COURSE DESCRIPTION CARD - SYLLABUS

Course name

Metal Structures

Course

Field of study

Civil engineering

Year/Semester

1/2

Area of study (specialization)

Structural Engineering

Profile of study

general academic

Level of study

Second-cycle studies

Course offered in

english

Form of study

full-time

Requirements

compulsory

Number of hours

Lecture

15

Laboratory classes

0

Other (e.g. online)

0

Tutorials

15

Projects/seminars

15

Number of credit points

2

Lecturers

Responsible for the course/lecturer:

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Wydział Inżynierii Lądowej i Transportu

ul. Piotrowo 5, 60-965 Poznań

Responsible for the course/lecturer:

Prerequisites

Has knowledge of structural mechanics and material strength in the field of content of the Civil Engineering field of study. Knows the methods of designing metal structures according to Eurocodes. Knows global analyses methods. Knows the imperfections in steel structures.

Is able to use Eurocode standards in the field of static calculations and dimensioning of steel structure elements. Is able to design structural elements of industrial halls and spatial trusses together with designing main joints. He can assess the sensitivity of a structure to second-order effects.

Understands the need for lifelong learning and is able to interact and work in a group, taking on different roles in it. Is aware of the responsibility of the profession he is learning.

Course objective

Acquiring knowledge and skills in the construction and dimensioning of thin-walled structures. Acquiring the knowldge and skills in the construction and dimensioning of the overhead crane bams and portal frames subjected to loads from overhead cranes.

Course-related learning outcomes

Knowledge

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

2. 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

3. Have advanced and detailed knowledge of the theoretical principles of structure analysis and optimization as well as design 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. 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

4. Utilizing the obtained knowledge, they can select appropriate (analytical, numerical, simulation, experimental) methods and tools to solve technical problems

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:

Completing the lecture - colloquium in the last class. Design exercises - the project and its oral defense.

Grading scale:

5.0 - the student has obtained over 90% of points from the test or project defense,

4,5 - the student obtained from 80% to 90% of points from the test or project defense,

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

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

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

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

Programme content

Lecture

Methods for constructing and dimensioning of overhead cranes (static diagrams, loads, dimensioning, connection details). Principles of construction and dimensioning of portal frames subjected to loads generated by the overhead cranes. Methods for constructing and dimensioning of thin-walled structures.

Teaching method:

lecture: information lecture, problem lecture, demonstration

Project

Project of the overhead crane girder.

Teaching method:

- projects: design and demonstration method

Teaching methods

Form of classes: Lectures - problem lecture / seminar lecture / lecture with multimedia presentation. Test.

Form of classes: projects - oral defense of the project. Steel hall design.

Bibliography

Basic

1. Design of Steel Structures, Luís Simões da Silva, Rui António Duarte Simões, Helena Gervasio, Publisher: ECCS Press and Ernst&Sohn, ISBN: 978-3-433-02973-2

2. Structural Stability of Steel: Concepts and Applications for Structural Engineers, Theodore V. Galambos, Andrea E. Surovek, John Wiley & Sons , 2008

3. Design of Steel Structures to Eurocodes, Vayas Ioannis, Ermopoulos John, Ioannidis George, ISBN 978-3-319-95474-5, DOI 10.1007/978-3-319-95474-5, Publisher: Springer International Publishing

4. Structural Design of Steelwork to EN 1993 and EN 1994, , Lawrence Martin, Elsevier, 2007

Additional

1. EN-1993-1-1 / EN-1993-1-3 / EN-1993-1-5 / EN-1993-1-8

2. EN-1993-6

3. EN-1990

4. EN-1991-1-1 / EN-1991-1-3 / EN-1991-1-4 / EN-1991-1-6

Breakdown of average student's workload

	Hours	ECTS
Total workload	60	2,0
Classes requiring direct contact with the teacher	45	1,5
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	15	0,5

[1] delete or add other activities as appropriate