



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Processing of tires [S1MiTPM1>POS]

Course

Field of study

Materials and technologies for automotive industry

Year/Semester

3/6

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

Polish

Form of study

full-time

Requirements

elective

Number of hours

Lecture

15

Laboratory classes

15

Other

0

Tutorials

0

Projects/seminars

0

Number of credit points

2,00

Coordinators

dr hab. inż. Karol Bula prof. PP
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Lecturers

Prerequisites

The student should have basic knowledge of the polymer materials including cross-linked and uncured elastomers. Application of information taken from the literature survey concerning science and technical profile including materials science. Understanding of necessity of taking new information and knowledge

Course objective

The student should obtain knowledge about the technology of preparing rubber tire compounds, manufacturing car tires and their material recycling without decomposition.

Course-related learning outcomes

Knowledge:

1. The student has a structured knowledge of the structure of materials covering the key issues in the field of material science, the formation of their properties and methods of their selection, especially for products of the automotive industry, knows the operational problems of automotive products.
2. The student has a basic knowledge of the development trends in materials engineering and technology, especially automotive materials, regarding materials design, technology and their selection.

Skills:

1. The student is able to apply the methods of materials testing and operate specialized measuring apparatus.
2. The student is able to apply manufacturing technologies to shape motor vehicle parts with specific properties, can design and implement material recycling techniques.
3. The student is able to identify and formulate simple engineering problems specific to the automotive industry, including, in particular, the selection of materials and technologies for the manufacture of certain automotive parts.

Social competences:

1. The student is aware of the importance and understanding of the non-technical aspects and consequences of engineering activities, including their impact on the environment and the associated responsibility for decision-making.
2. The student is able to appropriately determine priorities for the realization of a task defined by him or others.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture

Written colloquium at the end of the semester, contains open questions, number of questions ranging from 7 to 12. (credit in case of obtaining at least 50% correct answers).

Laboratory

Credit based on written tests and oral answers on the content of each laboratory exercise. All laboratory exercises must be passed with a passing grade.

Programme content

1. Elastomeric materials in automotive tires- general characteristics, technological properties.
2. Construction of tires.
3. Technology and processing of elastomeric materials.
4. Recycling of tires.

Course topics

Lecture

Material science concerning rubber and rubber fillers used in tire processing.

Main components of rubber recipe for tires manufacturing.

Selected methods for preparation of rubber compounds, technological properties of elastomeric compounds.

Methods of periodic vulcanization of tires, assembling of tires.

Methods for testing of cross-linked rubber and parts made of rubber

Diagonal and radial tires.

Recovery of tires, recycling of rubber products. Devulcanizing of rubbers taken from tires.

Laboratory

Processing of rubber compounds by using roll mill and mixer equipment.

Processing of highly-filled rubber, processing of rubber with addition of recycled scrap

Rubber vulcanization with monitoring the mold and part temperature

Decomposition of tire structure.

Investigation of rubber properties.

Teaching methods

Lecture: multimedia presentation illustrated with examples given on a board.

Laboratory exercises: performing exercises that are focused on rubber processing (tire processing) and their methods of testing, discussion, team work.

Bibliography

Basic:

1. Guma, Poradnik inżyniera i technika, Praca zbiorowa, WNT W-wa, 1981.

2. Poradnik technologa gumy, IPG „Stomil” Piastów 2003.

3. B. Jurkowski, B. Jurkowska, Sporządzanie kompozycji polimerowych. Elementy teorii i praktyki. WNT, W-wa 1995.

Additional:

1. Smorawiński A., Wtrysk elastomerów, Wyd. Plastech, W-wa 2001.

2. Jaroszyńska D., Metody badań właściwości fizycznych gumy, WNT, W-wa 1978.

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,00
Classes requiring direct contact with the teacher	30	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	20	1,00