Basics of Statics and Dynamics - BMEEOTMAT41 - 2024/25/2

I. Tantárgyleírás

1. Alapadatok

1.1 Tantárgy neve

Basics of Statics and Dynamics

1.2 Azonosító (tantárgykód)

BMEEOTMAT41

1.3 Tantárgy jellege

Kontaktórás tanegység

1.4 Óraszámok

Típus	Óraszám / (nap)
Gyakorlat	5

1.5 Tanulmányi teljesítményértékelés (minőségi értékelés) típusa

Vizsga

1.6 Kreditszám

6

1.7 Tárgyfelelős

név	Dr. Hincz Krisztián
beosztás	Egyetemi docens
email	hincz.krisztian@emk.bme.hu

1.8 Tantárgyat gondozó oktatási szervezeti egység

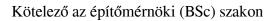Tartószerkezetek Mechanikája Tanszék

1.9 A tantárgy weblapja

https://epito.bme.hu/BMEEOTMAT41
https://edu.epito.bme.hu/course/view.php?id=451

1.10 Az oktatás nyelve

magyar és angol

1.11 Tantárgy típusa

Kötelező az építőmérnöki (BSc) szakon

1.12 Előkövetelmények

1.13 Tantárgyleírás érvényessége

2022. szeptember 1.

2. Célkitűzések és tanulási eredmények

2.1 Célkitűzések

The aim of the subject is to introduce the fundamental problems of rigid body mechanics, kinematic and kinetic analysis of planar motions of material points and rigid bodies, the procedure of statical analysis, the method for the calculation of reactions and internal forces, the procedure to determine internal force diagrams in the case of statically determinate simple and compound structures, the classification of structures and problems with respect to statical determinacy.

2.2 Tanulási eredmények

A tantárgy sikeres teljesítése utána a hallgató

A. Tudás

1. knows the concepts of velocity, acceleration, angular velocity, angular acceleration, and the relationships between them,
2. knows Newton's laws of motion and the major theorems based upon them,
3. clearly understands the concepts of linear momentum, angular momentum, kinetic energy in the cases of material points and rigid bodies,
4. knows the methods to determine the resultant of force systems,
5. knows the constraints used in statical models and the associated reaction types,
6. knows the concepts of statical determinacy, indeterminacy, and overdeterminacy,
7. knows the internal forces in bars and beams, their physical meaning and calculation methods,

B. Képesség

1. is able to characterize the motion of material points and rigid bodies, to formulate the relationships between the variables,
2. marks the active and passive forces acting on the bodies of structures consisting of a single or multiple rigid bodies,
3. solves the elementary equilibrium problems,
4. formulates the equilibrium equation system for engineering structures,
5. formulates and solves the equilibrium equations for the calculation of each reaction force of simple structures,
6. characterizes each section of internal force diagrams of planar and spatial strucures in equilibrium, and calculates all characteristic values,
7. routinely draws the internal force diagrams of planar structures with straight axis lines,
8. performs the calculation of reactions and internal forces of spatial structures,

C. Attitűd

1. aims at accurate and flawless problem solving,

2. elaborates the solution such that it is clear to understand or possibly to continue,
3. aims at precise and clear use of language,

D. Önállóság és felelősség

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

2.3 Oktatási módszertan

Lectures and calculation practices based on the electronically distributed workbook, solving home works and practice problems in individual or team work.

2.4 Részletes tárgyprogram

Week	Topics of lectures and/or exercise classes
1.	Basic concepts of mechanics, kinematics of material points
2.	Kinetics of material points, Newton's laws
3.	Kinematics and kinetics of rigid bodies
4.	Distributed forces, mid-term summary
5.	Reactions of simple structures
6.	Reactions of compound structures
7.	Trusses
8.	Statical determinacy, mid-term summary
9.	Internal forces of simple and compound structures
10.	Internal force diagrams of simple structures
11.	Internal force diagrams of compound structures
12.	Internal force diagrams of structures with branching axis lines
13.	Spatial internal forces, mid-term summary
14.	Summary, repetition

A félév közbeni munkaszüneti napok miatt a program csak tájékoztató jellegű, a pontos időpontokat a tárgy honlapján elérhető "Részletes féléves ütemterv" tartalmazza.

