TANTÁRGYI ADATLAP
SUBJECT DATASHEET

BMEEOTMAMM1

I. COURSE DESCRIPTION

1. SUBJECT DATA

Course name

Course code BMEEOTMAMM1

Course type
Module with associa-ted contact hours

Kurzustípusok és óraszámok

Type	*Lessons*
Lecture	2
Practice	0
Laboratory	0

Type of assessment
Midterm grade

Number of credits
3

Course leader

Name	*Position*	*Email adress*
Dr. Kovács Flórián	Associate professor	kovacs.florian@emk.bme.hu

Organizational unit for the subject
External department

Subject website
https://edu.gtk.bme.hu

Language of teaching
magyar - HU

Curriculum role of the subject, recommended semester
Programme: **Műszaki menedzser alapszak 2015/16/1 félévtől**
Subject Role: **Kötelező**
Recommended semester: **4**

Programme: **Műszaki menedzser alapszak 2017/18/1 félévtől**
Subject Role: **Kötelező**
Recommended semester: **4**

Programme: **Műszaki menedzser alapszak 2010**
Subject Role: **Kötelező**
Recommended semester: **4**

Pre-requisites

strong	Nincs
weak	Nincs
paralell	Nincs
exclusive	Nincs

1.13 A tantárgyleírás érvényessége / Validity of the Subject Description
5 February 2020
5 February 2020

2. OBJECTIVES AND LEARNING OUTCOMES

Objectives

The aim of the course is to introduce simple mechanical problems that occur in technical life, as well as present the concepts used there. In more details: in the field of statics of rigid bodies, it deals with operations with con-centrated and distributed forces, balancing, calculation of external and internal reactions, calculation of stresses and stress diagrams; in the field of strength theory, introduces the concept of loads, stresses, deformations, displacements and the relationship between them, with which simple problem (structural verification, dimen-sioning) can be performed; presents the concept of a material particle, the description of its motion (kinematics) and the relationship between the forces causing the motion and the motion itself (kinetics), as well as introduces the basic concepts of free and damped vibration (free vibration, excited vibration, resonance factor, resonance).

Learning outcomes

Knowledge

1. knows the concepts of speed, acceleration, angular velocity, angular acceleration, the relati-onships between them,
2. is familiar with Newton's laws of motion, the main theorems derived from them,
3. is aware of the concepts of impulse, rotation, kinetic energy in the case of a material particle and a rigid body,
4. is familiar with the methods of determining the results of force systems,
5. knows the constraints that occur in static models, the type of reactions that occur in them,
6. knows the concept of static determinacy,
7. is familiar with the stresses of bars and beams, their calculation methods and their meaning,
8. is familiar with the concepts of load, stress, deformation and displacement,
9. knows the concept of beam and beam element, 1
10. is familiar with the geometrical quantities characteristic of the cross-section of the bar and, in simple cases, the method of their calculation, 1
11. is familiar with the linearly elastic and the linearly elastic-perfectly plastic material model, 1
12. is familiar with the internal forces in the cross-sections of bars, the stresses resulting from them and the formulas used for their calculation, 1
13. is familiar with the deformations of the cross-sections of bars, their relation to the stresses and strains of certain points, 1
14. is familiar with the stresses acting on the differential volume element; knows the concept of stress state, 1
15. is aware of the direction dependence of stresses, the concepts of principal stresses and directi-ons, 1
16. is familiar with the deformations of the differential volume element; knows the concept of the state of strain, 1
17. is aware of the directionality of deformations, the concepts of principal strains and directions, 1
18. is familiar with the basic concepts of mechanical vibration of single-freedom systems (damped, undamped vibration; free, excited vibration; excitation with harmonic force, resonance).

