exam score between 0 and 100 points, oral exam score between 0 and 40 points.

Minimum mid semester requirement to participate at the final exam

The semester score must be at least 80 out of 180. Semester score are calculated by the following formula:

Semester score= sum of two tests + home work

Final Mark:

The final mark based on the total score. Total score calculated by the following formula:

Total score= sum of two tests + homework + written exam + oral exam

- 1 for 80-99 points (fail)
- 2 for 100-140 points
- 3 for 141-180 points
- 4 for 181-220 points
- 5 for 221-320 points

KÖTELEZŐ IRODALOM / OBLIGATORY MATERIAL

Fung, Y. C. – Pin Tong: Classical and Computational Solid Mechanics, World Scientific, 2007.
Ibrahimbegovic, A. : Nonlinear Solid Mechanics, Springer, 2009.
Holzapfel: Nonlinear solid mechanics. Wiley, 2001.