

Cracow University of Technology

Course syllabus

binding for the doctoral students of the CUT Doctoral School commencing their studies
in the academic year 2022/2023

Information on the course

Name of the course in Polish	Metodyka Badań Doświadczalnych Materiałów i Konstrukcji
Name of the course in English	Methodology of Experimental Tests for Materials and Structures
Number of the ECTS points	1
Language of instruction	Polish
Category of the course	Choosable
Field of education	Engineering and Technology
Discipline of education	Civil Engineering and Transport
Person responsible for the course Contact	CUT Prof. Lucyna Domagała PhD Eng. lucyna.domagala@pk.edu.pl

Type of course, number of hours in the study programme curriculum

Semester	Credit type (G / NG)*	Lecture	Practical classes	Laboratory	Computer Lab	Project Class	Seminar
2, 3, 4, 5	G	15	0	0	0	0	0

*G – graded credit, NG – non-graded credit

Course objectives

Code	Objective description
Objective 1	Expanding knowledge on modern laboratory testing methods and in situ testing of the properties of building materials
Objective 2	Expanding knowledge in the field of diagnostics of the technical condition of building structures
Objective 3	Acquiring the ability to select appropriate methods of testing building materials and structures and to carry out these tests.

Learning Outcomes

Code	Description of the learning outcome adjusted to the specific characteristics of the discipline	Learning outcome symbol in the CUT SD	Methods of verification
OUTCOMES RELATED TO KNOWLEDGE			
EUW1	A PhD student knows and understands the methodology of conducting modern laboratory tests of building materials and research of materials embedded in building and engineering structures	E_W01, E_W02	Involvement in class activities, a written assignment assessment

EUW2	A PhD student knows and understands the principles of diagnostics of the technical condition of building structures.	E_W01, E_W02	Involvement in class activities, a written assignment assessment
OUTCOMES RELATED TO SKILLS			
EUU1	A PhD student is able to choose the appropriate methods of testing the properties of building materials and correctly analyse and assess / classify the results obtained.	E_U01	Involvement in class activities, a written assignment assessment
EUU2	A PhD student is able to diagnose the technical condition of a building, including interpretation of the observed damage, plan and carry out the necessary tests, and prepare a technical study.	E_U01	Involvement in class activities, a written assignment assessment
EUU3	A PhD student is able to design and carry out a trial load of a building structure.	E_U01	Involvement in class activities, a written assignment assessment
OUTCOMES RELATED TO SOCIAL COMPETENCES			
EUK1	A PhD student is ready to critically evaluate the methodology of applied research on materials and structures and to analyse the results of these studies, described in the subject literature	E_K01	Involvement in class activities, a written assignment assessment
EUK2	A PhD student is ready to recognize the importance of knowledge about conducting research on materials and structures in the implementation of the process of monitoring, strengthening and repairing buildings	E_K03	Involvement in class activities, a written assignment assessment

Course outline

No.	Contents	Learning outcomes for the course	No. of hours
LECTURE			
W1	Objectives and general principles of conducting experimental research on building materials and structures. Examples of the so-called cognitive disasters. Causes of measurement errors.	EUW1, EUU1, EUK1, EUK2	2
W2	Physical and chemical properties of building materials. Selected methods of laboratory tests and in situ tests, taking into account the specificity of materials.	EUW1, EUU1, EUK1, EUK2	3
W3	Mechanical properties of building materials. Selected methods of laboratory tests and in situ tests, taking into account the specificity of materials.	EUW1, EUU1, EUK1, EUK2	2
W4	Diagnostics of building structures (periodic, temporary, target), identification of actual static diagrams for building structure elements, identification of actual loads and parameters of construction products, identification of the substrate and the environment.	EUW2, EUU2, EUK1, EUK2	2
W5	Scratches in reinforced concrete and masonry structures - interpretation, monitoring, repair and reinforcement. Assessment of damage to structural elements, a scale for assessing the technical condition of a building object.	EUW2, EUU2, EUK1, EUK2	2

W6	Principles of preparation of technical studies: protocol and test report; technical opinion, expertise, judgment.	EUW2, EUU2, EUK1, EUK2	2
W7	Test loads of building structures - classification, selection of the size and load pattern, methods of measuring deformations and displacements, test implementation.	EUW2, EUU2, EUU3, EUK1, EUK2	2

The ECTS points statement

WORKING HOURS SETTLEMENT	
Type of activity	Average number of hours (45 min.) dedicated to the completion of an activity type
SCHEDULED CONTACT HOURS WITH AN ACADEMIC TEACHER	
Hours allotted in the syllabus	15
Consultations	1
Examination / course credit assignment	1
HOURS WITHOUT THE PARTICIPATION OF AN ACADEMIC TEACHER	
Independent study of the course contents	8
Preparation of a paper, a report, a project, a presentation, a discussion	5
ECTS POINTS STATEMENT	
Total number of hours	30
The ECTS points number	1

Preliminary requirements

No.	Requirements
1	Not specified

Course credit assignment conditions / method of the final grade calculation

No.	Description
COURSE CREDIT ASSIGNMENT CONDITIONS	
1	75% attendance in class.
2	Oral credit for a written dissertation prepared by a PhD student on the methodology of experimental research on materials / structures related to the subject of a doctoral dissertation.
METHOD OF THE FINAL GRADE CALCULATION	
Assessment of the completion of the presented work, taking into account the attendance	

Additional information

Not specified

The course reading list

1	Budownictwo ogólne. Tom 1. <i>Materiały i wyroby budowlane</i> , praca zbiorowa pod redakcją B. Stefańczyka, 2010, Arkady.
2	<i>Badania materiałów budowlanych i konstrukcji inżynierskich</i> , praca zbiorowa pod redakcją M. Kamińskiego, 2004, Dolnośląskie Wydawnictwo Edukacyjne.

3	Drobiec Ł., Jasiński R., Piekarczyk A., <i>Diagnostyka konstrukcji żelbetowych: Metodologia, badania polowe, badania laboratoryjne betonu i stali</i> , Tom. 1; 2021, PWN.
4	Jaśniok M., Jaśniok T., Zybura A., <i>Diagnostyka konstrukcji żelbetowych: Badania korozji zbrojenia i właściwości ochronnych betonu</i> , Tom 2; 2021, PWN.
5	Madaj A., Wołowicki W., <i>Budowa i utrzymanie mostów. Wymagania techniczne, badania, naprawy</i> , 2013, Wydawnictwa Komunikacji i Łączności WKŁ
6	Czasopisma: <i>Cement-Wapno-Beton; Budownictwo-Techno-logie-Architektura; Przegląd Budowlany; Materiały Budowlane; Inżynieria i Budownictwo; Archiwum Inżynierii Lądowej; Cement and Concrete Research; Cement and Concrete Composites; Materials and Structures; ACI Materials Journal; ACI Structural Journal, PCI Journal, Structural Concrete, Magazine of Concrete Research</i> , etc.
7	PKN standards for testing materials, products and construction elements
8	Conference materials