



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Composites in the construction of motor vehicles [S1MiTPM1>KwKPM]

Course

Field of study	Year/Semester
Materials and technologies for automotive industry	2/4
Area of study (specialization)	Profile of study
–	general academic
Level of study	Course offered in
first-cycle	Polish
Form of study	Requirements
full-time	compulsory

Number of hours

Lecture	Laboratory classes	Other
15	15	0
Tutorials	Projects/seminars	
0	0	

Number of credit points

3,00

Coordinators

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Lecturers

Prerequisites

Basic knowledge of chemistry, physics, materials science, mechanics. Logical thinking skills, using information obtained from library and the Internet resources.

Course objective

Getting the knowledge of the types, structure, production methods, application and operating conditions of composite materials, especially in motor vehicles.

Course-related learning outcomes

Knowledge:

1. Students have knowledge of the basic types of composite materials and their components.
2. Students have knowledge of the methods of composites products manufacturing.
3. Students have knowledge of the process of destruction and distribution of loading force in composite materials during their operation.
4. Students have knowledge of the use of composite materials in automotive industry.

Skills:

1. Students can choose the right composite material for a given application.
2. Students are able to choose the method of material formation, appropriate for a given application, as well as its composition and structure.
3. Students are able to identify the structure, defects and failure mechanisms of composite elements using appropriate research methods.

Social competences:

1. Students are able to work in a group.
2. Students are aware of the use of composite materials in the automotive industry and the resulting consequences for the environment, society, the development of the automotive industry and the implementation of innovative solutions.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The knowledge acquired during the lecture is verified during the final colloquium lasting at least 45 minutes. There are two completion dates to which every student is entitled. In addition, students are entitled to make-up colloquium in the make-up session. The final test includes 3-5 questions. The passing threshold is a minimum of 50% of points.

Skills acquired as part of the laboratory classes are checked on an ongoing basis during each class in the form of an oral or written answer to the questions asked and assessed on the basis of reports from each laboratory exercise. Each laboratory exercise requires a positive evaluation. At the end of the semester, after completing compulsory exercises, there is a possibility to pass a make-up test of selected exercises.

Programme content

Composite materials, their components and manufacturing processes, properties and applications of composites, in particular in the automotive industry.

Course topics

Lectures:

1. Basic information, definitions, the importance of composites as structural and functional materials, directions of development of composite materials, examples of applications.
2. Reinforcing phase in composite materials - structure, properties and application.
3. Matrix in composites - role in composites, types and properties.
4. Construction of composites.
5. Strength of composites.
6. Technologies for producing composite products, examples of applications in the automotive industry.

Laboratories:

1. Metal matrix composites.
2. Products with continuous fibers.
3. Polymer matrix composites.
4. Production of composites with a polymer matrix 1.
5. Production of composites with a polymer matrix 2.

Teaching methods

Lecture: multimedia presentation

Laboratory exercises: practical exercises, performing experiments, discussion, team work, case studies.

Bibliography

Basic:

1. W. Królikowski, Polimerowe kompozyty konstrukcyjne, PWN Warszawa 2012.
2. K. Konopka, A. Miazga, Kompozyty ceramika-metal, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2017.

Additional:

1. A. Boczkowska, Kompozyty, Wydawnictwo Politechniki Warszawskiej 2000.
2. J. Śleziona, Podstawy technologii kompozytów, Wydawnictwo Politechniki Śląskiej 1998.

3. H. Leda, Kompozyty polimerowe z włóknami ciągłymi, Wydawnictwo Politechniki Poznańskiej, 2000.
4. J. Nowacki, Spiekane metale i kompozyty z osnową metalową, WNT 2005.

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,00
Classes requiring direct contact with the teacher	30	1,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	45	1,50