



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Design of Plastic Parts [S1MiTPM1>PCzTS]

Course

Field of study

Materials and technologies for automotive industry

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

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

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Lecturers

Prerequisites

The student should have knowledge of polymer materials science and knowledge of polymer processing technology.

Course objective

The student should obtain knowledge about materials selection for making plastic parts and the roles important in design of plastic elements.

Course-related learning outcomes

Knowledge:

1. The student has basic knowledge of engineering design, especially technological and material design in the automotive industry.
2. The student has a structured knowledge of the structure of materials covering the key issues of material science, the formation of their properties and methods of their selection, especially for products of the automotive industry.
3. 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 obtain information from literature, databases and other appropriately selected sources in the field of materials engineering and technology of the automotive industry, in particular, is able to describe groups of materials used in the automotive industry.
2. The student is able to prepare in Polish and English well-documented problems in automotive materials engineering and technology, especially on the selection of materials, manufacturing technology.
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 vehicle parts.

Social competences:

1. The student is aware of the importance and understanding of non-technical aspects and consequences of engineering activities, including their impact on the environment.
2. The student is able to appropriately determine priorities for the realization of a task defined by himself 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, ranged from 7 to 12. (credit in case of obtaining at least 50% correct answers).

Project

Passing on the credits based on projects implemented during the classes, containing calculations and drawings of details. All projects must be passed with positive note.

Programme content

1. Technological aspects of construction of plastic parts molded by injection molding.
2. Analysis of the design of plastic parts taking into account the selection of materials, including for use in the construction of motor vehicles.
3. Computer aided designing of plastic parts.
4. Dimensional accuracy and defects of injected products.

Course topics

Lecture

Designing of injection channels and sprues in multicavity mold.

Designing with technological aspects of plastic part design.

Designing of snap-fit joints and welding joints.

Calculations and main roles in design of plastic plain bearings.

Designing of threads and leaving hinges.

Dimensional aspects in designing of injection molded parts. Warpage caused by shrinkage of plastic parts.

Main roles in designing of plastic parts in case of their recycling. Technological aspects of rotational molded parts.

Project

Designing of injection molding channels and sprues in multicavity cold mould.

Designing of plastic parts in case of technological and formability aspects.

Designing of welding points and snap fit joints for parts used in automotive industry.

Designing of plastic parts in case of maintain dimensional tolerances.

Teaching methods

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

Project: carrying out designs of injection-molded parts made of polymer materials, solving tasks, discussion, teamwork.

Bibliography

Basic:

1. Zawistowski H., Frenkler D.: Konstrukcja form do tworzyw termoplastycznych, WNT, 2000, W-wa
2. Garbarski J. i in.: Części maszyn z tworzyw sztucznych, Oficyna Wydawnicza Politechniki Warszawskiej, W-wa, 2016.
3. Frącz W., Krywult B.: Projektowanie i wytwarzanie elementów z tworzyw sztucznych, wyd. Politechniki Rzeszowskiej, 2005.
4. Łączyński B.: Nietalowe elementy Maszyn, wyd. WNT, W-wa 1998.

Additional:

1. Wilczyński K. (red.): Wybrane zagadnienia przetwórstwa tworzyw sztucznych, Ofic. Wyd. Politechniki Warszawskiej, Warszawa, 2011.
2. Malloy R., Plastic part design for injection molding, wyd. Hanser, Monachium 2010.

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