



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Construction Materials

### Course

Field of study

Civil Engineering First-cycle Studies

Area of study (specialization)

buildingobligatory

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

1/2

Profile of study

general academic

Course offered in

Polish

Requirements

compulsory

### Number of hours

Lecture

30

Laboratory classes

30

Other (e.g. online)

0

Tutorials

0

Projects/seminars

0

### Number of credit points

5

### Lecturers

Responsible for the course/lecturer:

Dr hab. inż. Krzysztof Zieliński, prof. PP

Responsible for the course/lecturer:

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### Prerequisites

Knowledge: Basic knowledge of the following subjects: mathematic, physics, chemistry

Skills: Ability to obtain information from literature and other sources. Capability to combine obtained information.

Social competencies: Understanding the need to continue education throughout the professional career. Understanding the necessity of co-operation and team work.

### Course objective

Passing on engineering knowledge regarding proper selection and assessment of building materials quality and usefulness both in the phase of design and on-site application.

### Course-related learning outcomes

Knowledge

1. have the basics of general knowledge in mathematics, physics, chemistry, biology and other fields of science, forming theoretical principles appropriate to formulate and solve tasks related to building engineering



2. have advanced knowledge of building materials and their properties, research methods, basic elements of design as well as performance and assembly technologies (including environment-friendly materials). .

#### Skills

1. are able to gather information from literature, databases and other properly selected information sources; can synthesize the obtained information, interpret and evaluate it, as well as draw conclusions, formulate, discuss and justify opinions and positions
2. can classify buildings building structures
3. are able to design and carry out simple lab experiments dedicated to evaluate the building material and engineering structure quality; are able to clearly present and interpret the results and draw conclusions
4. can evaluate the technical condition of building facilities and indicate appropriate methods for their maintenance
5. can apply the building law regulations and legal documents concerning building facilities
6. can make plans autonomously and carry out the lifelong learning processes; can apply the obtained knowledge in the field of building engineering in order to communicate with the surroundings using specialized terminology, and discuss important problems of building industry

#### Social competences

1. take responsibility for the accuracy and reliability of work results and their interpretation
2. are ready to autonomously complete and broaden knowledge in the field of modern processes and technologies of building engineering
3. can realise how important it is to take care of personal health and physical fitness

#### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lectures:

- oral or written exam,

Laboratory classes:

- oral test of knowledge before the start of laboratory classes,
- written report after each laboratory class,
- final test after completing the classes.

#### Programme content



## Lectures

Basic information on the standardization of construction materials. Technical characteristics of building materials. General classification of building materials. Test methods. Durability of building materials. Stone materials. Aggregates (light, normal and heavy). Building ceramics/tiles. Wood. Biological corrosion of wood. Bitumens and waterproofing materials. Heat- insulation and sound-deadening materials. Metals. Binding materials. Common and special cement types, lime, gypsum. Basic information about plastics. Building glass. Attestation and control of the quality of building materials. Mortars. Preliminary information on designing concrete mixes.

## Laboratory classes

Testing binders (the right amount of water in the cement paste, binding time, preparation of cement samples and determining the actual cement strength class after 28 days of curing, testing surface area), Study of natural and crushed aggregates (sieve analysis, bulk density in loose and compact state, shape indicator, content of dust). Testing ceramics (external characteristics, determining the strength class, basic disadvantages, testing flexural strength of tiles), Study of membranes (modified and oxidised), tensile strength, elongation at break, testing oxidised and modified bitumens (penetration, softening point). Testing plastics and rubber (flame analysis of plastics, determination of hardness, testing thickness of coatings/ paint, rubber abrasion).

## Teaching methods

Lecture: multimedia presentation, illustrated with examples on the board

Laboratory classes: multimedia presentation illustrated with examples given on a blackboard and performance of tasks given by the teacher - practical exercises.

## Bibliography

### Basic

1. Stefańczyk B., Budownictwo ogólne, t. 1: Materiały i wyroby budowlane, Warszawa, Arkady 2005
2. Żenczykowski W., Budownictwo ogólne, t. 1, Warszawa, Arkady 1992
3. Zieliński K., Podstawy technologii betonu, Wydawnictwo Politechniki Poznańskiej, Poznań 2015

### Additional

1. Szymański E., Materiałoznawstwo budowlane z technologią betonu, cz. 2, Warszawa, Oficyna Wydawnicza Politechniki Warszawskiej 1999
2. Monthly magazines: Materiały budowlane, Izolacje and other technical magazines dealing with building materials. Information and technical materials provided by building materials manufacturers, the Internet



### Breakdown of average student's workload

	Hours	ECTS
Total workload	125	5,0
Classes requiring direct contact with the teacher	60	2,5
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) <sup>1</sup>	65	2,5

<sup>1</sup> delete or add other activities as appropriate