COURSE DESCRIPTION CARD - SYLLABUS

Course name

Technological Properties of Plastics

Course

Field of study

Materials Science

Year/Semester

4/7

Area of study (specialization)

Profile of study

general academic

Level of study

First-cycle studies

Course offered in

polish

Form of study

full-time

Requirements

elective

Number of hours

Lecture

15

Laboratory classes

Other (e.g. online)

Tutorials

Projects/seminars

15

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

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Faculty of Mechanical Engineering

Piotrowo 3 st., 60-965 Poznań

Responsible for the course/lecturer:

Prerequisites

Student should have a basic knowledge of materials science and processing technologies of polymer materials.

Course objective

Student should obtain knowledge about the methods for investigation of the technological properties of polymeric materials and the ability to analyze results in the aspect of their manufacturing and recycling.

Course-related learning outcomes

Knowledge

1. Students have knowledge about the study of technological properties of polymeric materials. - [K_W08, K_W10].

2. Students have knowledge of polymeric materials and their properties used in processing. - [K_W012, K_W014].

Skills

1. Students are able to obtain information from literature, in particular they can describe groups of materials, their production and processing processes. - [K_U01].

2. Students are able to apply methods of testing engineering materials and operate specialist research equipment. - [K_U09].

3. Students are able to prepare well-documented problems in materials engineering, manufacturing technology, materials testing methods. - [K_U14].

Social competences

1. Students are aware of non-technical aspects and effects of engineering activities, including its impact on the environment. - [K_K02].

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 5 to 6 questions (credit if at least 50.1% of correct answers are obtained). Up to 50.0% - ndst, from 50.1% to 60.0% - dst, from 60.1% to 70.0% - dst +, from 70.1% to 80.0% - db, from 80, 1% to 90.0% - db +, from 90.1% - very good.Laboratoryclasses:

Every single exercise should be passed by giving the written answer and additional final report on a training. All laboratory exercises must be passed with positive note.

Programme content

Lecture

1. Testing methods for evaluation the technological parameters of polymers (powders, pellets).

2. Methods used for evaluation of polymer properties in molten state.

3. Technological properties of PVC dry-blend - methods of characterization .

4. Methods for assessing and testing the effect of reprocessing on the structure and properties of polymers.

5. Measurement methods of moisture content in bulk polymers and their influence on processing.

6. Technological properties of rubber.

7. Technological properties of polyester and epoxy resins.

Laboratory classes

1. Investigation of shrinkage of injection molede parts.

2.Investigation of Barus effect in profile shaping.

3. Plastic flow testing in mold shaped in spiral of Archimedes.

4. Investigation of gel point during curing process of polyester and epoxy resins.

5. Evaluation of time restriction for application of single and multicomponent adhesives.

6. Estimation of moisture content in thermoplastic pellets.

Teaching methods

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

Laboratory classes: demonstration of machine and equipment operation, performing experiments, solving tasks, discussion, teamwork.

Bibliography

Basic

1. T. Broniewski , J. Kapko, W. Płaczek, J. Thomalla - Metody badań i ocena właściwości tworzyw sztucznych, WNT, Warszawa, 2000.

2. K. Wilczyński, Reologia w przetwórstwie tworzyw sztucznych, WNT, Warszawa, 2001.

3. J.F. Rabek, Polimery, otrzymywanie, metody badawcze, zatosowanie, Wydawnictwa naukowe PWN, Warszawa, 2013

4. P. Penczek, i in., Chemia i technologia żywic epoksydowych, WNT, Warszawa, 2002.

5. K. Wilczyński, Przetw. Tworzyw Sztucznych, wyd. Politechnika Warszawska, 2000.

6. K. Wilczyński, Przetwórstwo tworzyw sztucznych, Oficyna wydawnicza Politechniki Warszawskiej 2018.

7. M. Bernaciak, Klejenie tworzyw sztucznych- wprowadzenie do technologii, podręcznik dla inżynierów, Wyd. AMB Technic 2015.

Additional

1. J. Czaplicki, Klejenie tworzyw konstrukcyjnych , Wydawn. Kom. I Łączn., Warszawa, 1987.

2. B. Antczak, i in., Guma: poradnik inżyniera i technika, WNT, Warszawa, 1981.

3. H. Saechtling, Poradnik Tworzyw Sztucznych, Wydawnictwa Naukowo-Techniczne, Warszawa 2007.

Breakdown of average student's workload

	Hours	ECTS
Total workload	60	3,0
Classes requiring direct contact with the teacher	30	2,0
Student's own work (literature studies, preparation for laboratory classes, preparation for colloquium)[1]	30	1,0

[1] delete or add other activities as appropriate