



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Metallurgy and foundry

### Course

Field of study

Management and Production Engineering

Area of study (specialization)

Level of study

First-cycle studies

Form of study

part-time

Year/Semester

1/2

Profile of study

general academic

Course offered in

Polish

Requirements

compulsory

### Number of hours

Lecture

10

Laboratory classes

8

Other (e.g. online)

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. Learning about casting technology.

### Course-related learning outcomes

Knowledge

1. The student is able to describe the process steps for producing metals and metal alloys



2. The student is able to describe the process of obtaining iron alloys
3. The student is able to recognize the methods of casting process
4. Student can identify relationships between technology and the foundry castings characteristics

#### Skills

1. The student is able to choose the production technology for simple castings
2. The student is able to make a simple cast in accordance with the principles of health and safety
3. The student is able to assess the quality of the castings and determine the cause of casting defects

#### Social competences

1. The student is open to discuss technical issues
2. The student is able to think and act in an entrepreneurial manner
3. The student understands technical and non-technical aspects related to casting technology

#### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Written test carried (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:

Metal ores. Stages of the metallurgical process. Primary and secondary metals. Ways of enriching ores. Ways to merge concentrate. Initial metallurgical process. Contaminants in metals and alloys: origin, form and properties. Refining processes, their purpose, methods, course and effect. Refined metal (characteristics, properties, purpose). Ferrous metallurgy. Blast furnace - construction. Blast furnace input, process course and its products. Molten iron. Steelmaking process. The stages of the process and its course and effect. Examples of the production of technical alloys of non-ferrous metals. Basic concepts related to foundry. Casting materials. Shaping of a casting in a casting mold. The gating system - elements, purpose, operation. The course of clotting. Systolic phenomena before and after casting solidification. Feeding of castings - rules. Control of the solidification of castings. Risers and chillers. Foundry shrinkage. Classification of casting production methods. Overview of casting production methods. Relationships between technology and the foundry castings characteristics.

##### Laboratory :

1. Sand casting.



2. Die casting.
3. Special casting methods (lost wax method and casting in shell molds).
4. 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	20	1,0
Student's own work (literature studies, preparation for laboratory classes, preparation for tests,preparation of reports from laboratories) <sup>1</sup>	55	2,0

<sup>1</sup> delete or add other activities as appropriate