COURSE DESCRIPTION CARD - SYLLABUS

Course name
Industrial structures [S1Bud1>BP]

Course

Field of study
Civil Engineering

Year/Semester
3/6

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
30

Laboratory classes
0

Other (e.g. online)
0

Tutorials
0

Projects/seminars
30

Number of credit points

4,00

Coordinators

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Lecturers

Prerequisites

Student commencing this subject should have basic knowledge in the field of strength of materials, structural mechanics, soil mechanics, foundation engineering, building engineering, concrete and steel structures. One ought to have capability to acquire different types of knowledge from indicated standards and books and also be able to apply the theoretical knowledge to solve practical problems. It is advisible that Student has key skills to use the basic graphical and computational computer programs. Student should be able to work in team and present the results of the own work in a comprehensible manner.

Course objective

The main objective of this course, realized in form of lecture and project, is to acquaint students with peculiarities of the industrial building and especially technological influencing factors, machanical actions, dynamic effects occuring in industry as well as ways of determination of structural form of industrial structures.

Course-related learning outcomes

Knowledge:
Know building legislation, Polish standards (PN) and European srandards (EN), technical conditions of

constructing industrial facilities.
Know how to define the load values for industrial structures.
Know the basics of foundation of selected industrial facilities.
Know the rules of constructing and analysing certain industrial structures.
Know the principles of constructing and dimensioning basic metal, concrete and brick elements of industrial structures.
Have the basic knowledge of operation algorithms of selected software, supporting the calculation and design of industrial constructions.

Skills:
Is able to obtain information from literature, databases and other properly selected information sources; can integrate the obtained information, interpret and evaluate it, as well as draw conclusions, formulate and justify opinions.
Can set up the forces influencing industrial building units and perform static analysis of statically determinate and non-determinate bar structures.
Can develope structural scheme of simple industrial structures.
Is able to do preliminary sizing and detailed design of the basic metal, concrete and brick structural elements.
Can utilize and critically evaluate the obtained results of numerical analysis.
Is able to plan and organise work; both individual and team; can cooperate with other people, is prepared to team work.

Social competences:
Student take responsibility for the accuracy and reliability of working results and their interpretation.
Student is able to critically evaluate the results of their own work.
Student is ready to autonomusly complete and broaden knowledge in the field of modern structures and technologies of industrial building engineering.
Student understand the need of team work, is responsible for the correctness of their own work and team"s work.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The lecture is passed on the basis of final written one-hour exam completed at the end of the course, consisting of three open questions in the scope of lectures programme content (percentage limit of passing at least - 51%).
A necessary condition of getting credits in project is correct performance of it within the time limit.
The project grade is an average value of two grades: oral test from knowledge of issues relating to project grade and the project grade based on the project documentation.

Programme content

Types and specifies of industrial facilities.
Loads and technological factors influencing on industrial structures.
Dimensioning methods for building structures. Method of partial factors.
Construction and design of masonry, concrete and steel industrial chimneys.
Construction and design of steel and concrerte belt conveyor trestle bridges.
Mechanical actions and loads caused by overhead travelling cranes.
Construction and design of concrete and steel crane girders.

Course topics

Types and specifies of industrial facilities.
Loads and technological factors influencing on industrial facilities.
Evolution of methods for dimensioning of building structures. Limit states and partial factors method.
Load combinations for industrial structures.
Technological and environmental issues taken into account when designing industrial chimneys.
Construction and design of masonry industrial chimneys.
Construction and design of single flue reinforced concrete industrial chimneys.
Construction and design of reinforced concrete multi-flue chimneys.

Construction of steel chimneys.
In-house transport facilities. Belt coveyors general characteristics.
Construction and design of steel and reinforced concrete belt conveyor trestles.
Cranes in industrial facilities - terminology and classification.
Actions induced by overhead travellig cranes - variable actions and wind loads.
Construction of reinforced concrete and prestressed concrete runway beams.
Construction of steel runway beams. Crane rails and crane rail joints.

Teaching methods

An information lecture supplemented by elements of the problem lecture and multimedia presentation.
Subjective classes based on illustrative and problem type case study.
Project consisting in the execution of practical task by group of students.

Bibliography

Basic
1. Meller M., Pacek M.: Kominy przemysłowe. Wyd. Uczelniane Politechniki Koszalińskiej, Koszalin 2007.
2. Fijak S.: Kominy przemysłowe. Wyd. UKiP J&D Gębka, Gliwice 2005.
3. Włodarczyk W., Kowalski A., Pietrzak K.: Projektowanie wybranych konstrukcji przemysłowych. Przykłady. Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 1995.
4. Ziółko J., Włodarczyk W., Mendera Z., Włodarczyk S.: Stalowe konstrukcje specjalne. Arkady, Warszawa 1995.
5. Żmuda J.: Konstrukcje wsporcze dźwignic. Wydawnictwo Naukowe PWN, Warszawa 2013.
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7. Mielnik A.: Budowlane konstrukcje przemysłowe, cz. I i II. PWN, Warszawa 1975.
Additional
1. Relevant standards.
2. Konstrukcje stalowe. Przykłady obliczeń według PN-EN 1993-1. Cz. 1-3 pod redakcją A. Kozłowskiego, Rzeszów 2012-15.
3. Knauff M.: Obliczanie konstrukcji żelbetowych według Eurokodu 2. Wydawnictwo Naukowe PWN, Warszawa 2012.
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5. Puła O.: Projektowanie fundamentów bezpośrednich według Eurokodu 7. Wyd. III. Dolnośląskie Wydawnictwo Edukacyjne, Wrocław 2014.
6. Rawska-Skotniczy A.: Obciążenia budynków i konstrukcji budowlanych według eurokodów. Wydawnictwo Naukowe PWN, Warszawa 2014.
7. Antoniak J.: Przenośniki Taśmowe. Wprowadzenie do teorii i obliczenia. Wydawnictwo Politechniki Śląskiej, Gliwice 2004.

Breakdown of average student's workload

	Hours	ECTS
Total workload	120	4,00
Classes requiring direct contact with the teacher	62	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	58	2,00