Ability

1. is able to characterize the motion of material particles and rigid bodies, to describe the relati-onships between variables,
2. determines active and passive forces acting on the bodies of structures consisting of one or more rigid bodies,
3. solves elementary balancing problems,
4. writes the equilibrium system of equations of engineering structures,
5. is able to write and solve the equilibrium equation for calculating each reaction of simple beams,
6. is able to characterize the internal force functions of planar and spatial structures in equilibrium, calculates the values characteristic of each section,
7. draws the internal force diagrams of planar frame structures,
8. calculates the stresses and deformations arising in a bar in tension/compression, performs the steps of dimensioning and verification,
9. calculates stresses and deformations resulting from pure shear, performs the steps of dimensio-ning and verification, 1
10. calculates the stresses and deformations resulting from twisting in the case of simple cross secti-ons, 1
11. calculates stresses and deformations resulting from straight bending, performs the steps of di-mensioning and verification, 1
12. calculates the stresses resulting from transverse shear of beams, 1
13. calculate the stresses of an eccentrically compressed cross section for a linearly elastic material.

Attitude

1. aims at an accurate and error-free problem solving,
2. develops his tasks in such a way that it can be followed or even continued by anyone,
3. aims at a precise wording.

Autonomy and responsibility

1. is open to critical remarks,
2. is prepared to recognize and correct errors.

Methodology of teaching

Lectures aided by homework and practice problems to be solved independently or in groups.

Materials supporting learning

- Gáspár-Tarnai: Statika (Műegyetemi Kiadó, 2002)
- Kaliszky S., Kurutzné Kovács M., Szilágyi Gy.: Szilárdságtan, 2000;
- Beer, Johnston: Mechanics of materials;
- Budynas: Advanced Strength and Applied Stress Analysis;
- Popov: Mechanics of materials;
- Gere – Goodno: Mechanics of Materials. Cengage Learning, 2015
- Németh-Hincz-Kovács: Munkafüzet (https://edu.epito.bme.hu/course/view.php?id=595)

II. SUBJECT REQUIREMENTS

TESTING AND ASSESSMENT OF LEARNING PERFORMANCE

General Rules

A 2.2. pontban megfogalmazott tanulási eredmények értékelése két évközi írásbeli teljesítménymérés alapján történik. Az egyes zárthelyi dolgozatok időtartama 45 perc. Az 40%-nál gyengébb zárthelyi dolgozat sikertelen. Az értékelések pontos időpontját a tárgy honlapján elérhető "Részletes féléves ütemterv" tartalmazza

Performance evaluation methods

Teljesítményértékelés neve (típus) jele Értékelt tanulási eredmények 1. zárthelyi dolgozat (összegző értékelés) ZH1 A.1-A.8; B.1-B.7; C.1-C.3; D.1-D.2 2. zárthelyi dolgozat (összegző értékelés) ZH2 A.9-A.18; B.8-B.13; C.1-C.3;D.1-D.2

Proportion of performance evaluations performed during the diligence period in the rating

- **ZH1**: 50%
- **ZH2**: 50%
- : 100%

Proportion of examination elements in the rating

- :

The condition for obtaining the signature, validity of the signature

Grading

Excellent	
Very good	> 80
Good	70–80
Satisfactory	60–70
Pass	50-60
Fail	< 50

Correction and retake

Valamennyi zárthelyi dolgozat egyszer javítható vagy pótolható a félév elején kijelölt időpontban. A pótzárthelyire a tárgy moodle oldalán keresztül jelentkezni kell A zárthelyin és javításon vagy pótláson elért eredmények közül a jobb eredményt vesszük figyelembe. Amennyiben a tárgyból a TVSz 122§(8) utolsó mondata szerinti pótlási lehetőséget kell biztosítani, úgy azt egy, a pótlási időszakban tartott, összegző típusú pótzárthelyi formájában teszi. Ezen a díjköteles pótláson csak azok vehetnek részt, akiknek addigi eredményük elégtelen és egyik zárthelyin legalább 40%-os eredményt értek el. E pótlás eredménye szolgál a féléves eredmény alapjául.

Study work required to complete the course

28

28

34

90

Approval and validity of subject requirements

III. COURSE CURRICULUM

THEMATIC UNITS AND FURTHER DETAILS

Topics discussed during the semester

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1 -

Lecturers participating in teaching

Approval and validity of subject requirements