



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Multidisciplinary project [S2Bud1E-ZBZ>PI]

Course

Field of study

Civil Engineering

Year/Semester

1/2

Area of study (specialization)

Sustainable construction and management

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

15

Projects/seminars

15

Number of credit points

2,00

Coordinators

dr hab. inż. Jerzy Paślawski prof. PP
jerzy.paslawski@put.poznan.pl

Lecturers

Prerequisites

The student has basic knowledge of civil engineering. The student is able to acquire information from indicated sources and analyse engineering activities. The student is aware of the need for continuous learning and taking responsibility in professional work. The student understands the importance of seeking practical solutions to problems observed in construction enterprises.

Course objective

To acquire and expand knowledge in the field of sustainable construction and management methods and techniques in construction projects, including flexible design, artificial intelligence, and lean and agile management approaches. To familiarise students with the possibilities of conducting scientific research within a master's thesis in cooperation with external companies. To develop and present an individual concept of a research project.

Course-related learning outcomes

Knowledge:

- Has in-depth knowledge of the environmental impact of construction projects and understands the need to implement principles of sustainable development.

- Has in-depth knowledge of algorithms used in selected software supporting analysis and design of building structures and tools useful for planning and managing construction projects, including BIM technology.
- Has structured and theoretically grounded knowledge of processes occurring throughout the life cycle of construction objects and understands the need for systematic assessment and maintenance of their technical condition.

Skills:

- Is able to select appropriate methods and tools (analytical, numerical, simulation-based, experimental) to solve technical problems.
- Is able to formulate and test hypotheses related to research problems using scientific methods and prepare studies supporting future research work.
- Is able to assess risks related to construction projects and building operation, implement appropriate safety principles, and develop work standards and quality management procedures.

Social competences:

- Is aware of the need for continuous professional and personal development and is ready to critically evaluate acquired knowledge.
- Understands the need to communicate knowledge about construction in an accessible way.
- Is ready to think and act in an entrepreneurial way.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lectures - assessment based on student activity and contribution to the preparation and presentation of professional experience (internships/work) and the concept of a master's thesis

Classes - final test conducted during the last class

Project - preparation and defence of a project assignment, evaluated based on workload and substantive content

Grading scale:

90-100 - very good (A)

80-89 - good plus (B)

70-79 - good (C)

60-69 - satisfactory plus (D)

50-59 - satisfactory (E)

below 50 - fail (F)

Programme content

Lectures

Lecture 1 - Introduction

Lectures 2-4 - Discussion of topics:

- Modular construction - flexibility in engineering practice
- Selection of system formwork based on PERI systems
- Positive-energy buildings
- Selection of parameters for ready-mix concrete delivery based on modelling of production, transport and placement processes
- Management of concreting processes in low temperatures based on simulation of processes in concrete and its environment
- Infrastructure design using flexibility concepts - life cycle modelling and scenario-based approaches
- Self-healing concrete

Lectures 5-7 - Seminars: student presentations of experience

Project classes

Project 1 - Introduction, energy efficiency

Projects 2-6 - Review of project work - active house concept

Project 7 - Project defence

Classes

Class 1 - Introduction

Classes 2-4 - Energy efficiency of buildings, sustainable solutions

Classes 5-6 - Modular building envelopes

Course topics

Issues related to interdisciplinary design in construction with consideration of sustainable development principles and construction project management. Analysis of modern technologies and solutions used in construction, including modular construction, positive-energy buildings, and advanced materials (e.g. self-healing concrete). Application of life cycle concepts in infrastructure design. Use of simulation methods and tools supporting design and management of construction processes. Student project work focused on engineering problems related to energy efficiency and sustainable construction.

Teaching methods

- informative lecture
- problem-based lecture
- discussion
- case study analysis
- project-based method
- group work

Bibliography

Basic:

1. Schmidt R. III, Austin S. Adaptable Architecture, theory and practice; Routledge Taylor & Francis Group, London, NY 2016
2. March Ch. Operations management for construction, Hoboken, NJ: Taylor and Francis, 2009, 223 p.
3. Neufert E. Bauentwurfslehre; Vieweg & Sohn; Wiesbaden, 2000

Additional:

1. Douglas J., Building adaptation. 2nd ed. Great Britain, Elsevier Ltd., 2006

Breakdown of average student's workload

	Hours	ECTS
Total workload	60	2,00
Classes requiring direct contact with the teacher	45	1,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	15	0,50