COURSE DESCRIPTION CARD - SYLLABUS

Course name
Modern technologies of plastics processing [S2IMat1-MMiTS>NTPTS]

Course

Field of study
Materials Engineering

Year/Semester
1/2

Area of study (specialization)
Metal and Plastics Materials

Profile of study
general academic

Level of study
second-cycle

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
15

Laboratory classes
15

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

2,00

Coordinators

dr inż. Monika Knitter
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Lecturers

Prerequisites

Basic knowledge of the basics of machine building, material processing technology, physicochemistry of polymers and material science. Logical thinking, analyzing occurring phenomena, using knowledge obtained from scientific, technical and popular science literature. Understanding the need to learn and acquire new knowledge.

Course objective

Learning about modern technologies of plastics processing and the possibility of producing unique products using them.

Course-related learning outcomes

Knowledge:
1. the student should learn modern technologies of plastics processing - [k_w07, k_w11]
2. the student should be able to describe the course of selected technological processes - [k_w11]
3. the student should be able to propose a process for the production of a selected product - [k_w11, k_w07]

Skills:
1. the student is able to select the process for the production of a specific product - [k_u13]
2. the student is able to analyze the course of the technological process - [k_u16]
3. the student is able to control the technological process - [k_u13, k_u20]

Social competences:
1. the student is aware of the role of manufacturing processes in the economy and human life. - [k_k02]
2. the student shows an active attitude in creating the processing of theorem. pcs - [k_k05]
3. the student is able to interact and work in a group, assuming different roles in it. - [k_k03]
4. the student is determined to achieve the goals set for him - [k_k04]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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Lecture:
Passing on the basis of a written exam consisting of 5 general questions (pass if the correct answer to at least 3 questions: <3? Ndst .; 3? Dst; 3.5? Dst +; 4? Db; 4.5? Db +; 5 ? vg) carried out at the end of the semester.
Laboratories:
Passing on the basis of a written test on the content of each laboratory and reports from each laboratory according to the instructions of the teacher (positive assessment of the answers and the report).

Programme content

Lecture:
Non-conventional injection molding includes the production of sandwich and mono-sandwich type products, as well as precision parts (micro-injection molding), and the use of additional media such as gas and water.
Equipment supporting the injection molding and extrusion processes, such as static and dynamic mixers.
Production of special products, namely CD and DVD media, and PA/Al/PE pipes.
Processing of magnetically soft and hard polymers and biodegradable materials.
Lab:
1. Production of flat foil in the "chill-roll" technology.
2. Plastic injection with the use of a dynamic mixer
3. Analysis of the precision injection molding process of plastic products
4. Stability analysis of the plastic extrusion process
5. Extrusion of plastics on twin-screw extruders.
6. Injection of bio-degradable plastics.

Course topics

Lecture:
1. Special injection technologies: sandwich and mono-sandwich.
2. Gas and water assisted injection technology.
3. Micro-injection technology.
4. The use of static and dynamic mixers in injection and extrusion technologies.
5. Production of CDs and DVDs.
6. Manufacturing of multilayer PA / Al / PE pipes for hot water.
7. Preparation of polymeric soft and hard materials.
8. Processing of bio-degradable plastics.
Lab:
1. Production of flat foil in the "chill-roll" technology.
2. Plastic injection with the use of a dynamic mixer
3. Analysis of the precision injection molding process of plastic products
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Teaching methods

1. Lecture: multimedia presentation, presentation illustrated with examples given on the blackboard.
2. Laboratory exercises: practical exercises, carrying out experiments, discussion, team work.

Bibliography

Basic
1. Bociąga E: Specjalne metody wtryskiwania tworzyw polimerowych, WNT, Warszawa 2010
2. Praca zbiorowa. Poradnik "Tworzywa sztuczne", WNT, Warszawa 2006
3. Haponiuk J.T.; Tworzywa sztuczne w praktyce; Wyd. Verlag Dashofer, Warszawa 2008
Additional
1. Czasopisma: Plastics Review, Rubber Review, Plast News, Tworzywa Sztuczne
2. Sikora R., Przetwórstwo tworzyw wielkocząsteczkowych, Wyd. Pol. Lubelskiej 2006

Breakdown of average student's workload

	Hours	ECTS
Total workload	65	2,00
Classes requiring direct contact with the teacher	40	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	15	1,00