COURSE DESCRIPTION CARD - SYLLABUS

Course name

Construction of rail vehicles

Course

Field of study

Mechanical and Automotive Engineering

Year/Semester

3/6

Area of study (specialization)

Mass transport vehicles

Profile of study

general academic

Level of study

First-cycle studies

Course offered in

Polish

Form of study

part-time

Requirements

elective

Number of hours

Lecture

18

Laboratory classes

18

Other (e.g. online)

0

Tutorials

0

Projects/seminars

0

Number of credit points

4

Lecturers

Responsible for the course/lecturer:

dr hab. inż. Bartosz Firlik, prof. nadzw.

bartosz.firlik@put.poznan.pl

tel. (61) 665 2012

Faculty of Civil and Transport Engineering

ul. Piotrowo 3, room 722, 60-965 Poznan

Responsible for the course/lecturer:

mgr inż. Tomasz Staśkiewicz

tomasz.staskiewicz@put.poznan.pl

tel. (61) 665 2012

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ul. Piotrowo 3, room 722, 60-965 Poznan

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

Getting to know the construction and operation of locomotives, carriages, trams and other types of vehicles. Presentation of loads acting on the vehicle and their assemblies and rules of guiding the vehicle on the track. Overview of the basics of design and operation of modern rail vehicles.

Course-related learning outcomes

Knowledge

The student has knowledge in the field 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. 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. Has basic knowledge of the basics of machine design and the theory of machines and mechanisms, including mechanical vibrations.

Skills

The student 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 use learned mathematical theories to create and analyze simple mathematical models of machines and their elements, and simple technical systems.

Social competences

The student is ready to critically assess his knowledge and received content. Is ready to recognize the importance of knowledge in solving cognitive and practical problems and to consult experts in case 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 exam, laboratory credit based on the results of individual exercises.

Programme content

History, types of trains and vehicles for mass transport. Electric and diesel locomotives, passenger and freight carriages, traction units, trams, unconventional rail vehicles and other vehicles. Structural elements of the body and chassis of rail vehicles. Driving and rolling carriages. Drive systems. Brakes. Vehicle control. Vehicle guidance on a track. Loads acting on the vehicle.

Teaching methods

1. Lecture with digital presentation

2. Laboratories - team work on selected problems in the construction of rail vehicles

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

Additional

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

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

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,0
Classes requiring direct contact with the teacher	36	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	64	2,0

[1] delete or add other activities as appropriate