**Name of course:**

Implementation of BIM in Design of Structures

**Coordinator of course:**

mgr inż. Kostiantyn Protchenko

**Type of course:**

Optional

**Level of education:**

First cycle studies

**Programme:**

Civil Engineering

**Group of courses:**

Elective

**Code of course:**

1080-BU000-ISA-0601

**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: classes 30 h, literature study, reading manuals 4 h, home work on the project 15 h, consultations 1 h.

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

Total 31 h = 1 ECTS: classes 30 h, consultations 1 h.

**Language of course:**

english

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

Total 45 h = 2 ECTS: classes 30 h, home work on the project 15 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:**

Acquaintance with the basics of design processes.
Skills to represent own work.

**Limit of students:**

15

**Purpose of course:**

Goal 1 - clarification of the basic principles and benefits of BIM. Subject will be implemented by showing what needs arise during the design process and how to solve problems, which can arise during BIM process. Clarification of the basics on information exchange, data transfer, the possibilities of cooperation between the planned participants in the construction process.
Goal 2 - acquaintance students with the possibilities of using BIM. Introduction to strategic and technical solutions of BIM implementation.
Goal 3 – application of innovative programs for structural design, that enable cooperation of all participants in the design process. Most classes will be conducted with Allplan Software, and 2 classes are dedicated for visualization with Lumion Software.
Goal 4 – explanation of the concept on architectural and building model. Creation of a project, its technical documentation and visualization by implementation of programs that work in accordance with BIM.

**Contents of education:**

The Subject will be divided into four parts.
Part 1 - the concept of BIM, the basic principles, the benefits of BIM, information exchange, data transfer, various possibilities of the BIM use and BIM profitability.
Part 2 – acquaintance with Allplan Software and representation of its main capabilities. This section will be divided into separate modules: basic tools, 3D modeling, architectural designing, reinforcing structures in Allplan, revealing of automated process for reinforcing of more complex elements, creating documentation, export of the model to Lumion Software and making visualization.
Part 3 – creation of the own projects on the base of the knowledges, which were gained in part 2. Lecturer will consult and provide guidance to students in creating of the building models according to their own concept.
Part 4 - evaluation of students by teacher at the end of the course. Evaluation of contest projects.

**Methods of evaluation:**

An ability to create the elements of construction projects and implementing programs in accordance with BIM will be considered as a grading criterion. In addition, skills to employ the programs, and knowledge on basics of BIM technology will be taken into consideration.

**Exam:**

no

**Literature:**

[1] Kostiantyn Protchenko, Anna Chomenko., Podręcznik Allplan: Od szkicu do projektu., wrzesień 2017.
[2] BIM Industry Working Group. “Strategy Paper for the Government Construction Client Group”. March 2011.
[3] Computer Integrated Construction Research Program. (2011). “BIM Project Execution Planning Guide - Version 2.1.” May, The Pennsylvania State University, University Park, PA, USA.
[4] Eastman, C., Liston, K., Sacks, R., Teicholz, P., “BIM Handbook: A Guide to Building Information Modeling for Owners, Managers, Designers, Engineers, and Contractors”. John Wiley & Sons, 2011. Print.
[5] National Building Information Modeling Standard. “National Building Information Modeling Standard. Version 1 - Part 1: Overview, Principles, and Methodologies”. National Institute of Building Sciences. December 2007.

**Website of the course:**

http://bimplatform.pl/pl/zastosowanie-bim-projektowaniu-konstrukcji/

**Notes:**

## Charakterystyki przedmiotowe

### General academic profile - knowledge

**Charakterystyka W1:**

The graduates know the basic principles of designing reinforced concrete structures.

Verification:

realization and pass the design project

**Powiązane charakterystyki kierunkowe:** K1\_W05, K1\_W07

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

### General academic profile - skils

**Charakterystyka U1:**

The graduates can design the basic elements of reinforced concrete structures using BIM tools and can choose the right tools for solving design tasks. Students can develop construction and assembly drawings, can interpret drawings related to construction. Can plan and organize team work.

Verification:

Realization and presentation of the project

**Powiązane charakterystyki kierunkowe:** K1\_U20, K1\_U19, K1\_U02, K1\_U03, K1\_U04, K1\_U07, K1\_U09, K1\_U23, K1\_U21

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

### General academic profile - social competences

**Charakterystyka K1:**

The graduates are able to perform team tasks with other participants in the design process (including consults experts in case of difficulties with solving the problem on their own), are able to reliably present the results of their work

Verification:

Realization and presentation of the project

**Powiązane charakterystyki kierunkowe:** K1\_K01, K1\_K02, K1\_K07

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