2.5 Tanulástámogató anyagok

Books: Gáspár-Tarnai: Statika (Műegyetemi Kiadó, 2002)
Online materials: Németh-Hincz-Kovács: Workbook (https://edu.epito.bme.hu/course/view.php?id=595)

2.6 Egyéb tudnivalók

- Students attending checks must not communicate with others during the check without explicit permission, and must not hold any electronic or other communication device switched on.
- Students who have obtained a valid signature and have registered for a course other than examination course cannot lose their signature and eligibility for exam, but the final results are to be computed based

on the new test results.

2.7 Konzultációs lehetőségek

The instructors are available for consultation during their office hours, as advertised on the department website. Special appointments can be requested via e-mail: hincz.krisztian@emk.bme.hu.

Jelen TAD az alábbi félévre érvényes:

II. Tárgykövetelmények

3. A tanulmányi teljesítmény ellenőrzése és értékelése

3.1 Általános szabályok

- Evaluation of learning outcomes described in Section 2.2. is based on six individual assignments, two mid-term tests, and an exam in the examination period.
- Individual assignments must be prepared and uploaded to the moodle system in the periods given in the detailed semester schedule.
- There are 90 minutes for the preparation and the submission of each mid-term test.
- The duration of the preparation part of the exam is 105 minutes.
- An individual assignment is valid if its score reaches 80%.
- A mid-term test is valid (counted in the final grading) if its score reaches 50%.

3.2 Teljesítményértékelési módszerek

Evaluation form	Abbreviation	Assessed learning outcomes
Individual assignments (diagnostic assessment)	IA	A.1-A.4; B.1-B.3; C.1-C.3
1st mid-term test (summarizing assessment)	ZH1	A.4-A.6; B.2-B.5; C.1-C.3
2nd mid-term test (summarizing assessment)	ZH2	A.7; B.8; C.1-C.3
Oral exam (summarizing check)	V	A.1-A.7; B.1-B.8; C.1-C.3; D.1-D.2

A szorgalmi időszakban tartott értékelések pontos idejét, a házi feladatok ki- és beadási határidejét a "Részletes féléves ütemterv" tartalmazza, mely elérhető a tárgy honlapján.

3.3 Teljesítményértékelések részaránya a minősítésben

Abbreviation	Score
ZH1	20%
ZH2	20%
V	60%
Sum	**100%**

3.4 Az aláírás megszerzésének feltétele, az aláírás érvényessége

A student is to obtain a signature and has eligibility for the exam
-if at least two-thirds of the individual assignments are valid,
-if all two mid-term tests are valid and
-the average of the three best mid-term tests reaches or exceeds 50%.

3.5 Érdemjegy megállapítása

- The exam with a result below 50% is regarded unsuccessful, the exam mark is "Failed".
- In the case of a successful written exam, the final result is computed by the weighted average A of the exam, and the mid-term tests, as in section 3.3.
- The final mark depends on the A value as follows:

Grade	Points (A)
excellent (5)	85%≤A
good (4)	75%≤A<85%
satisfactory (3)	65%≤A<75%
passed (2)	50%≤A<65%
failed (1)	A<50%

3.6 Javítás és pótlás

- There is no retake for the individual assignments
- There is one retake of each mid-term test.
- There is no second retake in the subject.
- Students failing the requirement on the number of valid individual assignments but passing at least half of the requirement (i.e., at least one-third of IAs valid, or at least two-thirds of IAs with 40% or more) may write a summarizing assessment from the topics of IAs. The assessment with at least 50% result substitutes the requirement on the number of IAs.

3.7 A tantárgy elvégzéséhez szükséges tanulmányi munka

Activity	Hours/semester
contact lessons	35×2=70
preparation for lessons during the semester	35×1=35
preparation for the checks	6×5=30
study of the assigned written sources	9
preparation for the exam	36
Sum	**180**

3.8 A tárgykövetelmények érvényessége

2023. szeptember 1.

Jelen TAD az alábbi félévre érvényes: