



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Thermal spraying and surfacing by welding

Course

Field of study

Product Lifecycle Engineering

Area of study (specialization)

Level of study

Second-cycle studies

Form of study

full-time

Year/Semester

2/3

Profile of study

general academic

Course offered in

English

Requirements

elective

Number of hours

Lecture

15

Laboratory classes

15

Other (e.g. online)

Tutorials

Projects/seminars

Number of credit points

2

Lecturers

Responsible for the course/lecturer:

Ph.D. Eng. Artur WYPYCH

Responsible for the course/lecturer:

Prerequisites

Basic knowledge of physics, chemistry and materials science.

Course objective

Presentation of the essence of contemporary methods of thermal spraying and surfacing by welding used in the aspect of changing the properties of details surface layers. Explanation of the mechanism for joining a heteronominial materials without thermal effects on the native material - HAZ absence.

Presentation the application aspect of thermal spraying and surfacing by welding methods in various production fields in the shipbuilding, energy, defense industries, aviation, automotive, metallurgy, waste processing and management, implantology, sports equipment and daily use equipment.

Course-related learning outcomes

Knowledge

The graduate knows and understands the essence of thermal spraying and surfacing by welding with various methods, is able to choose the method of surface layer modification and also coating / additional material for a specific case, has an idea what techniques dominate in a given product group, what are their advantages and disadvantages.



Skills

The graduate will not design processes, but is able to choose the best thermal spraying or surfacing by welding method, taking into account costs and accuracy, will be able to prepare joining preliminary documentation.

Social competences

The graduate will be able to start a discussion and precisely present the problem, will be an organizationally prepared to lead the team.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture material - passing in the form of a written test.

Laboratory material - passing in the form of a project task, the topic of which is determined by the person responsible for the subject.

Programme content

The essence of thermal spraying and surfacing by welding with various methods. Characteristics of in coating and surfacing properties changes as a function of process parameters and also coating / additional material. Mechanism of coating deposition. The essence of surface expansion at the preparatory stage before spraying. Criteria for the selection of coating / additional material. Rules for the preparation of process executive documentation. Methodology for changing the properties of surface layers in the aspect of producing new details and in the regeneration process. Research methodology in coating quality assessment.

Teaching methods

Verbal method of transferring essential content along with multimedia imaging and using a traditional table and details in the form of samples made with currently discussed methods. Based on the lecture knowledge, individual work of the student in the laboratory under the supervision of the person responsible for the subject.

Bibliography

Basic

1. The science and engineering of thermal spray coatings, L. Pawłowski, John Wiley & Sons, cop. 2008,
2. Alloying, J.L. Walter, M.R. Jackson, C.T. SimsASM International, 1988.

Additional

1. Handbook of thermal spray technology, J.R. Davis, ASM International, 2004,
2. Welding Fundamentals, W. A. Bowditch, K. E. Bowditch, M. A. Bowditch, Goodheart-Willcox, 2017.



Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,0
Classes requiring direct contact with the teacher	30	1,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) ¹	20	1,0

¹ delete or add other activities as appropriate