COURSE DESCRIPTION CARD - SYLLABUS

Course name

Running systems of rail vehicles

Course

Field of study

Construction and Exploitation of Means of Transport

Year/Semester

1/1

Area of study (specialization)

Railway Vehicles

Profile of study

general academic

Level of study

Second-cycle studies

Course offered in

polish/english

Form of study

full-time

Requirements

compulsory

Number of hours

Lecture

15

Laboratory classes

0

Other (e.g. online)

0

Tutorials

0

Projects/seminars

0

Number of credit points

1

Lecturers

Responsible for the course/lecturer:

dr hab. inż. Bartosz Firlik

bartosz.firlik@put.poznan.pl

tel. (61) 665 2012

Faculty of Civil and Transport Engineering

ul. Piotrowo 3, pok. 722, 60-965 Poznań

Responsible for the course/lecturer:

Prerequisites

The student has a basic knowledge of machine science, mechanics, the basics of machine construction and the laws of physics.

The student is able to integrate the obtained information, interpret it, draw conclusions, read diagrams and technical drawings.

The student is aware of the role of means of transport in human economic activity.

Course objective

Acquainting with the construction and operation of running systems of rail vehicles, such as locomotives, multiple units, carriages, trams and other types of vehicles. Presentation of loads acting on

the vehicle and their assemblies and the rules of driving the vehicle on the track. Overview of the basics of design and operation of modern rail vehicles

Course-related learning outcomes

Knowledge

1. Has knowledge of mathematics, including algebra, analysis, theory of differential equations, probability, analytical geometry necessary to: describe the operation of discrete mechanical systems, understand computer graphics methods, describe the operation of electrical and mechatronic systems

2. Has knowledge in the field of physics, including the basics of classical mechanics, optics, electricity and magnetism, solid state physics, quantum and nuclear physics, necessary to understand specialist lectures in the field of the theory of construction materials and materials science, theory of machines and mechanisms, theory of electric drives and mechatronic systems

3. Has a basic knowledge of the basics of machine design and the theory of machines and mechanisms, including mechanical vibrations

Skills

1. 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

2. Is able to properly use modern equipment for measuring the main physical quantities used in machine research and production control

3. Can use learned mathematical theories to create and analyze simple mathematical models of machines and their components, and simple technical systems.

Social competences

1. Is ready to critically assess the knowledge and content received

2. Is ready to recognize the importance of knowledge in solving cognitive and practical problems and to consult experts in the event of difficulties in solving the problem on its own

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Written credit

Programme content

Types of railway bogies and their tasks. Bogie frames. Wheelsets. Bearing nodes. Alignment in track curves. Springs and dampers for rail vehicles. Body backrests (suspension) on bogies. The use of the driving mass of locomotives and methods of transferring longitudinal forces from the driving and rolling bogies to the body. Structures of railway bogies. Locomotive driving bogies. Bogies of high-speed multiple units. Electric multiple unit (EMU) driving bogies. Passenger bogies. Two-axle driving and rolling bogies for public transport vehicles and subway trains. Traditional trams. Bogies for low-floor trams. Freight bogies.

Teaching methods

Lecture with multimedia presentation

Bibliography

Basic

1. Romaniszyn Z.: Podwozia wózkowe pojazdów szynowych, Wydawnictwo Instytutu Pojazdów Szynowych Politechniki Krakowskiej, Kraków 2010

2. Maksym Spiryagin, Colin Cole, Yan Quan Sun, Mitchell McClanachan, Valentyn Spiryagin, Tim McSweeney: Design and Simulation of Rail Vehicles, CRC Press 2017. ISBN 9781138073708

3. W. Gąsowski: Wagony kolejowe - konstrukcja i badania. WKŁ, Warszawa 1988.

4. W. Gąsowski, Z. Durzyński, Z. Marciniak: Elektryczne pojazdy trakcyjne. Wyd. Polit. Poznańskiej, Poznań 1995.

5. W.Gąsowski, Z,. Marciniak: Konstrukcje oraz modele wózków i układów zawieszeń wagonów i lokomotyw. Wyd. Polit. Poznańskiej, Poznań 1993.

Additional

1. J. Gronowicz , B. Kasprzak: Lokomotywy spalinowe. WKŁ, Warszawa 1989.

2. Z. Romaniszyn, Z. Oramus, Z. Nowakowski: Podwozia trakcyjnych pojazdów szynowych. WKŁ, Warszawa 1989.

Breakdown of average student's workload

	Hours	ECTS
Total workload	30	1,0
Classes requiring direct contact with the teacher	15	0,5
Student's own work (literature studies, preparation for final test) [1]	15	0,5

[1] delete or add other activities as appropriate