



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Project of casting products

Course

Field of study

Management and Production Engineering

Area of study (specialization)

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

3 / 6

Profile of study

general academic

Course offered in

Polish

Requirements

elective

Number of hours

Lecture

15

Laboratory classes

-

Other (e.g. online)

-

Tutorials

-

Projects/seminars

15

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

PhD. Eng. Jakub Hajkowski

Responsible for the course/lecturer:

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Management

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Prerequisites

Student has basic knowledge of materials technology, machine construction, electrical engineering, automation. Has also skills in Acquiring information from literature survey and internet and analyzing technology with executive devices and understand the necessity to learn, taking new knowledge and collaboration in a workgroup.

Course objective

Student should obtain knowledge about automation of materials processing processes and automated devices in foundry.



Course-related learning outcomes

Knowledge

1. Student is able to describe casting methods, has basic knowledge related to the issue of the impact of various types of liquid alloy modification and casting technology on the structure and structure on mechanical properties - [K_W09]
2. Has basic knowledge of filling the mold with liquid alloy and feeding the castings, - [K_W03 K_W09]
3. Has basic knowledge of designing the geometric shape of the casting - [K_W09]

Skills

1. Can develop a concept of casting technology - [K_U03]
2. Is able to choose the process of liquid alloy modification, the method of making the cast in order to obtain the possible refines and geometric shape of the crystals in the structure - [K_U14]

Social competences

1. Can work on a given task independently and cooperate in a team - [K_K03]
2. Understands the need for continuous training to improve professional qualifications - [K_K01]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: written test (4 questions); the correct answer to 2 questions assessment - 3.0, 3 questions - 4.0, 4 questions - 5.0.

Design:

- project made correctly, there are small calculation errors and drawings, the student can answer questions about the content of the project, can partially describe the process of filling the mold, supplying the casting and changing the structure (50%) assessment -3.0,
- project made correctly, the student can answer questions about the content of the project, can describe the process of filling the mold, supplying the casting and changing the structure (70-90%) assessment - 4.0,
- project made correctly, the student can answer questions about the content of the project, can describe the process of filling the mold, supplying the casting and changing the structure (over 90%) rating - 5.0.

Programme content

Lecture

1. Impact of the casting method, casting material and mold material on the geometric shape of the casting, surface quality and structure of the casting.



2. The impact of the cooling rate on the shape of the separated phases in the microstructure and shrinkage defects in castings. Changing the geometric shape of the phases in the cast microstructure as a result of chemical, mechanical and heat treatment.
3. Solidification of iron and aluminum castings.
4. Examples of metallurgical and technological processes resulting in a change in structure (size, phase shape and proportion of porosity).
5. Technology of casting construction. Rules for filling the mold cavity.
6. Supply of castings depending on the type of alloy.
7. Principles of developing a raw casting drawing and the concept of casting technology.

Design

Development of the casting technology design (project content: structural drawing of the part, drawing of the raw casting, number of springs, minimum module (s) of the sprue (s), dimensions of the sprue (s) and its solidification module, calculation of the pouring time and cross-sectional area of the filler system, drawing concept of casting technology).

Teaching methods

Lecture: multimedia presentation, illustrated with examples on the board.

Project: performance of tasks given by the teacher.

Bibliography

Basic

1. M. Perzyk i inni, *Odlewnictwo*. WNT, Warszawa 2004.
2. E. Fraś, *Kryształizacja metali* PWN Warszawa 2003.
3. M. Perzyk i inni, *Materiały do projektowania procesów odlewniczych*. PWN Warszawa 1990.

Additional

1. Praca zbiorowa red. J. Sobczak, *Poradnik Odlewnika. Odlewnictwo Współczesne, Tom 1 MATERIAŁY*, Wydawnictwo Stowarzyszenia Technicznego Odlewników Polskich, Kraków 2013.
2. J. Campbell, *Complete Casting Handbook, Metal Casting Processes, Metallurgy, Techniques and Design*, wyd.2, Elsevier Butterworth-Heinemann, 2015.
3. S. Karpiński, T. Karpiński, *Podstawy odlewnictwa*. Wyd. Politechniki Koszalińskiej, Koszalin 2009.



Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	35	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) ¹	40	1,0

¹ delete or add other activities as appropriate