



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Design of mass transport vehicles

### Course

Field of study

Year/Semester

Construction and Exploitation of Means of Transport

4/7

Area of study (specialization)

Profile of study

Mass transport vehicles

practical

Level of study

Course offered in

First-cycle studies

Polish

Form of study

Requirements

full-time

compulsory

### Number of hours

Lecture

Laboratory classes

Other (e.g. online)

45

15

0

Tutorials

Projects/seminars

15

0

### Number of credit points

3

### Lecturers

Responsible for the course/lecturer:

Responsible for the course/lecturer:

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### Prerequisites

The student has a basic knowledge of the construction of rail vehicles and their role in the modern world. The student is able to use technical drawing and has spatial imagination in order to read, understand and prepare three-dimensional models of technical objects and their documentation. The student is able to use the acquired knowledge to analyze specific phenomena and processes occurring in the operation of rail vehicles. The student is able to solve specific problems that arise during the construction of technical objects. The student is able to work in a group, taking different roles in it. The student is able to determine the priorities important in solving the tasks set before him. The student shows independence in solving problems, acquiring and improving the gained knowledge and skills.



## Course objective

The aim of the course is to learn how to use the CAD SolidWorks program, aimed at designing rail vehicles. Students acquire the ability to make models of single parts, assemblies and technical documentation. Optionally, students can obtain the following certificates: Certified SolidWorks Associate and Certified SolidWorks Professional.

## Course-related learning outcomes

### Knowledge

The student has detailed knowledge of design tools for solid modeling, creating parametric models. The student has detailed knowledge of the operations used, geometrical relationships and the creation of correct construction models.

### Skills

The student is able to obtain information from literature, the Internet, databases and other sources, in Polish and foreign languages, can communicate using various techniques in the professional environment and other environments using the formal notation of construction, the technical drawing. Has the ability to self-educate with the use of modern teaching tools, such as remote lectures, internet sites and databases, teaching programs, books and electronic journals. Student is able to draw by hand machine elements and diagrams in accordance with the rules of technical drawing according to European standards.

### Social competences

The student understands the need and knows the possibilities of continuous training, knows the need to acquire new knowledge for professional development, is aware of responsibility for his own work and readiness to submit to the principles of teamwork and responsibility for jointly performed tasks, is aware of transferring the acquired knowledge to society, undertakes efforts to make the information understandable.

## Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Completion in the form of an online test for which 180 minutes are allocated. An additional component of the final grade in the subject is activity in the classroom and social skills while working in a group, assessed by the teacher.

## Programme content

- using the CAD program interface (adjusting it to user preferences), editing the view position, modifying the graphic representation of the designed object, built-in 3D visualization program tools
- reading technical drawings, creating and modifying 2D sketches, creating adaptive sketches, duplicating operations
- creation of solid elements by the extrusion operation (simple, path, shape and revolution), their modification by cutting operations and the hole wizard, duplicating operations



- creating assemblies of many parts, creating mates between components
- creating technical documentation of designed technical objects, editing the sheet, inserting annotations
- development of the concept of a tram corresponding to the client's requirements and analysis of the kinematic gauge

### Teaching methods

Lecture with a multimedia presentation, independent work with computers (Solidworks software), assessment in the form of online tests.

### Bibliography

#### Basic

1. Domański J.: SolidWorks 2014. Projektowanie maszyn i konstrukcji. Praktyczne przykłady (ebook), Wydawnictwo Helion 2015.
2. SolidWorks user manual.
3. Babiuch M.: SolidWorks 2009 PL. Ćwiczenia, Wydawnictwo Helion 2009.

#### Additional

1. Dobrzański T., Rysunek techniczny maszynowy, Wydawnictwo Naukowo-Techniczne 2013.
2. Romaniszyn Z., Podwozia wózkowe pojazdów szynowych, Wydawnictwo Instytutu Pojazdów Szynowych Politechniki Krakowskiej 2010.
3. Podemski J., Marczewski R., Seria Wagony kolejowe.
4. M. Spiryagin, C. Cole, Y. Q. Sun, M. McClanachan, V. Spiryagin, T. McSweeney, Design and Simulation of Rail Vehicles, CrC Press, T&Fr Group.

### Breakdown of average student's workload

	Hours	ECTS
Total workload	105	3,0
Classes requiring direct contact with the teacher	75	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) <sup>1</sup>	30	1,0

<sup>1</sup> delete or add other activities as appropriate