



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Industrial Structures

### Course

Field of study

Sustainable Building Engineering

Area of study (specialization)

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

3/6

Profile of study

general academic

Course offered in

english

Requirements

compulsory

### Number of hours

Lecture

30

Laboratory classes

Tutorials

Projects/seminars

30

Other (e.g. online)

### Number of credit points

3

### Lecturers

Responsible for the course/lecturer:

dr inż. Tomasz Oleszkiewicz

Responsible for the course/lecturer:

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### Prerequisites

Student commencing this subject should have basic knowledge in the fields 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 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

Know building legislation, Polish standards (PN) and European standards (EN), technical conditions of constructing industrial facilities.

Know how to define the load values for industrial structures.

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.

Know the basics of foundation of selected industrial building facilities.

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 develop 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 autonomously 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:

Final written one-hour exam from lectures at the end of course, consisting of three open questions in the scope of lectures programme content (percentage limit of passing a 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: the oral test from knowledge of issues relating to project grade and the project grade based on the project documentation.

### Programme content

Lecture:

Loads and technological influencing factors on industrial structures. Mechanical actions and loads caused by overhead travelling cranes. Construction and design of concrete and steel crane girders. Construction of the overhead travelling crane trestle bridges. Construction and design of masonry, concrete and steel industrial chimneys. Underground and overground chimney smoke conduits design guidelines. Construction and design of steel and concrete belt conveyor trestle bridges.

Project:

Masonry industrial chimney design.

Reinforced concrete industrial design.

Overhead travelling crane trestle bridge design.

### 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.: 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. Codes and specifications.
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.

#### Breakdown of average student's workload

	Hours	ECTS
Total workload	90	3,0
Classes requiring direct contact with the teacher	63	2,0
Student's own work (literature studies, preparation for tests/exam, project preparation) <sup>1</sup>	27	1,0

<sup>1</sup> delete or add other activities as appropriate