Óbuda University **Donát Bánki Faculty of Mechanical and Safety Engineering**	**Institute of Machine Design and Safety Engineering**

Name of the subject: Mechanics I., BGBMN1ENND   **Credit*:* 4**

English language course 2016/2017. winter semester

Mechatronics BSc				
Subject leader:	Dr. Árpád CZIFRA		Lecturer:	Dr. Árpád CZIFRA
Prerequsites:	–			
Weekly hours: 3	Lecture: 2	Group seminar: 2	Lab: 0	Consultation:
Requirements (s,v,f):	v- exam			

Course description:

This course provides a basic introduction to mechanics, especially to static; to develop confidence and competence in solving statics problems

Shedule:

Week	Topic
1.	Vector- and matrix algebra.
2.	Introduction to static.
3.	Definition of force. Force systems: Reduction of force systems. Force-couple systems. Classification of force systems.
4.	Computation of centroid: Definition of the first moment and the centroid. Determination of the centroid of bodies, areas and line segments. Resultant of parallel force systems.
5.	Planar force systems: Conditions of the equilibrium of two and three forces. Equations of equilibrium.
6.	Equilibrium of beams and system of beams. Computation of reactions. Statically determinate and indeterminate structures.
7.	Trusses I: External and internal forces. Method of joints and method of section
8.	Trusses II: Structures with three pins. Separation of structures. Principle of superposition. Combined structures.
9.	Stress resultants I: Internal force system. Definition and types of stress resultants. Stress resultant functions and diagrams. Connection among stress resultant functions.
10.	Stress resultants II: Stress resultant functions and diagrams of straight beams.
11.	Not ideal constraints: Coulomb friction. Static friction, limiting friction and kinetic friction. Self locking. Belt friction. Pin friction. Rolling resistance.
12.	Second moment of area (moment of inertia). Principal moment of inertia, principal axes.
13.	Mohr-circle of second moment of area. Parallel axis theorem
14.	Repetition, closing.

Tasks in semester

Week	Homeworks and test
3.	Announcement of 1st homework; submission: week 7
6.	Announcement of 2nd homework; submission: week 11 1st midterm test (25 point)
11.	2nd midterm test (25 point)

Conditions for the signature:

One must participate in at least 70% of all classes.

Two obligatory homeworks must be solved and submitted until the deadline. Wrong and/or not accepted homeworks should be submitted again.

Two midterm tests must be written. The 1st test takes place in the 6. semester week, the 2nd test takes place in the 11. semester week. The sum points of midterm tests must be no less than 20 (40%). In case of failed tests, one repeated test can be written in the first 10 day of exam season. If the repeated test is not accepted, then the semester is invalid and no signature will be given.

Exam: written and oral (50 pont).

Examination note (based on the sum of the semester and exam points) 0-50 point: fail (1); 51-62 point: pass (2); 63-75 point: satisfactory (3); 76-88 point: good (4), 89-100 point: excellent (5).

Recommended references:

Mechanika 1 (Statika), Dr. Legeza László, Egyetemi tananyag (ÓE) 2013

Date: 06. 01. 2016.

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subject leader