**Nazwa przedmiotu:**

Special Metal Structures

**Koordynator przedmiotu:**

Wioleta Barcewicz, Ph.D., C.Eng., Associate Professor

**Status przedmiotu:**

Obowiązkowy

**Poziom kształcenia:**

Studia II stopnia

**Program:**

Civil Engineering

**Grupa przedmiotów:**

Obligatory

**Kod przedmiotu:**

1080-BUKBD-MSA-0406

**Semestr nominalny:**

2 / rok ak. 2021/2022

**Liczba punktów ECTS:**

4

**Liczba godzin pracy studenta związanych z osiągnięciem efektów uczenia się:**

Total 110 h = 4 ECTS: lecture 30 h, project tutorial 30 h, project 35 h, exam 10 h.

**Liczba punktów ECTS na zajęciach wymagających bezpośredniego udziału nauczycieli akademickich:**

Total 65 h = 2,5 ECTS: lecture 30 h, project tutorial 30 h, consultations (obligatory min. 3 times) and exam (participation in the exam) 5 h.

**Język prowadzenia zajęć:**

angielski

**Liczba punktów ECTS, którą student uzyskuje w ramach zajęć o charakterze praktycznym:**

Total 65 h = 2,5 ECTS: project tutorial 30 h, preparation of project 35 h (including participation in consultations).

**Formy zajęć i ich wymiar w semestrze:**

|  |  |
| --- | --- |
| Wykład: | 30h |
| Ćwiczenia: | 0h |
| Laboratorium: | 0h |
| Projekt: | 30h |
| Lekcje komputerowe: | 0h |

**Wymagania wstępne:**

The following courses passed: Metal Structures I, II and III on the level of BSc degree.

**Limit liczby studentów:**

15

**Cel przedmiotu:**

The aim of the course is to equip the student with adequate background information considering design and manufacture of different types of shell and bar steel structures and practical experience in design of steel cylindrical tank for storing liquids. The student is expected to demonstrate the basic knowledge and full understanding of advanced techniques for analysis and design of structural elements made of steel using elastic and plastic design principles; such ability is gained through the completion of design semester project.

**Treści kształcenia:**

Lecture and tutorial:
Tanks for liquids, gases and water storage (types – considering also static terms and conditions of structural working, structural detailing, basics of design including loading conditions, transportation and assembly methods).
Silos and containers/trays for bulk materials (types – considering also static terms and conditions of structural working, structural detailing, basics of design including loading conditions, transportation and assembly methods).
Pipelines (types – considering also static terms and conditions of structural working, structural detailing, basics of design including loading conditions, transportation and assembly methods).
Observation and telecommunication towers (types of structures, structural detailing, basics of design including loading conditions, transportation and assembly methods, differences between towers and masts).
Telecommunication and broadcasting masts (types of structures, structural detailing, basics of design including loading conditions, transportation and assembly methods, differences between towers and masts).
Supporting structures of overhead power lines (types of structures, structural detailing, basics of design including loading conditions, transportation and assembly methods).
Steel spatial structures and domes (types of structures, structural detailing, basics of design including loading conditions, transportation and assembly methods).
Semester design project:
Design of vertical, cylindrical, flat-bottomed, above ground, welded, steel tank for the storage of liquids (fuels) at ambient temperature. The project comprises static calculation, dimensioning of steel elements and preparation of technical drawings.

**Metody oceny:**

Satisfactory marks for submission of the design project of vertical, cylindrical, flat-bottomed, above ground, welded, steel tank for the storage of liquids (fuels) at ambient temperature produced within the semester and consulted min. 3 times.
Passing the written exam within the examination session with at least a satisfactory mark.
Course aggregate is an average mark of two components, namely the mark for the semester design project and the examination mark.

**Egzamin:**

tak

**Literatura:**

EN 1991-4: Eurocode 1 – Actions on structures – Part 4: Silos and tanks;
EN 1993-4-2: Eurocode 3 – Design of steel structures – Part 4-2: Tanks;
EN 1993-1-1: Eurocode 3 – Design of steel structures – Part 1-1: General rules and rules for buildings;
EN 1993-1-6: Eurocode 3 – Design of steel structures – Part 1-6: Strength and Stability of Shell Structures;
EN 14015: Specification for the design and manufacture of site built, vertical, cylindrical, flat-bottomed, above ground, welded, steel tanks for the storage of liquids at ambient temperature and above.

**Witryna www przedmiotu:**

https://pele.il.pw.edu.pl/moodle/course/view.php?id=333

**Uwagi:**

## Charakterystyki przedmiotowe

### Profil ogólnoakademicki - wiedza

**Charakterystyka W1:**

A graduate has knowledge about special metal structures.

Weryfikacja:

Exam.

**Powiązane charakterystyki kierunkowe:** K2\_W09, K2\_W13, K2\_W14\_KB, K2\_W16\_KB

**Powiązane charakterystyki obszarowe:** I.P7S\_WG.o, P7U\_W, III.P7S\_WG, I.P7S\_WK, III.P7S\_WK

### Profil ogólnoakademicki - umiejętności

**Charakterystyka U1:**

The graduate can prepare a project on the given topic.

Weryfikacja:

Consultations (obligatory min. 3 times), submission and defence of the project.

**Powiązane charakterystyki kierunkowe:** K2\_U05, K2\_U10, K2\_U15\_KB, K2\_U16\_KB, K2\_U17\_KB, K2\_U19\_KB, K2\_U20\_KB

**Powiązane charakterystyki obszarowe:** P7U\_U, I.P7S\_UW.o, III.P7S\_UW.o

### Profil ogólnoakademicki - kompetencje społeczne

**Charakterystyka K1:**

The graduate has the responsibility of being a designer.

Weryfikacja:

Consultations (obligatory min. 3 times), submission and defence of the project.

**Powiązane charakterystyki kierunkowe:** K2\_K03, K2\_K05, K2\_K02

**Powiązane charakterystyki obszarowe:** P7U\_K, I.P7S\_KK, I.P7S\_KO