1. Course number and name

RB-S1-18-W13-10, Steel Structures

2. Credits and contact hours*

4 ECTS, lectures: 23 hours**, classes: 2 hours**, project: 20 hours**

3. Instructor's or course coordinator's name

Witold Basiński, CEng, MSc, PhD,

4. Text book, title, author, and year

- Farkas J., Jarmai K.: „Optimum Design of Steel Structures" Springer-Verlag GmbH 2013.
- Farkas J., Jarmai K.: „ Basics Steel Construction" Birkhäuser Verlag GmbH 2015

a. other supplemental materials

- Standards: EN 1990:2002, EN 1991-1-1: 2001, EN 1993-1-1:2006, EN 1993-1-5:2008, EN 1993-1-8:2006.

5. Specific course information

a. brief description of the content of the course (catalog description)

Lectures:

Characteristics of steel structures. Advantages and disadvantages of steel as a construction material. Some examples of realizations. Steel production technology overview - some issues related to metallurgical process connected with steel properties. Manufacture and types of steel products Mechanical properties of steel (tensile graphs). Fatigue. Weldability and fragility steel. Grades of steel, their marking and use. Methods of dimension of steel structures. Limit states Plastic reserve: section and system Beams and plate girders. Bending, shear and twisted resistance of elements. Lateral buckling. Local stability. The phenomenon, calculation models, the coefficients of local instability. Tensile elements. compressed elements. Buckling resistance. Buckling characters. Bolted joints. Lap joints. End-plate joints – examples. Welded joints. Technology of welded joints Types and destiny of electrodes. Designation of joints. Types of welded joints. Design requirements. Selected disadvantages of welded joints. Calculations calls on fillet and but welds according to EC3.

Classes:

Calculation of welded and bolted connections..

Project:

Construction of a steel floor, located in an industrial building. It includes the calculation of static-strength rolled beams, plate girder and column in option one and double branch and construction of connections, stiffeners, head and base plate. Design drawings (scale of 1:10)

b. prerequisites or co-requisites

No prerequisites and additional requirements

c. indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program

Required.

6. Specific goals for the course

a. specific outcomes of instruction, ex. The student will be able to explain the significance of current research about a particular topic

- Student knows the principles of mechanics and analysis of bar structures in the field of statics, dynamics and stability and knows selected computer programs supporting the calculation and design of structures.
- Student knows the standards and guidelines for the design of buildings and their components
- Student knows the principles of construction and dimensioning of metal structures
- Student is able to correctly define computational models of computer structure analysis and critically evaluate the results of this analysis.
- Student is able to perform static analysis of statically determinate and indeterminate bar structures. Is able to determine the natural vibrations frequencies for simple rod structures and perform their dynamic analysis in the area of resonant states evaluation.
- Student can design selected elements and simple metal structures
- Student is able to assess and make a statement of loads acting on building objects.
- Formulates conclusions and describes the results of own work. He is communicative in media presentations
- Student is responsible for the reliability of the results of his work and their interpretation.
- Student can work independently and collaborate in a team over a designated task.

b. explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.

K1A_W05, K1A_W06, K1A_U02, K1A_U04

7. Brief list of topics to be covered

The aim of the subject is to present major information from steel structures technology, teach of designing of the basic steel elements and steel civil engineering structures. Characteristics of steel structures. Types of steel products. Mechanical properties of steel. Steel marking system. Classification of sections. Plastic reserve of the cross-section. Local instability. Elements bent, shear, compression, stretching. Connections in steel structures.

*- Consultations were not included in the contact hours

**-per semester