SYLLABUS

Name:	**Theory of machines**
Name in Polish:	**Podstawy maszynoznawstwa**
Name in English:	**Theory of machines**

Information on course:

Course offered by department:	Faculty of Organisation and Management
Course for department:	Silesian University of Technology
Study level and form:	Bachelor's degree, Full-time
Term:	winter semester 2021/2022
Coordinator of course edition:	Dr hab. inż. Grzegorz Nowak, prof. PŚ

Default type of course examination report:

Credit

Language:

English

Course homepage:

https://platforma.polsl.pl/roz/

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4

Short description:

The course discusses issues related to the motion of machine components involving the determination of geometric features of motion and forces occurring during machine operation. The presented issues will be considered in different coordinate systems according to the problem being solved. Students will become familiar with the methods of describing motion and determining mechanical loads.

Description:

The lecture will discuss:
1. motion of a material point in Cartesian, natural and cylindrical coordinates
2. kinematics of a rigid body in Cartesian, natural and cylindrical coordinates
3. determination of dynamic forces for a material point
4. determination of forces for a rigid body

As part of the exercises, students will solve problems:
1. Determination of velocities and accelerations during the motion of a particle in Cartesian, natural and cylindrical systems
2. determination of velocities and accelerations during motion of machine elements (rigid body) in Cartesian, natural and cylindrical systems
3. determination of forces during motion of a particle in Cartesian, natural and cylindrical systems
4. determination of basic mass moments of inertia of rigid bodies
5. determination of forces during motion of machine elements (rigid bodies) in Cartesian, natural and cylindrical systems

During the project, students will:
Solve simple problems related to planar motion of a particle and simple machine elements.

Bibliography:

Hibbeler R.C. “Engineering Mechanics - Dynamics”, Pearson, 2012
Ruina A., Pratap R., „Introduction to statics and dynamics” Oxford University Press, 2015

Learning outcomes:

1 Student knows and understands the mathematical description of plane motion (K1A_W04, K1A_W10).
2 Student is able to describe the planar motion of a particle and a rigid body (K1A_U04, K1A_U07).
3. Student is able to determine dynamic forces in planar motion of a particle and a rigid body (K1A_U04, K1A_U07).
4. Student is able to evaluate dynamic loads associated with the operation of machines (K1A_U04, K1A_U07)
5. Student is ready to work as a team in solving technical problems (K1A_K03)

Assessment methods and assessment criteria:

As the course credit, students are required to solve in small (2-3 person) teams the assigned problem of kinematics and dynamics of motion of a machine component. A credit prerequisite is preparing a report on the implementation of the

project and its presentation to the group. His part provides 50% of the credits required. Another 50% results from a test composed of 5 questions involving basic theory and simple practical problems.

Practical placement: