COURSE DESCRIPTION CARD - SYLLABUS

Course name
Metallurgy and foundry [S1IMat1>MiO]

Course

Field of study
Materials Engineering

Year/Semester
1/2

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
15

Laboratory classes
15

Other (e.g. online)
0

Tutorials
0

Projects/seminars
0

Number of credit points

3,00

Coordinators

dr inż. Dorota Nagolska
dorota.nagolska@put.poznan.pl

Lecturers

dr hab. inż. Piotr Mikołajczak
piotr.mikolajczak@put.poznan.pl

dr inż. Dorota Nagolska
dorota.nagolska@put.poznan.pl

Prerequisites

Basic knowledge of chemistry and physics of solids, liquids and gases. the ability to think logically and to obtain information (library, Internet). Awareness of the need for education and broadening the scope of knowledge

Course objective

Understanding the basic phenomena and processes related to obtaining metal materials and shaping products (castings) from them

Course-related learning outcomes

Knowledge:
1. the student should identify the basic physical and chemical phenomena occurring in the course of the following processes: ore (metalliferous mineral)? primary metal. - [k_w03]
2. distinguish the relationship between basic metallurgical processes and their effects. - [k_w12,

k_w03]
3. identify the specificity of metallurgical and foundry treatments and processes. - [k_w12]
4. describe the basic casting technologies. - [k_w12]

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. is able to safely perform the casting process for the selected casting technology - [k_u12]
3. select the casting technology depending on the product requirements. - [k_u16]

Social competences:
1. understands the need for lifelong learning; is open to cooperation with specialists from other (related) fields. - [k_k01]
2. can interact and work in a group, assuming different roles in it. - [k_k03]
3. readiness to exchange views on professional topics. - [k_k07]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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Lecture: Credit based on a written test: 4-5 questions. Each answer is assessed on a scale of 2 ÷ 5 (na / vv). Pass: average> 3. Colloquium at the end of the semester.
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 manufacturing metals and technical alloys. Metallic raw materials. Rudy, their characteristics, purposes and methods of processing. Physical phenomena and chemical reactions. Preliminary metallurgical processes and their effects. Raw (primary) metal and its characteristics. Impurities in liquid metals and alloys, their sources, form and impact on the quality of the material. Refining treatments, their purpose, course and effects. Examples of the production of technical alloys of ferrous and non-ferrous metals. Foundry molds? raw materials and methods of their production. Characteristic features and properties of foundry molds. Physico-chemical phenomena during filling molds with liquid casting material. Relations between the conditions of cooling and solidifying a metal and the structure of the material and properties of the casting. Control of the structure and properties of castings. Overview of casting methods. Features of individual methods and obtained castings. Control of technological processes and the quality of castings. Basics of designing a technological process in a foundry. Technological documentation.
Lab :
1. Preparation and testing of the basic properties of molding sand.
2.Manual molding.
3. Die casting.
4. Producing precision castings (smelting metals 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

1st lecture: multimedia presentation, presentation illustrated with examples given on the board,
2. laboratory exercises: practical exercises, performing experiments, discussion, team work, case studies.

Bibliography

Basic
1. Szweycer M., Nagolska D. : Metalurgia i odlewnictwo. Wyd. PP, Poznań 2002
2. Perzyk M., Waszkiewicz S., Kaczorowski M., Jopkiewicz A.: Odlewnictwo. WNT ? Warszawa 2000
3. Tabor A. : Odlewnictwo. Wyd.Politechniki Krakowskiej, Kraków 2009
4. Laboratorium z odlewnictwa. Praca zbiorowa pod red. K.Granata, Oficyna Wyd. Politechniki Wrocławskiej, Wrocław 2007, 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	60	3,00
Classes requiring direct contact with the teacher	35	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	15	1,00