COURSE DESCRIPTION CARD - SYLLABUS

Course name
Building prefabricated elements [S2Bud1E>BP]

Course

Field of study
Civil Engineering

Year/Semester
2/3

Area of study (specialization)
Structural Engineering

Profile of study
general academic

Level of study
second-cycle

Course offered in
English

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
15

Laboratory classes
0

Other
0

Tutorials
0

Projects/seminars
15

Number of credit points

2,00

Coordinators

dr hab. inż. Volodymyr Semko
volodymyr.semko@put.poznan.pl

Lecturers

Prerequisites

KNOWLEDGE: Student has knowledge of mathematics, physics and chemistry, knows the rules of analysis, construction and dimensioning of reinforced concrete elements as well as the standards and guidelines for designing building and engineering structures. He/She knows the issues covered by the courses "Advanced Concrete Structures" and "BIM Technology". SKILLS: Student is able to assess and compile loads acting on constructions and their members, and can design structural elements of complex reinforced concrete structures, and can choose tools (analytical or numerical) to solve engineering problems. SOCIAL COMPETENCE: Student is a responsible person who wants to broaden and deepen his/her knowledge, communicate with others and work in a team.

Course objective

The goal of the course is to present and discuss the principles of manufacturing, transport and design of prefabricated concrete elements, as well as design and erection of prefabricated concrete structures with the use of the BIM approach.

Course-related learning outcomes

Knowledge:

Student knows the rules for determining the combination of permanent and variable actions for prefabricated concrete elements and structures
Student knows the specifics and principles of designing prefabricated concrete elements, taking into account the serviceability and load-bearing limit states
Student knows the rules of constructing interconnections and load-bearing structures from prefabricated elements

Skills:
Student is able to determine the loads acting on structural systems and determine the most unfavorable load situations
Student is able to properly select prefabricated concrete elements and design structures made of them
Student is able to design connections of prefabricated concrete elements forming the load-bearing system of the structure -

Social competences:
Student is aware of the responsibility for the results of calculations and designs of structural members and is able to provide their interpretations
Student is aware of the need to act in the public interest, taking into account the goals of sustainable building engineering
Student sees the need to systematically deepen and expand his/her competences

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 - final written test at the last lecture (1.5h).
Projects - preparation of a frame design from prefabricated concrete elements and its defense in the form of a 1-hour test at the last class.

Programme content

Specificity of prefabricated concrete elements and structures made thereof. Materials used in concrete prefabrication. Imperfections in prefabricated structures. Stiffness and stability of prefabricated structures. Design of precast concrete beams, columns, floors and frames. Joints and connections in structures made of prefabricated elements. Beam to column connection.

Course topics

Lectures:
Prefabricated concepts, history and design philosophy.
Prefabricated concrete structures. Terms.
The advantages of prefabricated concrete structures.
Types of precast concrete structure.
Principal joints.
Precast frameworks. Structural stability. Geometric imperfections.
Design of the prefabricated structural elements.
The calculation of the corbel.
Technical drawings. Construction drawings. Drawings for assembly of prefabricated structures.

Project — individual discussion and checking of each student's project to help solve problems encountered by the student; computer-aided solutions in the BIM system.

Teaching methods

Lectures — traditional lectures ("chalk-and-talk"), with computer-assisted presentations at times.
Projects — individual discussion and checking of each student"s project and help in solving problems encountered by the student; computer-aided solutions in the BIM system.

Bibliography

Basic

1. Bachmann H., Steinle A.: Precast Concrete Structures. Ernst & Sohn, Berlin 2011.
2. Elliott K.S.: Precast Concrete Structures. CRC Press. Second Edition, Oxford 2017.
Additional
1. Elliott K.S., Jolly C.K.: Multi-storey Precast Concrete Framed Structures. Wiley Blackwell, Chichester2013.
2. Dowgird R.: Prefabrykowane żelbetowe konstrukcje szkieletowe. Warszawa, Arkady 1975.

Breakdown of average student's workload

	Hours	ECTS
Total workload	60	2,00
Classes requiring direct contact with the teacher	30	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	30	1,00