



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Industrial structures [N1Bud1>BP]

Course

Field of study

Civil Engineering

Year/Semester

4/8

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

Polish

Form of study

part-time

Requirements

compulsory

Number of hours

Lecture

20

Laboratory classes

0

Other

0

Tutorials

0

Projects/seminars

20

Number of credit points

4,00

Coordinators

dr inż. Tomasz Oleszkiewicz

tomasz.oleszkiewicz@put.poznan.pl

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 advisable 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, mechanical actions, dynamic effects occurring in industry as well as ways of determination of structural form of industrial structures.

Course-related learning outcomes

Knowledge:

- design of engineering industrial facilities

- collecting loads (fixed, utility, climatic)
- optimization of steel structures
- optimization of reinforced concrete structures
- optimization of direct foundations

Skills:

The ability to comprehensively design and optimize the construction of industrial halls and the use of computer programs such as Autodesk Robot Structural Analysis in the field of:

- static and stability analysis of rod structures
- uses advanced specialist tools to search for useful information, communication and acquiring software supporting the work of a designer and organizer of construction processes

Social competences:

Awareness of the need to expand one's competences and take serious responsibility at 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 (grade 3.0 - from 50%, 3.5 from 60%, 4.0 from 70%, 4.5 from 80% and 5.0 from 90%).

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 specifics 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 concrete 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 specifics 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 conveyors general characteristics.

Construction and design of steel and reinforced concrete belt conveyor trestles.

Cranes in industrial facilities - terminology and classification.

Actions induced by overhead travelling 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.
6. Matysiak A., Grochowska E.: Konstrukcje stalowe. Belki podsuwnicowe. Estakady. Część I: Belki podsuwnicowe. Oficyna Wydawnicza Uniwersytetu Zielonogórskiego, Zielona Góra 2016.
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.
4. Knauff M., Golubińska A., Knyziak P.: Tablice i wzory do projektowania konstrukcji żelbetowych z przykładami obliczeń. Wydawnictwo Naukowe PWN, Warszawa 2013.
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	100	4,00
Classes requiring direct contact with the teacher	36	1,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	64	2,50