COURSE DESCRIPTION CARD - SYLLABUS

Course name
Composite structures [N2Bud1-KB>KZ]

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
polish

Form of study
part-time

Requirements
compulsory

Number of hours

Lecture
10

Laboratory classes
0

Other (e.g. online)
0

Tutorials
0

Projects/seminars
10

Number of credit points

2,00

Coordinators

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Lecturers

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 the design of modern steel and concrete composite structures.

Course-related learning outcomes

Knowledge:
1. KB_W02 know in detail the principles of analysing, constructing and dimensioning elements and connections in selected building structures. [P7S_WG (I)]
2. KB_W04 have extended and detailed knowledge of material strength, modelling and constructing; have knowledge of theoretical principles of the finite element method as well as general rules of non-linear calculations of engineering structures. [[P7S_WG (O/I)]
3. KB_W07 know in detail the rules of design, construction and operation of selected building units.

[P7S_WG (I)]

Skills:
1, KB_U01 can prepare an evaluation and statement of strengths influencing both simple and complex building units. [P7S_UW (I)]
2. KB_U02 can design elements and connections in complex building units, working both individually and in a team. [P7S_UW (I)]]
3. KB_U03 can perform a classical static and dynamic analysis and stability analysis of statically determinate and non-determinate bar structures (trusses, frames and strands); as well as surface construction (discs, plates, membranes and shells). [P7S_UW]
4. KB_U04 use advanced specialized tools in order to search for useful information, communication and in order to obtain software supporting the designer and organizer of building engineering works. [P7S_UW (O/I)]
5. KB_U05 are able to correctly define a computational model and carry out an advanced linear analysis of complex building units, their elements and connections; are able to apply basic nonlinear computational techniques together with a critical evaluation of numerical analysis results. - [P7S_UW (I)]
6. KB_U07 are able to correctly define a computational model and carry out an advanced linear analysis of complex building units, their elements and connections; are able to apply basic nonlinear computational techniques together with a critical evaluation of numerical analysis results.[P7S_UW (I)]
7. KB_U15 are able to prepare a building unit design and technical documentation in the environment of selected CAD software, including the usage of BIM technology. [P7S_UW (I)]

Social competences:
1. KB_K01 take responsibility for the reliability of working results and their interpretation. [P7S_KK (O)]
2. KB_K03 are ready to autonomously complete and broaden (extend) knowledge in the field of modern processes and technologies of building engineering. [P7S_KR (O)]
3. KB_K05 can realise that it is necessary to improve professional and personal competence; are ready to critically evaluate the knowledge and received content. [P7S_KK (O)]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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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 designing 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. Methods of designing 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 - preliminary discussion of the task, gradual preparation of calculations and drawing documentation by students, consulting and approval of work stages, clarification of recurring doubts by the teacher. The basis for the credit 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., Szumigała 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 Ogolne tom 5, Stalowe konstrukcje budynków. Projektowanie według eurokodów z przykładami obliczeń

Breakdown of average student's workload

	Hours	ECTS
Total workload	60	2,00
Classes requiring direct contact with the teacher	20	0,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	40	1,50