



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Computer aided design of special-purpose vehicles [N1MiBP1>KWPNS]

### Course

Field of study

Mechanical and Automotive Engineering

Year/Semester

4/7

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

Polish

Form of study

part-time

Requirements

elective

### Number of hours

Lecture

27

Laboratory classes

9

Other

0

Tutorials

9

Projects/seminars

0

### Number of credit points

5,00

### Coordinators

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### Lecturers

### Prerequisites

Knowledge: Has basic knowledge of mechanics, basics of machine construction and vehicles construction.

Sills: Student is able to use the basic computer techniques. Social competences: Student is aware of responsibility for his/her own work.

### Course objective

The use of computer tools for the design of special-purpose vehicles bodies. Mastering theoretical and practical knowledge of engineering modeling methods and analysis of special-purpose vehicles in CAD systems.

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

Has basic knowledge of tribological processes occurring in machines, i.e. friction, lubrication and wear.

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.

#### Skills:

Can use computer office packages for editing technical texts, including formulas and tables, technical and economic calculations using a spreadsheet and running a simple relational database.

Can plan and carry out the process of constructing uncomplicated machinery units or machines and formulate requirements for electronic components and automatic control systems for industry specialists in mechatronic systems.

Can use popular packages for editing technical drawings and 3D modeling to the extent enabling the creation of drawing documentation in accordance with applicable drawing standards and models of virtual machines in three-dimensional space.

Can prepare a technical descriptive and drawing documentation of an engineering task.

#### Social competences:

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.

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:

Lecture - written exam. Laboratory - current reports.

### Programme content

The use of CAD systems in the aspect of engineering problems. Classification of motor vehicles. Special and specialized vehicles - general information. Specialized vehicles - design solutions and purpose. Bodies of specialized vehicles. Chassis and equipment of specialized vehicles. Self-unloading and self-loading vehicles. Engineering problems in the design of specialized vehicles.

Isothermal bodies (thermal insulation materials, production of construction elements, assembly technology). Additional equipment (movable floor, spreader bars). Loading platforms. Certification tests of thermal bodies. Preparation of the means of transport for loading. Characteristics of design solutions of specialized vehicles bodies. Estimation of body dimensions. Strength analysis of selected body elements, including binding of the bottom frame. Using AutoCAD for the body design process.

Determination of axle loads for vehicles with oversized bodies - calculation algorithm.

### Course topics

The use of CAD systems in the aspect of engineering problems. Classification of motor vehicles. Special and specialized vehicles - general information. Specialized vehicles - design solutions and purpose. Bodies of specialized vehicles. Chassis and equipment of specialized vehicles. Engineering problems in the design of specialized vehicles.

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Determination of axle loads for vehicles - calculation algorithm.

### Teaching methods

Lecture: multimedia presentation and a didactic discussion. Laboratory: design tasks solved in CAD systems.

### Bibliography

#### Basic

1. Prochowski L., Żuchowski A.: Pojazdy samochodowe. Samochody ciężarowe i autobusy. Wydawnictwo Komunikacji i Łączności, Warszawa 2006
2. Prochowski L., Żuchowski A., Technika transportu ładunków, WKiŁ, Warszawa 2009
3. Gabrylewicz M. Podwozia i nadwozia pojazdów samochodowych. Cz. 1, Podstawy teorii ruchu i eksploatacji oraz układ przeniesienia napędu /. Warszawa : Wydawnictwa Komunikacji i Łączności, 2010.
4. Gabrylewicz M. Podwozia i nadwozia pojazdów samochodowych. Cz. 2, Układ hamulcowy i kierowniczy, zawieszenie oraz nadwozie. Warszawa : Wydawnictwa Komunikacji i Łączności, 2010.
5. Starkowski D., Bieńczak K., Zwierzycki W., Samochodowy transport krajowy i międzynarodowy. Kompendium wiedzy praktycznej. T. I Cz. I Wyd. III, Wyd. SYSTHERM, Poznań 2013

#### Additional

1. Zienkiewicz O.C.: Metoda elementów skończonych, Arkady. Warszawa, 2004
2. E. Chlebus, Systemy CAx, WNT, Warszawa 2000.

#### Breakdown of average student's workload

	Hours	ECTS
Total workload	125	5,00
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)	80	3,00