Óbuda University Bánki Donát Faculty of Mechanical and Safety Engineering	Institute for Natural Sciences and Basic Subjects

Course name and code: **Mechanics II.** (BTXMNE2BNF) **Credit: 5**
Full-time, 2nd semester

Programs for which the course is available Mechatronic engineering BSc

Subject leader:	**Dr. Tibor Goda**	Lecturer:	**Dr. Tibor Goda**
Prerequisites:			

Lessons/week:	Lecture: 2	Practice.: 2	Lab: 0	Consultation:
Requirement:	exam			

Course description

This course gives an introduction to mechanics, especially to kinematics and dynamics and develops confidence and competence in engineering problem solution.

Topics:

Week	**Lectures**	
1.	Fundamentals. Kinematics. Velocity and acceleration.	
2.	Projectile motion, circular motion, and vibration.	
3.	Kinematics of rigid bodies. State of velocity, state of acceleration.	
4.	Plane motion of rigid bodies. Kinematics of mechanisms.	
5.	Particle dynamics. Newton's axioms. Linear and angular momentum.	
6.	Kinetic energy, power theorem, work theorem.	
7.	**1st mid-semester test (max. 25 points)**	
8.	Rector break (No teaching)	
9.	Restrained motion of particle.	
10.	Kinetics of system of particles.	
11.	Kinetics of rigid bodies. Linear and angular momentum of rigid bodies.	
12.	Basic equations of rigid body dynamics. Kinetic energy.	
13.	**2nd mid-semester test (max. 25 points)**	
14.	Single degree of freedom undamped/damped free vibration. Excited vibration.	

Conditions for the signature

One must participate in at least 70% of all classes.
Two obligatory homework's must be solved and submitted until the deadline. Wrong and/or not accepted homework should be submitted again.
Homeworks:
1st HW: Kinematics, Handing out: week 3, Due date: week 7
2nd HW: Dynamics, Handing out: week 7, Due date: week 12
Two midterm tests must be written (max. 25 points per test). Only one of the tests (1st OR 2nd) may be repeated. To get signature the total number of points from the tests must be no less than 25 points (50%).

Method of replacements: The replacement test can be written in the first 10 day of exam period. If the replacement test is not accepted, then the semester is invalid, and no signature will be given.

Examination: written (max. 50 points)
The grade of the exam is established 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).

Literature:

Own lecture notes
Materials available in Moodle
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

Budapest, 2024. 02. 01.

subject leader