

Tadeusz Kosciuszko Cracow University of Technology

Course Card

Faculty of Civil Engineering

Field of study: Civil Engineering

Study profile: general academic

Study form: full-time

Field of study code: BUD

Study cycle: 1st

Specialty: no specialty

1 COURSE INFORMATION

Course name	Materiały budowlane
Course name in English	Building Materials
Course code	WIL BUD oIS C17 24/25
Course category	Basic
No. of ECTS points	5.00
Semester	1 and 2

2 CLASS TYPE, NUMBER OF HOURS ACCORDING TO THE STUDY PLAN

Semester	Lecture	Class exercise	Laboratory	Computer lab	Design exercise	Seminar
1	15	15	0	0	0	0
2	0	0	30	0	0	0

3 COURSE OBJECTIVES

Objective 1 Providing students with information related to the general classification of building materials and products.

Objective 2 Getting students acquainted with the internal structure of various groups of materials and the ways they react to the factors acting on them during their lifetime.

Objective 3 Getting students acquainted with the general rules of production, properties and the application of particular building materials and products.

Objective 4 Getting students acquainted with the basic properties of building materials and products as well as the methods of laboratory assessment of them.

Objective 5 Preparing students for teamwork.

4 PREREQUISITES IN TERMS OF KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1 Basic knowledge of chemistry and physics within the scope of the high school program.

5 LEARNING OUTCOMES

LO1 Knowledge The student knows the basic groups of building materials and products as well as their assortments.

LO2 Knowledge: The student knows the internal structure of particular groups of building materials.

LO3 Knowledge The student knows the basic processes of production of various materials and products as well as their relationship with the properties of particular materials.

LO4 Knowledge: The student knows and is capable of explaining the influence and the mechanisms of the action of various environmental factors on the changes in the properties of materials and products during their lifetime.

LO5 Knowledge: The student knows the properties of particular groups of building materials and products as well as the directions for their applications.

LO6 Knowledge: The student knows the methods of determination of the properties of materials and products and can choose the necessary equipment.

LO7 Skills: The student can choose a building product appropriately to the conditions in which the product is used.

LO8 Knowledge Skills: The student can conduct laboratory tests of the chosen properties of building materials and products.

LO9 Social competences: The student can work independently and in a team on a given task.

6 COURSE CONTENT

Lecture		
No.	Subject matter of the course Detailed description of thematic blocks	No. of class hours
L1	Introduction, the scope of the subject, the basic definitions, material versus a building product. Basic information on standardization and attestation.	1
L2	Basic information concerning the durability of materials and products: environmental factors, the mechanisms and the results of their actions.	2

Lecture		
No.	Subject matter of the course Detailed description of thematic blocks	No. of class hours
L3	The general classification of building materials and products. The classification of the properties of building materials and the presentation of the basic physical properties.	1
L4	Stone materials and their application in civil engineering. Building ceramics: the basic processes of production, properties, the groups of burnt clay products.	2
L5	Thermal and acoustic insulation materials: required internal structure, porosity, the influence of material moisture content. Bitumens and the products for damp insulation.	2
L6	Timber (internal structure, anisotropy, species, properties, durability) and wood waste products. Presentation of sawmill products (structural timber).	2
L7	Glass in civil engineering: composition and types of glass, production of flat glass, other glass products.	2
L8	Mineral binders: air-hardening (lime, gypsum, anhydrite, magnesia) and hydraulic (hydraulic lime and cements).	3

Laboratory		
No.	Subject matter of the course Detailed description of thematic blocks	No. of class hours
L1	Presentation of the health and safety requirements for laboratory classes.	1
L2	Determination of the selected physical properties of building materials, such as: density by pycnometer and Le Chatelier flask, apparent density by direct method and by hydrostatic weighing, density index and porosity, water absorption along with the course of absorption, moisture content along with the course of drying (with the use of a moisture analyzer), the height of capillary action in porous materials.	5
L3	Methodology and determination of the selected properties of building stones, such as: compressive and flexural strength, abrasion resistance by Boehme and wide wheel abrasion tests.	2
L4	Conducting the initial type test for clay masonry units, determining the following properties: dimensions and dimensional tolerances, geometry shape and features, gross dry density and net dry density, compressive strength.	7
L5	Presentation of the methods of determination of the thermal conductivity coefficient. Conducting laboratory tests for the two kinds of foamed polystyrene (EPS and XPS), determining and comparing their following properties: apparent density, compressive strength at 10% deformation and flexural strength.	2

Laboratory		
No.	Subject matter of the course Detailed description of thematic blocks	No. of class hours
L6	Methodology and determination of the selected properties of asphalt (a raw material for bituminous damp proofing products), such as: softening point, breaking point, penetration (hardness), ductility. Determination of maximum tensile force and elongation for various types of asphalt sheets.	3
L7	Methodology and determination of the selected mechanical properties of various types of timber, such as: compressive strength, tensile strength parallel and perpendicular to grain, static bending strength with modulus of elasticity in bending, shear strength, hardness by the Janka method. Presentation of the influence of timber moisture content on its mechanical properties (determination of the moisture content of specimens with the use of a hygrometer).	6
L8	Determination of compressive and flexural strength of gypsum as well as softening factors in compression and tension using beams from gypsum paste. Determination of the selected properties of gypsum cardboards (e.g. failure load in bending in transverse and longitudinal direction). Determination of surface hardness and water absorption capacity for gypsum blocks.	4

Class exercise		
No.	Subject matter of the course Detailed description of thematic blocks	No. of class hours
C1	Classification of the properties of building materials and products and presentation of the methods of determination of the most important ones.	4
C2	Presentation of the assortment and the range of applications of stone materials and products.	1
C3	Presentation of the assortment and the range of applications of burnt clay products.	3
C4	Presentation of the assortment and the range of applications of thermal and acoustic insulation materials.	2
C5	Presentation of the assortment and the range of applications of bitumen damp insulation materials.	2
C6	Presentation of the assortment of selected timber and wood waste products.	2
C7	Presentation of the assortment and the range of applications of building glass products.	1

7 TEACHING TOOLS

N1 Lectures

N2 Multimedia presentations

N3 Laboratory exercises

N4 Group work

N5 Office hours

8 Student workload

Activity form	Number of hours of activity
Hours realized in contact with the teacher	
Hours resulting from the study plan	60
Consultation hours	9
Exams and tests during session	9
Hours of autonomous student work	
Preparing for classes, studying literature	30
Developing results	22
Preparing of reports, projects presentations, discussion	20
Total number of hours devoted to the subject	150
Total number of ECTS points	5.00

9 Methods of grading

Partial grades

F1 Test

F2 Lab report

Summary grade

P1 Test

P2 Weighted mean, obtained from the combined grades

Conditions for passing the course

L1 Semester 2: Weighted mean, obtained from the combined grades (weight: Lab report - 0,3; Test - 0,7)
