



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Composite Structures

Course

Field of study

Year/Semester

Civil Engineering

1/1

Area of study (specialization)

Profile of study

Structural Engineering

general academic

Level of study

Course offered in

Second-cycle studies

polish

Form of study

Requirements

full-time

compulsory

Number of hours

Lecture

Laboratory classes

Other (e.g. online)

15

Tutorials

Projects/seminars

15

Number of credit points

2

Lecturers

Responsible for the course/lecturer:

Responsible for the course/lecturer:

dr hab. inż. Maciej Szumigala, professor PUT

Prerequisites

Basic knowledge of the strength of materials and mechanics of buildings, metal and reinforced concrete structures

The ability to obtain information from the indicated sources, e.g. standards. Ability to design a typical steel and reinforced concrete structure.

Awareness of the need to expand one's professional competences and take serious responsibility in project work.

Course objective

Acquiring skills in constructing and designing modern steel and concrete composite structures.

Course-related learning outcomes

Knowledge

KB_W02 have advanced knowledge of the principles of descriptive geometry and technical drawing, recording and reading architectural drawings, P6S_WG (I)



KB_W04 have detailed knowledge of theoretical mechanics, knowledge of materials' strength and general rules of structure design; know the theories explaining complex relations of structures. P6S_WG (O/I)

KB_W07 knows detailed rules of constructing and dimensioning composite elements P6S_WG (I)

Skills

KB_U01 are able to gather information from literature, databases and other properly selected information sources; can synthesize the obtained information, interpret and evaluate it, P6S_UW (O/I)

KB_U02 are able to use advanced information and communication technologies (ICT) appropriate to perform typical engineering tasks. P6S_UW (O/I)

KB_U03 when formulating and solving problems related to building engineering, they can notice their systemic and non-technical aspects, including ethical aspects. P6S_UW (I)

KB_U05 can classify buildings building structures. P6S_UW (O/I)

KB_U07 are able to correctly utilise numerical, analytical, simulation and experimental methods, in order to identify and solve problems in the field of building engineering. P6S_UW (I)

KKB_U10 are able to design selected elements and simple composite elements

Social competences

KB_K01 are able to adapt to new and changing circumstances, can define priorities for performing tasks assigned by themselves and by other people, acting in the public interest and with regard to the purposes of sustainable development P6S_KK (O)

KB_K03 are ready to autonomously complete and broaden knowledge in the field of modern processes and technologies of building engineering. P6S_KR (O)

KB_K04 understand the need of team work, are responsible for the safety of their own work and team's work. P6S_KR (O)

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture - written test.

Credit for design exercises on the basis of:

- substantive evaluation of the prepared design documentation,
- regular work (entries in the consultation card and attendance at exercises),
- project defense (written or oral form)

Programme content

As part of Composite Structures, the following are presented:



- general principles of constructing and designing elements of composite structures (limit states, calculation schemes and assumptions, forms of destruction, strength parameters of steel and concrete),
- methods of designing and dimensioning of composite slabs, steel-concrete composite beams, bending and shear load-bearing capacity, load-bearing capacity of connectors, stiffness, construction details. Design methods and dimensioning of composite columns, M-N interaction, structural details - nodes.
- design of composite structures for fire conditions.

Teaching methods

Monographic lecture with a multimedia presentation with elements of a problem-solving lecture.

Design exercises - practical implementation of an engineering task - introductory discussion of the task, preparation of calculations and drawing documentation in stages by students, consulting and approval of work stages, clarification of recurring doubts by the teacher. The basis for passing the test is a systematically (confirmed entries from the consultations) correctly made project and its defense (oral or written form).

Bibliography

Basic

1. PN-EN 1994 Projektowanie konstrukcji zespolonych stalowo-betonowych
2. Kurzawa Z., Rzeszut K., Szumigala M., Konstrukcje stalowe prętowe. Część 3. konstrukcje z łukami, elementy cienkościenne, pokrycia membranowe, elementy zespolone, belki podsuwnicowe, Wydawnictwo PP, 2018
3. Kucharczuk W., Labocha S., Konstrukcje zespolone stalowo-betonowe budynków, Arkady, Warszawa 2007

Additional

Giżejowski M., Ziólko J., Budownictwo Ogólne tom 5, Stalowe konstrukcje budynków. Projektowanie według eurokodów z przykładami obliczeń

Breakdown of average student's workload

	Hours	ECTS
Total workload	60	2,0
Classes requiring direct contact with the teacher	30	1,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) ¹	30	1,0

¹ delete or add other activities as appropriate