



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Metallurgy and foundry

Course

Field of study

Education in Technology and Informatics

Area of study (specialization)

-

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

1/2

Profile of study

general academic

Course offered in

Polish

Requirements

compulsory

Number of hours

Lecture

15

Laboratory classes

15

Other (e.g. online)

0

Tutorials

0

Projects/seminars

0

Number of credit points

2

Lecturers

Responsible for the course/lecturer:

Dorota Nagolska

Responsible for the course/lecturer:

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Wydział Inżynierii Mechanicznej

ul. Piotrowo 3, 60-965 Poznań

hala A15

Prerequisites

Knowledge: Basics of chemistry and physics of solids, liquids and gases.

Skills: Logical thinking. Use of information sources (library, internet). The ability to perceive the lecture content.

Social competences: Understanding the need to learn and acquire new knowledge.

Course objective

Getting to know the theoretical basis and course of metallurgical and foundry processes, classic casting technologies.



Course-related learning outcomes

Knowledge

1. Has a basic, structured knowledge of metal materials used in mechanical engineering, such as iron, aluminum, copper alloys, and in particular about the methods of their production
2. Has a basic knowledge of metal casting techniques used in the machinery industry

Skills

1. Can design casting technology for a simple machine component.
2. Can use the technical language to a degree enabling the understanding of technical texts in the field of metallurgy and foundry (knowledge of technical terminology)

Social competences

1. Is ready to critically assess the knowledge and content received
2. Is willing to think and act in an entrepreneurial manner

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture

Written credit. Positive evaluation in the case of obtaining min. 50.1% correct answers. Up to 50.0% - ndst, from 50.1% to 60.0% - dst, from 60.1% to 70.0% - dst +, from 70.1 to 80 - db, from 80.1% to 90 , 0% - db +, from 90.1% - very good.

Laboratories

Positive written or oral answers to the teacher's questions, reports accepted by the teacher.

Programme content

Lecture:

Definition of metallurgy. Basic concepts related to metallurgy. Stages of producing metals and alloys. Metallic compounds. Primary and secondary metals. Ores, their characteristics and methods of processing. Ways of enriching ores. Initial metallurgical process. Characteristics of the raw metal. Contaminants in metals and alloys: origin, form and properties. Methods of metal refining. Refined metal (characteristics, properties, purpose). Ingots and their processing. Ferrous metallurgy. Blast furnace. Blast furnace input, process course and its products. Steel pig iron. Steelmaking process. The stages of the process and its course and effect. Steel casting. Production of cast iron. Cast iron spheroidization. Obtaining selected non-ferrous metals (e.g. aluminum, copper, titanium, magnesium). Casting of ingots. Division, construction and application of metallurgical and foundry furnaces. Basic concepts related to foundry.

Casting materials (basic characteristics and application). Foundry molds. Shaping of a casting in a casting mold. The gating system - elements, purpose, operation. Metal flow through the gating system and



filling the mold. Formation of the casting surface layer. The solidification and cooling of the metal. The course of clotting. Desorption of impurities. Systolic phenomena before and after casting solidification. Feeding shrinkage. Feeding of castings - rules. Control of the coagulation process. Feeder and chills. Foundry shrinkage. Free and inhibited contraction. Removal of castings from molds. Final treatment of castings. The quality of castings. Casting inspection and repair. Overview of casting manufacturing methods. Features of castings and methods of their production.

Exercises:

1. Introduction (compliance with health and safety rules in the foundry)
2. Investigation of selected properties of molding / core sand.
3. Making castings by hand molding.
4. Die casting.
5. Special casting methods.
6. Computer simulation of selected casting processes.
7. Identification and evaluation of the features of castings obtained by various methods

Teaching methods

Presentations, films, counting tasks, practical tasks.

Bibliography

Basic

1. Szweycer M., Nagolska D., Metalurgia i odlewnictwo, Wyd. Politechniki Poznańskiej Poznań 2002.
2. Jackowski J., Podstawy odlewnictwa. Ćwiczenia laboratoryjne, Wyd. Politechnika Poznańska 1993
3. Tabor A., Odlewnictwo , Wyd. Politechniki Krakowskiej, Kraków 2007

Additional

1. Błaszowski K., Technologia formy i rdzenia. WSiP, Warszawa 1979 lub 1984
2. Górny Z., Odlewnicze stopy metali nieżelaznych, Przygotowanie ciekłego metalu, struktura i właściwości, WNT Warszawa 1992
3. Perzyk M. i inni , Odlewnictwo, WNT Warszawa 2000



Breakdown of average student's workload

	Hours	ECTS
Total workload	55	2,0
Classes requiring direct contact with the teacher	30	1,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) ¹	25	1,0

¹ delete or add other activities as appropriate