

<b>Óbuda University</b> <b>Donát Bánki Faculty of Mechanical and Safety Engineering</b>		<b>Institute of Mechanical Engineering and Security Sciences</b>		
<b>Name of the subject: Mechanics I., BBXMEE1BNE</b>				<b>Credit: 5</b>
<i>English language course 2020/2021, winter semester</i>				
Mechatronics BSc				
Subject leader:	Dr. Árpád CZIFRA		Lecturer:	Dr. Árpád CZIFRA
Prerequisites:	–			
Weekly hours: 4	Lecture: 2	Group seminar: 2	Lab: 0	Consultation:
Requirements:	exam			
<b>Course description:</b>				
This course provides a basic introduction to mechanics, especially to static; to develop confidence and competence in solving statics problems				
<b>Shedule:</b>				
Week	Topic			
1.	Introduction to static. Vector- and matrix algebra.			
2.	Definition of force. Force systems: Reduction of force systems. Force-couple systems.			
3.	Resultant of parallel force systems.			
4.	Coplanar force systems: Conditions of the equilibrium.			
5.	Equilibrium of beams and system of beams. Computation of reactions. Statically determinate and indeterminate structures.			
6.	Trusses I: External and internal forces. Method of joints and method of section			
7.	Trusses II: Structures with three pins. Separation of structures. Principle of superposition. Combined structures.			
8.	Internal force systems: Tension-compression, shearing, bending and torsion.			
9.	Internal effect of force functions and diagrams. Connection between shearing and bending.			
10.	Internal effects of simple beams, cantilever beams, overhanging beams. Internal effect of force of beam and truss systems.			
11.	Not ideal constraints: Coulomb friction. Static friction, limiting friction and kinetic friction. Self locking. Belt friction. Pin friction. Rolling resistance.			
12.	Computation of centroid: Definition of the first moment and the centroid. Determination of the centroid of bodies, areas and line segments.			
13.	Second moment of area (moment of inertia). Principal moment of inertia, principal axes. Mohr-circle of second moment of area. Parallel axis theorem			
14.	Repetition, closing.			
<b>Tasks in semester</b>				
Week	Homeworks and test			
2.	Announcement of 1 <sup>st</sup> homework; submission: week 6.			
7.	1 <sup>st</sup> midterm test (25 point)			
8.	Announcement of 2 <sup>nd</sup> homework; submission: week 11.			
12.	2 <sup>nd</sup> midterm test (25 point)			
14.	Retake of 1 <sup>st</sup> OR 2 <sup>nd</sup> midterm test.			
<b>Conditions for the signature:</b>				
One must participate in at least 70% of all classes. – Online participation is accepted.				
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 on which 25+25=50 points can be collected. Only one midterm (1 <sup>st</sup> OR 2 <sup>nd</sup> ) test can be retake. The sum points of midterm tests must be no less than 25 (50%). 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.				
<b>Exam:</b> written and oral (50 point).				
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).				
<b>Recommended references:</b>				
Schaum's Outline Series; McNeel & Nelson: Engineering Mechanics, Statics and Dynamics, McGraw-Hill, 1988 R. Pratap and A. Ruina: Introduction to Statics and Dynamics, Oxford University Press, 2001				

Date: 09. 01. 2020.

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subject leader