COURSE DESCRIPTION CARD - SYLLABUS

Course name
Advanced research on mechanical properties [S2IMat1>ZBWM]

Course

Field of study
Materials Engineering

Year/Semester
1/2

Area of study (specialization)
Nanomaterials

Profile of study
general academic

Level of study
second-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

2,00

Coordinators

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Lecturers

Prerequisites

Basic knowledge of material strength and plasticity theory. Skills: logical thinking, using information obtained from the library. Student understanding the need to learn and acquire new knowledge.

Course objective

Learning advanced methods of testing the mechanical properties of materials and structures.

Course-related learning outcomes

Knowledge:
1. the student has theoretically founded detailed knowledge related to advanced methods of testing mechanical properties - [k_w05]
2. knows the basic methods, techniques, devices for advanced testing of strength properties - [k_w10]

Skills:
1. is able to develop independently the results of the research - [k_u03]
2. can use information and communication techniques appropriate for the development of research results and preparation of a report - [k_u07]

3. can use advanced methods of testing the properties of engineering materials, use specialized research equipment to evaluate materials according to various criteria - [k_u10]

Social competences:
1. is aware of the importance and understanding of non-technical aspects and effects of engineering activities, including its impact on the environment, and the related responsibility for decisions made. - [k_k02]
2. can think and act in a creative and entrepreneurial manner. - [k_k06]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
Lecture: Oral final test.
Laboratories: Credits based on conversations about the reports made at the time of their reception, final test on the theory of the tests carried out, provided that all laboratory exercises are completed and all reports are accepted by the teacher.

Programme content

Lecture
Machines and their equipment for tensile testing.
Methods of sampling for tensile test.
Bending test - types, machines, instrumentation, influence of the sample shape on the stress state in the sample, selection of the sample shape depending on the material properties. Experimental test methods in biaxial stress.
Test methods at low and very high loading speeds
Laboratories
Tensile, compression, bending and shearing tests of modern materials (foams, composites)

Teaching methods

1. Lecture: multimedia presentation, presentation illustrated with examples given on the board,
2. Laboratory exercises: practical exercises, taking measurements, discussion, team work.

Bibliography

Basic
1. Z. L. Kowalewski. Współczesne badania wytrzymałościowe. Kierunki i perspektywy rozwoju. Biuro Gamma. Warszawa 2008
2. Badania eksperymentalne w wytrzymałości materiałów. Pod redakcją S. Joniaka, WPP, 2006
Additional
1. Polskie Normy

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