



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Construction of autonomous vehicles

	Course
Field of study	Year/Semester
Mechanical and Automotive Engineering	3/5
Area of study (specialization)	Profile of study
Autonomous vehicles	general academic
Level of study	Course offered in
First-cycle studies	polish
Form of study	Requirements
full-time	elective

Number of		
hours		
Lecture	Laboratory classes	Other (e.g. online)
15	30	0
Tutorials	Projects/seminars	
0	0	
<b>Number of credit points</b>		
4		

Lecturers	
Responsible for the course/lecturer: PhD (Eng) Jerzy Kupiec	Responsible for the course/lecturer: PhD (Eng) Hubert Pikosz
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Faculty of Civil Engineering and Transport	Faculty of Mechanical Engineering

**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

Providing students with information on the construction and operation of car chassis systems.

## Course-related learning outcomes

### Knowledge

1. Has basic knowledge of the standardized rules of recording structures and engineering graphics.
2. Is aware of the latest trends in machine construction, i.e. automation and mechatronization, automation of machine design and construction processes, increased safety and comfort of operation, the use of modern construction materials.
3. Has extended basic knowledge necessary to understand specialist subjects and specialist knowledge about the construction, construction methods, manufacturing and operation of a selected group of working, transport, thermal and flow machines covered by the diploma path.

### 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. Can prepare a technical descriptive and drawing documentation of an engineering task.
3. Can draw a diagram and a simple machine element by hand in accordance with the rules of technical drawing.

### Social competences

1. Is ready to critically assess his knowledge and received content.
2. Is willing to think and act in an entrepreneurial manner.
3. 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:

The knowledge acquired during the course is verified on the final exam.

Mandatory individual reports on laboratory activities. Final credit of laboratory classes.

## Programme content

1. Construction of a chassis, wheels and tires
2. Construction of the suspension system
3. Construction of steering systems



4. Building a vehicle heating, ventilation and air conditioning system
5. Construction of pneumatic braking systems
6. Construction of hydraulic braking systems
7. Construction of manual gearboxes
8. Construction of clutches, shafts and driveshafts in the drive train
9. Construction of automatic gearboxes
10. Construction of automated gearboxes
11. Construction of 4x4 drive systems
12. Construction of main gears and differentials
13. Construction of assistive devices in steering systems
14. Construction of active and passive safety teams
15. Construction of car bodies for motor vehicles

### Teaching methods

Lecture with multimedia presentation.

Laboratory classes: independent execution of given by the teacher - practical exercises.

### Bibliography

Basic

Prochowski L.: Mechanika ruchu. WKŁ, W-wa, 2005

Jackowski J., Łęgiewicz J., Wieczorek M.: Samochody osobowe i pochodne. WKŁ, W-wa, 2011

Prochowski L., Żuchowski A.: Samochody ciężarowe i autobusy. WKŁ, W-wa, 2004

Reimpell J., Betzler J.: Podwozia samochodów. Podstawy konstrukcji. WKŁ, W-wa, 2003

Gabryelewicz M.: Podwozia i nadwozia pojazdów samochodowych cz. 2 Układ hamulcowy i kierowniczy, zawieszenie oraz nadwozie. WKŁ, W-wa, 2018

Additional

Heising B., Ersoy M.: Chassis Handbook. Vieweg + Teubner Verlag, Wiesbaden, 2011

Breuer B., Bill K.: Brake Technology Handbook. SAE International, Warrendale, 2008

Harrer M., Pfeffer P.: Steering Handbook. Springer, 2017



### Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,0
Classes requiring direct contact with the teacher	45	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) <sup>1</sup>	55	2,0

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