COURSE DESCRIPTION CARD - SYLLABUS

Course name
Metallurgy and foundry

Course

Field of study
Biomedical Engineering

Year/Semester
1/2

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
compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
15	15	
Tutorials	Projects/seminars	

Number of credit points

3

Lecturers

Responsible for the course/lecturer:
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Responsible for the course/lecturer:
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Prerequisites

Basic in the field of chemistry and physics of solid, liquid and gas state; logical thinking, use of information sources (library, internet); understanding the need to learn and acquire new knowledge.

Course objective

Knowledge of basic phenomena and processes related to obtaining metal materials and casting processes

Course-related learning outcomes

Knowledge

1. Identify the basic physical and chemical phenomena occurring in metallurgy - [K_W11]

2. Describe the relationship between basic metallurgical processes and their effects - [K_W11]

3. Describe the specificity of metallurgical and foundry processes - [K_W11]

4. Describe the basic casting technologies - [K_W11]

Skills

1. The student has the necessary preparation to work in an industrial environment and knows the safety rules related to this work - [K_U12]

2. Student is able to safely perform the casting process for the selected casting technology - [K_U12]

3. Student is able to choose the casting technology depending on the product requirements - [K_U12]

Social competences

1. Understands the need for lifelong learning; is open to cooperation with specialists from other (related) fields - [K_K01]

2. Is able to interact and work in a group, assuming various roles in it - [K_K03]

3. Willingness to exchange views on professional topics - [K_K07]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Written test carried out on the end of the term (in case of a credit min. 50.1% correct). Up to 50.0% - unsatisfactory (2.0) = F, from 50.1% to 60.0% - Satisfactory (3.0) = E, from 60.1% to 70.0% - Satisfactory plus (3,5) = D, from 70.1 to 80 - Good (4.0) = C, from 80.1% to 90.0% - Good plus (4,5) = B, from 90.1% - Very good (5,0) = A.

Laboratory: Passing the credit is conditioned by a positive assessment of each of the exercises (presence, written or oral answer to the topics indicated by the laboratory teacher.)

Programme content

Lecture:

Stages of producing metals and technical alloys. Raw materials used in metallurgical processes. Ores, their characteristics, purposes and methods of processing. Preliminary metallurgical processes and their effects. Raw (primary) metal and its characteristic properties. Classification of basic metal alloys. Contamination in liquid metals and alloys, their sources, form of occurrence and impact on the quality of the material. Refining treatments - their purpose, course and results. Examples of the production of technical alloys of ferrous and non-ferrous metals. Foundry molds - raw materials and methods of

making them. Characteristic features and properties of foundry molds. Physico-chemical phenomena during filling molds with liquid casting material. Influence of cooling and solidification conditions of liquid metal on the properties of the casting. Overview of casting methods. Features of castings and methods of their production.

Laboratory :

1. Preparation and testing of the basic properties of molding sand.

2. Sand casting.

3. Die casting.

4. Special casting methods (lost wax method and casting in shell molds).

5. Application of computer technology in foundry.

6. Comparison of the features of castings obtained with different methods.

Teaching methods

Lecture with the use of multimedia presentations. Laboratory: performance of tasks given by the teacher - practical exercises.

Bibliography

Basic

1. Szweycer M., Nagolska D.: Metalurgia i odlewnictwo. Wyd. PP, Poznań 2002

2. Jackowski J.: Podstawy odlewnictwa. Ćwiczenia laboratoryjne, Wyd. PP, Poznań 1993

3. Perzyk M., Waszkiewicz S., Kaczorowski M., Jopkiewicz A.: Odlewnictwo. WNT , Warszawa 2000

4. Tabor A.: Odlewnictwo. Wyd.Politechniki Krakowskiej, Kraków 2009

Additional

1. Górny Z. :Odlewnicze stopy metali nieżelaznych. WNT , Warszawa 1992

2. Braszczyński J. : Teoria procesów odlewniczych. PWN , Warszawa 1989

3. Łybacki W., Modrzyński A., Szweycer M. : Technologia topienia metali. Wyd. PP Poznań 1986

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	45	2
Student's own work (literature studies, preparation for laboratory classes, preparation for tests) [1]	30	1,0

[1] delete or add other activities as appropriate