COURSE DESCRIPTION CARD - SYLLABUS

Course name
Metal Constructions

Course

Field of study
Civil Engineering

Year/Semester
3/5

Area of study (specialization)

Profile of study
general academic

Level of study
First-cycle studies

Course offered in
polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
30		
Tutorials	**Projects/seminars**	
15	15	

Number of credit points

4

Lecturers

Responsible for the course/lecturer:
dr hab. inż. Maciej Szumigala, professor PUT

Responsible for the course/lecturer:

Prerequisites

BBasic knowledge of the strength of materials and building mechanics, descriptive geometry, basics of construction, basics of knowledge about building materials

The ability to obtain information from the indicated sources, e.g. standards, manuals. Ability to use basic design aiding software.

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

Course objective

Acquiring skills in the design (construction and dimensioning) of simple tensile, compression and bending elements of steel structures as well as bolted and welded connections.

Course-related learning outcomes

Knowledge

KB_W01 have the basics of general knowledge in mathematics, physics, theoretical mechanics,

strength of materials and principles of general construction shaping, creating theoretical foundations useful for formulating and solving construction-related tasks - [P6S_WG (O)]

KB_W07 knows detailed rules of constructing and dimensioning elements and metal connections, P6S_WG (I)

KB_W11 have basic knowledge of the operation of algorithms used in selected software (including applications of BIM technology) supporting calculations, design of building structures, organisation of construction works P6S_WG (O/I)

Skills

KKB_U02 are able to use advanced information and communication technologies (ICT) appropriate to perform typical engineering tasks. 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)

KB_U10 are able to design selected elements and simple metal,, working individually or as part of a team. P6S_UW (I)

Social competences

KB_K02 take responsibility for the accuracy and reliability of work results and their interpretation. 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:

Auditorium exercises: tests (bolted connections, welded connections)

Design exercises: (designing a welded and bolted joint): substantive evaluation of the project and evaluation of the defense

Programme content

Basic information on the production technology as well as strength and mechanical properties of steels used in construction for structures. Basic methods of designing metal structures. Principles of designing and dimensioning of welded joints (fillet and butt welds). Principles of designing and dimensioning lap joints and butt joints with bolts and information on other methods of steel joining Basic information on design, safety and reliability of structures according to PN-EN 1990. general information on loads and impacts on building structures and appropriate sets and combinations of loads according to PN_EN 1991. Basic information on the methods of designing and dimensioning of bending, compression and

tension elements of metal structures. Problems of loss of local and global stability of steel structure elements on the example of columns, rolled beams and plate girders.

Teaching methods

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

Auditorium exercises based on the method of demonstration and instruction. Presentation and discussion of a computational example partly with the practical participation of students. Credit on the basis of systematic participation in classes and a positive assessment of the test.

Design exercises - practical implementation of an engineering task. Initial discussion of the task, gradual preparation of calculations and drawing documentation by students, consultation and approval of work stages, clarification of recurring doubts by the tutor to all students. 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 1990 Podstawy projektowania konstrukcji

2. PN-EN 1991-1 Oddziaływania na konstrukcje

3. PN-EN 1993-1 Projektowanie konstrukcji stalowych

Additional

. Kurzawa Z., Chybiński M., Projektowanie konstrukcji stalowych, Wydawnictwo PP, Poznań 2008

2. Kozłowski + zespół, Konstrukcje stalowe. Przykłady obliczeń wg PN-EN 1993-1 cz.1, cz.2., Rzeszów 2012

3. Giżejowski M., Ziółko J., Budownictwo ogólne tom 5, Arkady, Warszawa 2010

4. Goczek J. + zespoł, przyklady obliczeń konstrukcji stalowych, Politechnika Łódzka 2013

5. Bródka J.+ zespol, Projektowanie i obliczanie połączeń i węzłów konstrukcji stalowych, PWT 2013

Breakdown of average student's workload

	Hours	ECTS
Total workload	120	4,0
Classes requiring direct contact with the teacher	60	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	60	2,0

[1] delete or add other activities as appropriate