COURSE DESCRIPTION CARD - SYLLABUS

Course name
Special manufacturing processes [N1ZiIP2>STW]

Course

Field of study
Management and Production Engineering

Year/Semester
3/6

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
part-time

Requirements
elective

Number of hours

Lecture
8

Laboratory classes
16

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

3,00

Coordinators

Lecturers

Prerequisites

Basic knowledge of manufacturing processes. Logical thinking, analysing occurring phenomena, using knowledge acquired from scientific, technical and popular literature. Understanding the need to learn and acquire new knowledge.

Course objective

Learning about special manufacturing processes using casting and plastics processing methods.

Course-related learning outcomes

Knowledge:
1. The student is able to characterize the use of special methods of manufacturing products.
2. The student is able to characterize special methods of manufacturing products.
3. The student is able to indicate the relationships between individual foundry and plastics processing technologies and the characteristics of products obtained in these processes.

Skills:
1. The student is able to select manufacturing technology for products depending on the requirements.
2. The student is able to make a product in accordance with health and safety regulations.
3. The student is able to assess the quality of manufactured products and determine the causes of any

defects.

Social competences:
1. The student is able to convey information about casting and plastic processing in a generally understandable way.
2. The student is able to determine the technical and non-technical conditions related to casting and plastic processing technology.
3. The student is able to think and act in an entrepreneurial manner.
4. The student understands the need for continuous education.
5. The student is able to cooperate and work in a group, assuming different roles in it.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture:
Written assessment. A positive assessment if at least 50% of correct answers are obtained. Assignment of grades to percentage ranges of results: <90-100> very good; <80-90) good plus; <70-80) good; <60-70) satisfactory plus; <50-60) satisfactory; <0-50) unsatisfactory.
Laboratory:
Assessment based on an oral or written answer from the content of each laboratory exercise performed, a report from each laboratory exercise according to the instructions of the laboratory instructor. To obtain a credit for the laboratories, all exercises must be passed (a positive assessment of the answers and reports passed).

Programme content

Characteristics of special methods of manufacturing castings and plastic products. Equipment used in special manufacturing methods. Characteristics of features of products obtained in special manufacturing methods. Selection of technology depending on the requirements set by the product.

Course topics

Lecture:
Classification of casting production methods. Review of casting production methods. Comparison of machine molding with special casting production methods: die casting, casting by the melted pattern method (and variations of this method), pressure die casting, centrifugal casting. Features of castings and their production methods. Characteristics of equipment used in casting processes. Precision casting methods and their scope of application. Application of 3D printing in foundry engineering.
Technological properties of polymer materials. Influence of technological parameters of processing processes on the properties of manufactured plastic products. Classification and characterization of plastic processing methods. Preparation of raw materials for processing. Technologies: injection, extrusion, lamination, thermoforming, rotational casting, pressing of polymer materials. Methods of joining polymer materials. Technology of applying polymer materials to metal products. Composite materials and directions of development of modern plastic processing technologies. Typical defects of plastic products made using various technologies and methods of their prevention.Laboratory:
Laboratory:
1. Application of 3D printing for making models - making tooling based on a 3D model design (making a model design, printing the model on a 3D printer)
2. Making plaster molds (a mold using a model made using the 3D printing method)
3. Making precision castings
4. Making castings using polystyrene models and die casting method
5. Injection technology
6. Extrusion technology
7. Vacuum thermoforming and joining plastics.
8. Applying polymer coatings to metal products.

Teaching methods

Lecture: multimedia presentation, films presenting selected technologies.
Laboratory: performing experiments, solving tasks, discussion, teamwork.

Bibliography

Basic:
1. Jackowski J.: Podstawy odlewnictwa. Ćwiczenia laboratoryjne. Wydawnictwo PP, Poznań, 1993
2. Sikora R.: Przetwórstwo tworzyw wielkocząsteczkowych. Wyd. ZAK , Warszawa 1997
3. Saechtling H.: Tworzywa sztuczne Poradnik, WNT, 2000.

Additional:
1. Nagolska D., Szweycer M.: Technologia materiałów. Metalurgia i Odlewnictwo, Wydawnictwo Politechniki Poznańskiej, Poznań 2002
2. Perzyk M. i inni,: Odlewnictwo. WNT, Warszawa 2004
3. Czasopisma: Plastics Review, Rubber Review, Plast News, Tworzywa Sztuczne
4. Haponiuk J.T.: Tworzywa sztuczne w praktyce. Wyd. Verlag Dashofer, W-wa 2008r.plastycznej, Wyd. Śląsk, 1986

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,00
Classes requiring direct contact with the teacher	24	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	51	2,00