



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Flaw detection and inspection of products [S1IMat1>DiKW]

Course

Field of study	Year/Semester
Materials Engineering	3/5
Area of study (specialization)	Profile of study
–	general academic
Level of study	Course offered in
first-cycle	Polish
Form of study	Requirements
full-time	compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
15	15	0
Tutorials	Projects/seminars	
0	0	

Number of credit points

2,00

Coordinators

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Lecturers

Prerequisites

The student has basic knowledge of physics and materials science. Has the ability to think logically, to use information obtained from the library and the Internet. Understanding the need to learn and new knowledge gaining.

Course objective

Knowledge the methods of inspection and non-destructive testing

Course-related learning outcomes

Knowledge:

1. student should characterize various types of destructive and non-destructive testing methods. [k_w02, k_w03, k_w07, k_w08]
2. student should select the parameters of destructive and non-destructive testing processes. - [k_w07, k_w10, k_w16]
3. student should define the basic defects occurring in the thermally sprayed coatings. - [k_w10, k_w12]
4. student should define the basic defects occurring in the joints. - [k_w10, k_w12]

Skills:

1. student is able to use devices for testing the quality and controlling bonded joints. - [k_u01, k_u05, k_u12]
2. student is able to choose the initial conditions of the research processes. - [k_u08, k_u21]
3. student is able to interpret the obtained results. - [k_u07, k_u09, k_u21]

Social competences:

1. the student is able to work in a group. - [k_k01, k_k03, k_k04]
2. the student is aware of the role of the bonding research and control processes in the modern economy and for society. - [k_k06, k_k07]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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Lecture: pass on the basis of a test consisting of 5 general questions (pass if the correct answer to at least 3 questions: <3 = ndst, 3 = dst, 3,5 = dst+, 4 = db, 4,5 = db+, 5 = bdb) carried out at the end of the semester.

Laboratory: Assessment based on an oral or written answer concerning the content of each performed laboratory exercise, a report on each laboratory exercise according to the instructions of the laboratory teacher. In order to pass the laboratories, all exercises must be passed (positive grade from the answers and the report).

Programme content

Lectures:

1. Destructive and non-destructive methods of testing products.
2. Defectoscopy and technical control methods.
3. Industrial radiography, ultrasonic, magnetic and penetration defectoscopy, eddy current methods: physical basics, testing methods and techniques, defect detection and factors affecting it, advantages and limitations, apparatus, elements of the inspection process, application.
4. Comparison and principles of selection of non-destructive methods of product control.

Laboratories:

1. Ultrasonic defectoscope - construction and application.
2. Ultrasonic defectoscopic research methods and defect detection with their help.
3. Measurement of product thickness with ultrasonic methods.
4. visual examination of bonded joints.
5. Interpretation of radiographs.
6. Inspection of products using magnetic defectoscopy methods.
7. Examination of the quality of welds by penetration methods.

Course topics

The essence of the issues discussed in the course Defectoscopy and Product Inspection, is the identification and presentation of testing methods in the field of destructive and non-destructive testing, as well as the definition of the term "quality". Due to the utilitarian and technological aspect of the tested workpieces, the issues discussed in this course will identify and clearly define the aforementioned methods in relation to welds, surfacing and thermal sprayed coatings. Topics in a very broad, and at the same time in-depth, aspect describe the test methods that determine the quality of products produced by welding methods. At the same time, the evolution of apparatus and the adaptation of new analytical methods, based on physical phenomena, in this area, is continuously introduced to the course topics and presented to students in a way that explains the application possibility to quality determination.

Teaching methods

1. Lecture: multimedia presentation, presentation illustrated with examples given on the blackboard.
2. Laboratory exercises: practical exercises, carrying out experiments, discussion and processing the results in the form of a report

Bibliography

Basic

1. Wybrane metody badania materiałów, Senczyk D., Wyd. Politechniki Poznańskiej, Poznań, 1988

2. Badania nieniszczące. Podstawy defektoskopii, Lewińska-Romicka A., WNT, Warszawa, 2001

Additional

1. Wybrane metody badania materiałów, Senczyk D., Wyd. Politechniki Poznańskiej, Poznań, 1988

2. Badania nieniszczące. Podstawy defektoskopii, Lewińska-Romicka A., WNT, Warszawa, 2001

Breakdown of average student's workload

	Hours	ECTS
Total workload	60	2,00
Classes requiring direct contact with the teacher	35	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	15	1,00