COURSE DESCRIPTION CARD - SYLLABUS

Course name
Theory of rail vehicle motion [S1MiBP1>TRPSz]

Course

Field of study
Mechanical and Automotive Engineering

Year/Semester
3/6

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
full-time

Requirements
elective

Number of hours

Lecture
30

Laboratory classes
15

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

3,00

Coordinators

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Lecturers

Prerequisites

Knowledge: The student has some basic knowledge about the place of railway transport in the economic system. The student knows and understands the basic methods and tools, practical from piece band, hard, especially movement. The student knows the main tasks of railway transportation in the area of functioning and development of enterprises, regions and countries. Skills: The student is able to use the concepts and methods in the description of technical problems. The student can use the acquired knowledge for the analysis of specific phenomena and processes occurring in technical systems. The student can solve concrete problems in technical systems. Social competencies: The student can work in a group, taking in her different roles. The student determines the priorities is important in solving the set tasks. Student showing independence in solving problems, acquisition and improvement of acquired knowledge and skills.

Course objective

The aim of the subject is to provide students with information on the organization and the theory of motion of the train. Students receive knowledge and skills in the field of functioning of electric traction and internal combustion, especially power transmission through the system drive to the wheels, problems of modeling and simulation using the modeling of movement of a train, learn the rules disable the conduct of the train. They provide basic information about the functioning and the role of transport in national (regional) and international transportation system.

Course-related learning outcomes

Knowledge:
Has ordered basic knowledge of the main divisions of technical mechanics: statics, kinematics and dynamics of a material point and a rigid body.
Has elementary knowledge of electric drives in machines, including three-phase current, AC and DC motors, frequency and voltage converters, power electronics.
Has basic knowledge of tribological processes occurring in machines, i.e. friction, lubrication and wear.

Skills:
Can obtain information from literature, the Internet, databases and other sources. Can integrate the obtained information, interpret and draw conclusions from it, and create and justify opinions.
Can properly use modern equipment for measuring major physical quantities, used in machine research and production control.
Can apply basic technical standards regarding unification and safety and recycling.

Social competences:
Is ready to critically assess his knowledge and received content.
Is willing to think and act in an entrepreneurial manner.
Is ready to fulfill professional roles responsibly, including: observing the rules of professional ethics and requiring this from others, caring for the achievements and traditions of the profession.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
Final test of the lectures

Programme content

Physical issues of the train motion process. Optimization of the motion process, Characteristics of thermal and electric drive machines used in drive systems.

Course topics

The process of movement of a train in the system of exploitation of Railways. Mathematical model of the process, process variables (status, management, physical), restrictions and violations. Problems of optimization of the process of movement, quality criteria and limitations. Characteristics of machines, plants and thermal power, processing and transmission of energy drive, traction characteristics of diesel locomotives. Elements of computer simulation of motion (us) and define the conduct of the train.
The functioning and the role of transport in national (including regional and international system of transportation. External effects of transport, including external costs.

Teaching methods

Lecture with multimedia presentation

Bibliography

Basic
1. MADEJ J.: Teoria ruchu pojazdów szynowych. Of. Wyd. Pol. Warsz. 2004.
2. KWAŚNIKOWSKI J.: Modelowanie i symulacja komputerowa procesu ruchu pociągu. Wyd. PP (Rozprawy PP, nr 264),1992.

Additional
1. KACPRZAK J., KOCZARA W.: Podstawy napędu elektrycznych pojazdów trakcyjnych. WKŁ, Warszawa 1990.

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,00
Classes requiring direct contact with the teacher	45	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	30	1,00