COURSE DESCRIPTION CARD - SYLLABUS

Course name
Virtual design in cloud with elements of bionics [S2IBio1E-BiIW>PBwCO]

Course

Field of study
Biomedical Engineering

Year/Semester
1/2

Area of study (specialization)
Bionics and Virtual Engineering

Profile of study
general academic

Level of study
second-cycle

Course offered in
English

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
15

Laboratory classes
15

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

2,00

Coordinators

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Lecturers

Prerequisites

KNOWLEDGE: Knowledge of geometry modeling methods in CAD systems. Basic knowledge of the construction of computer systems. basic knowledge of structural analysis. SKILLS: Ability to use computer systems. Ability to use a basic CAD system. Ability to model geometry in the CAD system. Ability to use the finite element method in practice. SOCIAL COMPETENCES: Ability to work in a team. Understanding the need for learning and acquiring new knowledge.

Course objective

Transfer of knowledge about the methods and processes related to advanced virtual design with the use of design systems embedded in the computing cloud with particular emphasis on bionics. Developing practical skills in creating a virtual project with the use of remote access. Practical acquainting students with the modern possibilities of conducting a mechanical project in a computing cloud - model Software as a Service - SaaS. Indication of factors stimulating the market need for the development of such design methods. To acquaint students with the available design software in the cloud. Overview of various software concepts. Software market overview.

Course-related learning outcomes

Knowledge:
1. The student has an ordered, theoretically founded general knowledge covering the issues of engineering design of machines and devices, methods of analysis of kinematic systems, machine design algorithms, selection of machine elements based on strength criteria and h, engineering databases in machine construction, technical standards, good practices applied in technique and technologies. The acquired knowledge allows you to design: machines and mechanical devices, objects and processes, systems in terms of systems with the use of software in a computing cloud. K_W08
2. The student has an ordered, theoretically founded general knowledge of technical mechanics, including elements of the stress and strain theory as well as kinematics and dynamics of a material point, the basics of the theory of vibrations of mechanical systems and computer mechanics, computer techniques in mechanics, determination of work and energy, as well as analysis : any system of forces, equilibrium of plane and spatial systems, static of beams, columns, frames and trusses, systems of material points and a rigid body. This knowledge will allow you to solve technical problems using the laws of mechanics, has a basic knowledge of development trends in virtual design, especially in the area of using SaaS technology. K_W11

Skills:
1. The student is able to obtain information on mechatronics from the Internet, library and reading room and other resources. In particular, he can correctly indicate the sources of the necessary information. He can define the quality and usefulness of the information and data found. Can understand and use the content of articles, technical books and patents related to mechatronics, which are published in Polish and English or another foreign language recognized as the language of international communication. He can also integrate information obtained from various resources, interpret them, as well as draw conclusions and formulate and justify opinions. He should characterize the IT structure of the SaaS model. The student should characterize the types of existing solutions and types of data access. K_U01
2. The student is able to communicate both in the professional environment and in other environments using various modern techniques, especially IT. In particular, he can prepare a multimedia presentation, a written report, a summary of data, charts, tables, spreadsheets, overview and construction drawings. He can also write a computer program on his own, which will visualize a given issue or problem graphically or in text. The student is able to use SaaS software in practice (especially the CAD environment). The student is able to describe the available design software in the computing cloud. K_U023.

Social competences:
1. The student an interact and work in a group using SaaS software, assuming various roles in it. K_K03
2. The student is able to set priorities for the implementation of the tasks set by himself or others. K_K04

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Oral and written tests. Individual assessment of completed projects. The condition for receiving a positive evaluation is obtaining at least 50% of the possible points. This applies to all forms of classes. Test for:
- level of knowledge,
- application of knowledge,
- potential problem-solving skills.

Programme content

Lecture topics:
- Familiarizing students with virtual design procedures using SaaS platforms.
- To provide theoretical and practical knowledge about various models of practical implementation of CAD systems and other elements of the virtual design process in the computing cloud.
- Practical knowledge of the specific use of SaaS platforms.
- Description of the existing software on the commercial market.
- Detailed analysis of the use of the selected SaaS platform.

Practical classes - students will receive access to the selected SaaS platform.

Course topics

none

Teaching methods

An interactive lecture using multimedia presentations.

Bibliography

Basic:
1. Kavis Michael J., Architecting the Cloud: Design Decisions for Cloud Computing Service Models (SaaS, PaaS, and IaaS), ISBN: 978-1-118-61761-8, 2014
2. Michon Robert , The Complete Guide to Software as a Service: Everything you need to know about SaaS 1st Edition, ISBN: 978-1546308492, 2019
3. Soboń M., Nawrocki P., Public cloud computing for software as a service platforms, DOI 10.7494/csci.2014.15.1.89, Wydawnictwa AGH, Computer Science, Vol. 15 (1), pp. 89-103, 2014
4. Zamani N., CAD Modeling Essentials in 3DEXPERIENCE 2016x Using CATIA Applications, ISBN-10: 1630570958, SDC, 2017
5. Zamani N., Finite Element Essentials in 3DEXPERIENCE 2017x Using SIMULIA/CATIA, ISBN-10: 1630571008, SDC, 2017

Additional:
1. Bernérus E., Karlsson M., Simulation with 3DEXPERIENCE Evaluation of software for production flow simulation in manufacturing industry Master’s thesis in Production Engineering Erik Bernérus Marc Karlsson Department of Product and Production Development CHALMERS UNIVERSITY OF TECHNOLOGY
Gothenburg, Sweden 2016
"https://publications.lib.chalmers.se/records/fulltext/238594/238594.pdf"

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,00
Classes requiring direct contact with the teacher	30	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	20	1,00