COURSE DESCRIPTION CARD - SYLLABUS

Course name

Metal Structures

Course

Field of study

Building Engineering

Year/Semester

1/1

Area of study (specialization)

Sructural Engineering

Profile of study

general academic

Level of study

Second-cycle studies

Course offered in

polish

Form of study

full-time

Requirements

compulsory

Number of hours

Lecture

30

Laboratory classes

Other (e.g. online)

Tutorials

Projects/seminars

30

Number of credit points

4

Lecturers

Responsible for the course/lecturer:

dr inż. Robert Studziński

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Wydział Inżynierii Lądowej i Transportu

ul. Piotrowo 5, 60-965 Poznań

Responsible for the course/lecturer:

Prerequisites

Basic knowledge in the field of mechanics of structures in the field of rod systems and strength of materials as well as information presented in the subject of Metal Structures of the 1st degree studies.

The ability to determine stresses. The ability to design basic elements of metal structures by the limit state method as well as welded and bolted connections. The ability to calculate cross-sectional forces in statically determinate and indeterminate systems.

Awareness of the need to improve professional and personal competences. Understanding the need to provide the society with knowledge about technical and technological processes in construction in a commonly understood manner.

Course objective

The element of the course is the presentation of the basic methods of designing crane beams, frame buildings, flyovers, and space trusses.

Course-related learning outcomes

Knowledge

1. Know in detail the principles of analysing, constructing and dimensioning elements and connections in selected building structures.

2. Know key issues of continuous medium mechanics; principles of analysing the issues of statics, stability and dynamics.

3. Know in detail the rules of design, construction and operation of selected building units.

Skills

1. Can prepare an evaluation and statement of strengths influencing both simple and complex building units.

2. Can design elements and connections in complex building units, working both individually and in a team.

3. 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).

4. 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.

5. Can dimension complex construction details in selected building units.

Social competences

1. Take responsibility for the reliability of working results and their interpretation.

2. Can realise that it is necessary to improve professional and personal competence; are ready to critically evaluate the knowledge and received content.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture - test checks the last class. Exercise design - execution of the project and its oral defense.

Grading scale:

5.0 - the student obtained more than 90% of the points in the colloquium or defense of the project,

4.5 - the student obtained from 80% to 90% of the points in the colloquium or project defense,

4.0 - the student obtained from 70% to 80% of the points in the colloquium or project defense,

3.5 - the student obtained from 60% to 70% of the points in the colloquium or project defense,

3.0 - the student obtained from 50% to 60% of the points in the colloquium or project defense,

2.0 - the student obtained less than 50% of the points from the colloquium or project defense

Programme content

Lecture

- cladding systems

- design of a overhead cranes

- numerical models of a frames

- 3D models of hall - cooperation between elements

- eave and foot connections

- designing of connections with respect to their flexibility

- designing of columns subjected to eccentric commpression

- 3D stabiity of hals (bracing systems)

- space structures of wide span roofs

Teaching method:

lecture: information lecture, problem lecture, demonstration

Project

- desing project of a overhead beam

Teaching method:

- projects: design and demonstration method

Teaching methods

Lectures illustrated with slides and films - problem lecture / seminar lecture / lecture with multimedia presentation. Design exercises - design of an industrial hall with a overhead beam.

Bibliography

Basic

1. Biegus A., (2008), Stalowe budynki halowe, Wydawnictwo Arkady, Warszawa, s. 342

2. Bródka J., Kozłowski A., (2009), Projektowanie i obliczanie połączeń i węzłów konstrukcji stalowych. Część 1. Polskie Wydawnictwo Techniczne, s. 600

3. Bródka J., Kozłowski A., (2009), Projektowanie i obliczanie połączeń i węzłów konstrukcji stalowych. Część 2. Polskie Wydawnictwo Techniczne, s. 843

4. Giżejowski, Ziółko J., (2010), Budownictwo ogólne. Tom 5. stalowe konstrukcje budynków projektowane wg eurokodów z przykładami obliczeń, Wydawnictwo Arkady, Warszawa, s. 1085

5. Kurzawa Z., (2011), Stalowe konstrukcje prętowe. Część 1. Hale przemysłowe oraz obiekty użyteczności publicznej, Wydawnictwo Politechniki Poznańskiej, Poznań, s. 368

6. Rykaluk K., (2006), Konstrukcje stalowe. Podstawy i elementy, Dolnośląskie Wydawnictwo Edukacyjne, Wrocław, s. 431

Additional

1. PN-EN 1990 Eurokod: Podstawy projektowania konstrukcji

2. PN-EN 1991 Eurokod 1: Oddziaływania na konstrukcje

3. PN-EN 1993 Eurokod 3: Projektowanie konstrukcji stalowych

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	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]	40	2,0

[1] delete or add other activities as appropriate