SUBJECT SPECIFICATION

1. BASIC DATA

1.1. Title

BASICS OF STATICS AND DYNAMICS

1.2. Code

BMEEOTMAT41

1.3. Type

contact lesson unit

1.4. Contact hours

- seminars/exercise classes: 5 lesson/week

1.5. Evaluation

exam mark

1.6. Credits

6

1.7. Coordinator

Dr. Hincz Krisztián, associate professor (@: hincz.krisztian@epito.bme.hu)

1.8. Department

Department of Structural Mechanics (http://www.epito.bme.hu/me)

1.9. Website

http://www.epito.bme.hu/BMEEOTMAT41

1.10. Language of instruction

Hungarian and English

1.11. Curriculum requirements

- compulsory in the BSc Civil Engineering course

1.12. Prerequisites

- none

1.13. Effective date

from 1 September 2017.

2. OBJECTIVES AND LEARNING OUTCOMES

2.1. Objectives

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. Learning outcomes

Upon successful completion of this subject, the student:

A. Knowledge

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. Skills

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. Attitudes

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. Autonomy and responsibility

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

2.3. Methods

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

2.4. Course outline

week	Practice topics
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

The above programme is tentative and subject to changes due to calendar variations and other reasons specific to the actual semester. Consult the effective detailed course schedule of the course on the subject website.

2.5. Study materials

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

2.6. Other information

1. 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.
2. 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. Consultation

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@epito.bme.hu.

SUBJECT REQUIREMENTS

3. ASSESSMENT AND EVALUATION OF THE LEARNING OUTCOMES

3.1. General rules

- Evaluation of learning outcomes described in Section 2.2. is based on three mid-term written checks and a written check in the examination period.
- The duration of each mid-term test is 90 minutes, the duration of the written exam is 105 minutes.
- Mid-term tests below 40% are regarded unsuccessful.
- The dates of the checks can be found in the "Detailed semester schedule" on the website of the subject.

3.2. Assessment methods

Evaluation form (type)	abbrev.	assessed learning outcomes (2.2)
1st mid-term test (summarizing check)	**ZH1**	A 1-4, B 1-3, C 1-3, D 1-2
2nd mid-term test (summarizing check)	**ZH2**	A 4-6, B 2-5, B 8, C 1-3, D 1-2
3rd mid-term test (summarizing check)	**ZH3**	A 4-7, B 5-7, C 1-3, D 1-2
Written exam (summarizing check)	**V**	A 1-7, B 1-8, C 1-3, D 1-2

Dates and deadlines of evaluations can be found in the „Detailed course schedule” on the subject’s website.

3.3. Evaluation system

Evaluation	score
ZH1 (1st mid-term test)	16,7%
ZH2 (2nd mid-term test)	16,6%
ZH3 (3rd mid-term test)	16,7%
sum in the midterm	50%
V (Written exam)	50%
Sum	100%

3.4. Requirement and validity of signature

- A student is to obtain signature and have eligibility for the exam, if all mid-term tests are successful (after retakes if any), and the average of the tests reaches or exceeds 50%.
- A signature obtained previously will remain valid at a re-registering for the subject, but the new results are to be considered nevertheless.

3.5. Grading system

- Written exam 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 mid-term tests and the written exam as in section 3.3.:

Average	grade
80%≤A	5 (Excellent)
70%≤A<80%	4 (Good)
60%≤A<70%	3 (Satisfactory)
50%≤A<60%	2 (Passed)
A<50%	1 (Failed)

3.6. Retake and repeat

- Each mid-term test can be retaken once at dates announced at the beginning of the semester.
- In the case of each test, the better one of the results of ordinary test and its retake is considered.
- At the end of the semester a second retake of one of the tests is available to the students, if only one of the tests has no successful result at that time (i.e. two test are successful after the first retakes).
- The second retake is an overall one covering all topics of the subject.
- The result of the second retake replaces that of the remaining unsuccessful test.

3.7. Estimated workload

activity	hours/semester
contact lessons	**35x2=70**
preparation for lessons during the semester + home works	**35x1=35**
preparation for the checks	**3x10=30**
study of the assigned written sources	**9**
preparation for the exam	**36**
in total	**180**

3.8. Effective date

from 1 Februar 2018.