Title	Code
Analytical mechanics	**10102522110102102312**
Field: **Mechanical Engineering**	Year / Semester: **1 / 1**
Specialty: **-**	Course: **core**
Hours: Lectures: **2** Classes: **1** Laboratory: **-** Projects / seminars: **-**	Number of credits: **5**
	Language: **polish**

Lecturer:

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Status of the course in the study program:

- The 2nd degree study core course at the Faculty Mechanical Engineering and Management.

Assumptions and objectives of the course:

- Acquaintance with basic knowledge of the analytical mechanics.
  Learning the skills of applying of mechanics to describing complex mechanical systems.

Contents of the course (course description):

- Free and constrained mechanical systems. Degrees of freedom.
  Analytical form of the constraints. Classification of the constraints.
  Two-sided geometric constraints: gradient of the constraints, conditions imposed on the velocities and accelerations of the particles. Linear kinematic constrains.
  Possible positions, kinematically-possible velocities. Possible and virtual displacements. Ideal constraints. Virtual work principle. Generalized coordinates and velocities. Generalized forces. Dirichlet's principle. Lagrange?s equations of the 1st and 2nd kind. The variational principles of mechanics. Hamilton?s equations.
  Application of analytical mechanics in the theory of vibrations. Vibrations of multiple degrees of freedom systems. Nonlinear vibrations. Motion trajectories in phase space.
  Elements of chaos theory.

Introductory courses and the required pre-knowledge:

- Fundamental knowledge of differential and integral calculus and mechanics.

Courses form and teaching methods:

- Lectures and classes

Form and terms of complete the course - requirements and assessment methods:

- Test. Written exam.

Basic Bibliography:

Additional Bibliography: