

Doctoral School on Safety and Security Sciences – Óbuda University

Course title: Kinematics and kinetics

To which area the course belongs: **Basic research**

Credit value of the course: 6 credits

Lecturer: István Bíró

The aim of the course:

Kinematic and kinetic investigation of moving mass points, rigid bodies and structures of rigid bodies including moving kinematical chains applied in human biomechanics.

Prerequisite: -

Content of the course:

Kinematics of mass point. Position, velocity, acceleration. Motion equations and diagrams. Kinematical investigation of translational motion of mass points. Circular motion. General plane and spatial motion. Kinematics of rigid bodies. The motion state of rigid bodies. Description of planar and spatial motion of rigid bodies. Degrees of freedom of mechanisms, constructions, classification.

Kinetics of mass points. Motion equations of mass points. Impulse, angular momentum, work, energy, power. Constrained motion. Kinetics of rigid bodies. Inertial moment of rigid bodies. The rotation of rigid bodies. Planar and spatial motion of rigid bodies.

Recommended reading:

Duane Knudson: Fundamentals of Biomechanics, 2nd Edition, Springer, 2007, ISBN 978-0-387-49311-4

Andy Ruina and Rudra Pratap: Introduction to Statics and Dynamics, Preprint for Oxford University Press, 2002