**Name of course:**

Computer Systems for Structural Analysis

**Coordinator of course:**

Bartosz Grzeszykowski, Ph. D.; Piotr Knyziak, Ph. D.

**Type of course:**

Optional

**Level of education:**

First cycle studies

**Programme:**

Civil Engineering

**Group of courses:**

Elective

**Code of course:**

1080-BU000-ISA-0609

**Nominal semester:**

7 / rok ak. 2021/2022

**Number of ECTS credits:**

2

**Number of hours of student’s work to achieve learning outcomes:**

Total 50 h = 2 ECTS: attendance at laboratory classes 30 h, preparation for classes, homeworks 20 h.

**Number of ECTS credits on the course with direct participation of academic teacher:**

Total 30 h = 1 ECTS: laboratory classes 30 h.

**Language of course:**

english

**Number of ECTS credits on practical activities on the course:**

Total 50 h = 2 ECTS: attendance at laboratory classes 30 h, preparation for classes, homeworks 20 h.

**Form of didactic studies and number of hours per semester:**

|  |  |
| --- | --- |
| Lecture: | 0h |
| Exercise type of course: | 0h |
| Laboratory: | 0h |
| Project type of course: | 0h |
| Computer lessons: | 30h |

**Preliminary requirements:**

The course is led for students which are interested in computer aided design, for students which are close the diploma connected with structural design.

**Limit of students:**

40

**Purpose of course:**

During the course students will achieve basic knowledge how to operate Autodesk Robot Structural Analysis Professional: build models, apply loads and loads combinations, perform calculations, view results and design steel, timber and RC concrete structures.

**Contents of education:**

1. User interface, program preferences (units, materials, codes etc.).
2. Building 2D and 3D models: frames, trusses, plates.
3. Structure geometry (bars, nodes, panels); definition of supports and releases; meshing.
4. Materials and section properties.
5. Additional attributes.
6. Loads types and loads combinations; claddings.
7. Analyse types (linear, non-linear, modal).
8. Viewing the results (tables, diagrams, maps).
9. Designing (dimensioning) steel, timber and reinforced concrete elements.
10. Optimisation of steel elements; codes parameters; members/group definitions.

**Methods of evaluation:**

Projects and practical exercises
Form of completion:
Individual one big project or several smaller projects (two or three) of 2D structure like RC concrete slab or 3D structure like steel frame of building, steel truss tower, timber rafter framing - building model, applying loads, loads combinations, calculations, designing. Student should finish and defend her/his own work till the end of the semester.

**Exam:**

no

**Literature:**

Autodesk Robot Structural Analysis Professional 2017 software help; tutorials from www.robobat.pl and internet.

**Website of the course:**

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**Notes:**

## Charakterystyki przedmiotowe

### General academic profile - knowledge

**Charakterystyka W01:**

He knows the possibilities and scope of the ARSA Pro program.

Verification:

Active participation in classes; execution and defense of home design works.

**Powiązane charakterystyki kierunkowe:** K1\_W07, K1\_W02, K1\_W04

**Powiązane charakterystyki obszarowe:** I.P6S\_WG.o, P6U\_W

**Charakterystyka W02 :**

Knows the rules of modeling bar structures and plates.

Verification:

Active participation in classes; execution and defense of home design works.

**Powiązane charakterystyki kierunkowe:** K1\_W02, K1\_W04

**Powiązane charakterystyki obszarowe:** P6U\_W, I.P6S\_WG.o

### General academic profile - skils

**Charakterystyka U01:**

Is able to build a flat and spatial bar system, define loads and their combinations, carry out calculations, interpret the obtained results.

Verification:

Active participation in classes; execution and defense of home design works.

**Powiązane charakterystyki kierunkowe:** K1\_U04, K1\_U05, K1\_U06, K1\_U07, K1\_U09, K1\_U20

**Powiązane charakterystyki obszarowe:** P6U\_U, I.P6S\_UW.o, III.P6S\_UW.o, I.P6S\_UU

**Charakterystyka U02 :**

Is able to model a reinforced concrete slab, define loads and their combinations, perform calculations, interpret the obtained results.

Verification:

Active participation in classes; execution and defense of home design works.

**Powiązane charakterystyki kierunkowe:** K1\_U07, K1\_U09, K1\_U20, K1\_U04, K1\_U05, K1\_U06

**Powiązane charakterystyki obszarowe:** I.P6S\_UW.o, III.P6S\_UW.o, P6U\_U, I.P6S\_UU

### General academic profile - social competences

**Charakterystyka K01 :**

Can work in a team in the implementation of project tasks.

Verification:

Work during the classes.

**Powiązane charakterystyki kierunkowe:** K1\_K01, K1\_K07

**Powiązane charakterystyki obszarowe:** P6U\_K, I.P6S\_KR, I.P6S\_KK