COURSE DESCRIPTION CARD - SYLLABUS

Course name
Technology of concrete [S1Bud1>TB]

Course

Field of study
Civil Engineering

Year/Semester
2/3

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
15

Laboratory classes
15

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

2,00

Coordinators

dr hab. inż. Krzysztof Zieliński prof. PP
krzysztof.zielinski@put.poznan.pl

Lecturers

Prerequisites

Knowledge: Basic knowledge of the following subjects: mathematic, physics, chemistry. Knowledge concerning classification and assessment of construction materials. Skills: Ability to obtain information from literature and other sources. Capability to select optimum building material for a particular building/ structure. 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 design of concrete mixes, classification and scope of applications in construction as well as carrying out standard concrete work.

Course-related learning outcomes

Knowledge:
1. 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).
2. have detailed knowledge of the technologies of building engineering and rules of selecting tools,

machines, and equipment to perform construction works.
3. 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.

Skills:
1. 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.
2. are able to analyse the architectural and urban planning needs of investor and select building and installation materials for the intended purpose.
3. 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.

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. understand the need of team work, are responsible for the safety of their own work and team?s work.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
Lectures:
- oral or written test,
Laboratory classes:
- oral test of knowledge before the start of laboratory classes,
- preparation and defence of concrete mix,
- final test after completing the classes.

Programme content

Lectures
Basic information on standardization and classification of cement concrete types. Concrete composition/ ingredients, properties of concrete mix and hardened concrete. Methods of designing concrete composition.
Laboratory classes
Design of concrete mix with selected characteristics. Study of ingredients. Preparation of concrete mix. Study of basic characteristics of
the mix, preparation of concrete samples. Study of the compressive strength of
concrete by destructive method. Determining the actual strength of the designed concrete.

Course topics

Lectures
Basic information on standardization and classification of cement concrete types. Concrete composition/ ingredients, properties of concrete mix and hardened concrete. Methods of designing concrete composition. Basic technological processes connected with preparation, transport, application and maintenance of concrete. Quality control of concrete. Admixtures (division, study methods, evaluation and discussing major varieties). Additives (ashes, bits, complex admixtures). Design of concrete with additives and admixtures, concrete application at low temperatures, application of large masses of concrete. Special concretes. Light concrete (distribution, application, basic components). Basic principles of lightweight concrete design.
Laboratory classes
Design of concrete mix (one of the four methods) with selected characteristics of consistency and strength class. Study of ingredients (aggregates, cement, water) with focus on suitability (compliance with relevant standards) to make concrete. Preparation of concrete mix. Study of basic characteristics of

the mix (texture, volume) preparation of concrete samples. Testing the impact of various types of additives on the mix characteristics (plasticizing, binding time). Study of the compressive strength of concrete by destructive method. Determining the actual strength of the designed concrete.

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. Jamroży Z., Beton i jego technologie, Warszawa ? Kraków, Wydawnictwo Naukowe PWN 2000
2. Zieliński K., Podstawy technologii betonu, Wydawnictwo Politechniki Poznańskiej, Poznań 2015
Additional
1. Neville A. M., Właściwości betonu, Kraków, Stowarzyszenie Producentów Cementu 2012
2. Szymański E., Materiałoznawstwo budowlane z technologią betonu, cz. 2, Warszawa, Oficyna Wydawnicza Politechniki Warszawskiej 1999
3. Technical magazines dealing with concrete technology, the Internet

Breakdown of average student's workload

	Hours	ECTS
Total workload	60	2,00
Classes requiring direct contact with the teacher	32	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	28	1,00