COURSE DESCRIPTION CARD - SYLLABUS

Course name
Computer Aided Design [S2EJ1>KWP]

Course

Field of study
Nuclear Power Engineering

Year/Semester
1/2

Area of study (specialization)
–

Profile of study
general academic

Level of study
second-cycle

Course offered in
Polish

Form of study
full-time

Requirements
elective

Number of hours

Lecture
15

Laboratory classes
30

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

3,00

Coordinators

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Lecturers

Prerequisites

Knowledge: student has basic knowledge in the field of mathematics and physics, and knowledge in the field of computer science and programming, knows the principles of descriptive geometry and technical drawing in the field of reading and drawing working drawings and documentation (architectural, construction, geodetic maps and others depending on the industry) with the use of CAD, knows the sequence of consecutive stages of the design and construction stages, knows the methods of planning the construction (or demolition) process of a building object, has knowledge of the scope of competences of the different professions involved in a building project. Skills: the student can uses available sources of information, can solve basic engineering problems, read, execute, edit and print drawings of documentation (architectural, construction, surveying maps and others depending on the industry) using CAD, can find software and software usage tutorials that can help in the development of the project, is able to independently seek out relevant help to hardware or software problems, can use modern methods of information exchange (internal network, internet, data storage clouds, cloud computing) . Social competences: the student is able to interact and work in a group and follows the rules of ethics.

Course objective

The main goal is to collect, systematize and order methods for creating numerical models of phenomena and objects, with particular emphasis on formulating a problem, choosing a solution method and assessing accuracy. Acquire the knowledge, skills and competence in the field of using BIM in the effective support of the construction process.

Course-related learning outcomes

Knowledge:
Student has knowledge of theoretical mechanics, strength of materials and principles of general structural design.
Student has a basic knowledge of the operating algorithms of selected computer programs.
Student knows BIM terminology
Student knows the advantages of BIM in comparison to traditional project delivery.
Student knows the methods for cross-disciplinary coordination of models.
Student knows the BIM software.
Student knows the principles of work in BIM at different levels of detail (LOD).

Skills:
Student can use information and communication technology appropriate for the performance of tasks typical of engineering activities.
Student can input documentation drawings prepared with the use of CAD as a background in 3D model.
Student is able to identify the need for model sharing and coordination in the multidisciplinary project context.
Student is able to find and apply BIM objects with a LOI relevant to the project stage and the specific use.
Student can generate views, sheets, visualizations

Social competences:
Student is responsible for the reliability of the obtained results and their interpretation
Student is ready to critically assess their knowledge and the received content.
Student is ready to critically evaluate the results of their own work.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture - written test (duration 45 minutes), the date is given at the beginning of the semester, lecture is passed in the case of positive mark (at least E).
Laboratory classes - assessment based on the current preparation for classes and activities and the implementation and defense of the project (at least E).
Scale of the evaluation:
excellent (A) (5,0)
very good (B) (4,5)
good (C) (4,0)
satisfactory (D) (3,5)
sufficient (E) (3,0)
fail (F)

Programme content

What is BIM. Big BIM / Open vs. little / Closed BIM. BIM development levels. Interoperability in the context of BIM. Tools and functions supporting work on the BIM model. BIM on construction site. Facility Management.

Course topics

Introduction to the finite element method of the tool for modeling and strength analysis of engineering structures. What is BIM. BIM as a building model. BIM as a process. Big BIM - little bim. BIM levels of development. BIM vs. OpenBIM. IFC format for the exchange of BIM models. Interoperability in the BIM context. Model level of development (LOD). The principles of good practice in BIM. BIM - responsibility

and copyrights. How to create a correct BIM model. Modeling errors. BIM in the world. BIM in Poland. BIM software. Tools and functions supporting work on the BIM model. BIM at the construction site. CDE Platform. Facility Management.

Teaching methods

informative and conversational lecture, multimedia presentation, method of projects, practical methods, computer laboratory work

Bibliography

Basic:
1. D. Kasznia, J. Magiera, P. Wierzowiecki, BIM w praktyce: standardy, wdrożenie, case study, PWN, 2017.
2. A. Tomana, BIM - innowacyjna technologia w budownictwie: podstawy, standardy, narzędzia, Builder, 2016.7. Przewłócki J., Górski J.: Podstawy mechaniki Budowli. Arkady, Warszawa, 2006
3. G.Rakowski, Z. Kacprzyk, Metoda elementów skończonych w mechanice konstrukcji, Oficyna Wydawnicza Politechniki Warszawskiej, 2016.

Additional:
1. A. Borrmann et al., Building Information Modeling - technology foundations and industry practise, Springer International Publishing, 2018.

Breakdown of average student's workload

	Hours	ECTS
Total workload	85	3,00
Classes requiring direct contact with the teacher	45	1,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	40	1,50