COURSE DESCRIPTION CARD - SYLLABUS

Course name

Materials processing technologies

Course

Field of study

Materials Engineering

Year/Semester

2/3

Area of study (specialization)

Metal and Polymeric Materials

Profile of study

general academic

Level of study

Second-cycle studies

Course offered in

Polish

Form of study

full-time

Requirements

elective

Number of hours

Lecture

15

Laboratory classes

15

Other (e.g. online)

Tutorials

Projects/seminars

Number of credit points

2

Lecturers

Responsible for the course/lecturer:

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Wydział Inżynierii Mechanicznej

Instytut Technologii Materiałów

ul. Piotrowo 3, 60-965 Poznań

Responsible for the course/lecturer:

Prerequisites

Student has basic knowledge of physics and materials science (including heat transfer, flows, stresses, materials science, crystallization, phase transformations), CAD geometry systems and the basics of manufacturing engineering. Has also skills in Acquiring information from literature survey and internet, is able to use the acquired knowledge to choose a technology selection strategy and understand the necessity to learn, taking new knowledge and collaboration in a workgroup.

Course objective

Learning about selected non-waste manufacturing technologies used in material technologies

Course-related learning outcomes

Knowledge

1. The student has detailed knowledge in the field of non-waste technologies, knows contemporary trends and directions of development of foundry K2_W06
2. The student is able to propose a method of manufacturing a product depending on the assumed needs K2_W04
3. The student is able to identify modern materials and technologies of their processing K2_W04
4. The student is able to indicate the use of computer systems in material technologies K2_W07

Skills

1. The student is able to select the manufacturing technology for products shaped by material technologies K2_U11
2. The student is able to use rapid prototyping methods for the production of metal products K2_U19
3. The student has the necessary preparation to work in an industrial environment. The student is able to carry out the process of manufacturing castings in a safe manner K2_U14

Social competences

1. The student understands the need for continuous learning; can inspire and organize the learning process of team members K2_K01
2. The student is able to cooperate and work in a team, assuming different roles K2_K03
3. The student is able to think and act in a creative and entrepreneurial way K2_K06

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture:

Written exam at the end of the semester (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% up to 90.0% - db +, from 90.1% to 100% - bdb.

Laboratories:

Participation in laboratory classes. Providing an oral or written answer to the teacher, graded on a scale from 2 to 5. Final grade on a grade scale from 2 to 5, the average of the obtained laboratory grades (all must be positively assessed, above 2)

Programme content

Application of the Rapid Prototyping method in foundry. Place of computer support in the design of casting technology. Modeling and simulation methods of complex foundry processes. Computer simulation of the casting process. Thermophysical databases in simulation systems. Characteristics of selected special casting manufacturing methods Application examples. Modern molding methods and production lines.

Manufacture of precision castings from models made by Rapid Prototyping. Pouring molds under the action of centrifugal force or vacuum. Computer simulation of the casting process in Magmasoft. Optimization of the casting supply conditions using the simulation of the casting process.

Teaching methods

Lecture: multimedia presentation illustrated with examples given on the blackboard, solving problems.
Laboratory exercises: performing experiments, solving problems, discussion, working in a team.

Bibliography

Basic

1. M. Perzyk i inni, Odlewnictwo. WNT, Warszawa 2004
2. Inżynieria produkcji, Karpiński T., WNT, Warszawa, 2004
3. Poradnik Odlewnika, Sobczak J., Wyd. Stowarzyszenia Technicznego Odlewników Polskich, Tom 1, Kraków 2013.
4. Poradnik Odlewnika, Sobczak J., Wyd. Stowarzyszenia Technicznego Odlewników Polskich, Tom 1, Kraków 2013.
5. D.M. Stefanescu, Science and Enginnering of Casting Solidification. Springer Verlag.2009

Additional

1. Virtual prototyping w odlewnictwie. Bazy danych i walidacja., Ignaszak Z., Wyd. Politechniki Poznańskiej, Poznań, 2002

2. Metalurgia i odlewnictwo, Szweycer M., Nagolska D., Wyd. Politechniki Poznańskiej, Poznań, 2002

Breakdown of average student's workload

	Hours	ECTS
Total workload	70	2,0
Classes requiring direct contact with the teacher	35	1,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	35	1,0

[1] delete or add other activities as appropriate