COURSE DESCRIPTION CARD - SYLLABUS

Course name
Automation of tasks in a virtual environment [S1IBio1E>AZuSW]

Course

Field of study
Biomedical Engineering

Year/Semester
3/6

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
English

Form of study
full-time

Requirements
elective

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: the student has basic knowledge of information technology and biomedical engineering SKILLS: the student is able to integrate the obtained information and interpret it SOCIAL COMPETENCES: the student is able to cooperate in a project team, is aware of the responsibility for the tasks performed, understands the need to acquire new knowledge

Course objective

Acquisition of IT skills useful in the integration of CAD / CAM tools, including automatic data processing and automation (pipelines) of task processing. Gaining basic knowledge about Unix systems and selected engineering software in Linux. Acquiring programming skills (including creating plugins and extensions) in Python, as well as shell scripts (BASH). Getting to know the methods of automated documentation creation (including the LaTeX system). Acquiring the ability to work remotely, navigate and exchange information between systems and computers.

Course-related learning outcomes

Knowledge:
Has a basic knowledge of computer science that allows to describe the architecture of computer

systems; apply the basics of algorithms, databases and relational databases, compilers and programming languages, procedural and object-oriented programming, multimedia techniques, software and Internet tools - in particular enabling the automation of data processing tasks - computer-aided engineering systems in biomedical engineering and technology.
Has detailed knowledge of digital data processing, thanks to which he can describe data processing methods and IT tools for data processing and analysis.

Skills:
Can use data processing methods to carry out tasks in the field of biomedical engineering.
Can plan computer simulations, interpret the obtained results and draw conclusions. Can use computer assistance to solving technical tasks, in particular in the field of engineering data processing and automation of simple computational tasks (e.g. using FEM simulation).
Has the ability to self-educate.

Social competences:
Understands the need for lifelong learning; can inspire and organize the learning process of other people.
Can properly define priorities for the implementation of a task set by himself or others.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Test / colloquium and evaluation of tasks performed during the laboratory classes. Points are awarded for both items. The condition for receiving a positive evaluation is obtaining at least 50% of the possible points.

Programme content

Discussion of the basics of remote work and virtualization issues (on the example of VmWare).
Presentation of working methods in Unix / Linux operating systems and basic system commands, graphic environments and tools.
Basics of scripting programming languages (eg Python, shell / BASH) and regular expressions.
Basic engineering tools in Linux and the possibility of automating their use. Possibilities of automation of FEM calculations.
Acquainting with the methods of automatic work with text files and their processing (e.g. sed, awk) and creating documentation (LaTeX system - PDF and PostScript documents) and its automatic generation (creating reports from numerical calculations).

Course topics

none

Teaching methods

Information / problem lecture, case study, multimedia presentation, computer lab.

Bibliography

Basic:
J.C. Armstrong, D. Taylor: Unix dla każdego. Helion, 2000. ISBN: 83-7197-158-3
D. Taylor: 101 skryptów w shellu. Mikom, 2004, ISBN: 83-7279-453-7
D. Dougherty, A. Robbins: Sed i Awk. Helion, 1997. ISBN: 83-7197-540-6
M. Dawson: Python dla każdego. Podstawy programowania. Helion, 2014. ISBN: 978-83-246-9358-0

Additional:
J. Cybulka, B. Jankowska, J.R. Nawrocki, Automatyczne przetwarzanie tekstów AWK, Lex, YACC. Nakom, 2002. ISBN: 83-86969-52-0
T. Oetiker, H. Partl, I. Hyna i E. Schlegl: Nie za krótkie wprowadzenie do systemu LATEX2e ftp://sunsite.icm.edu.pl/pub/CTAN/info/lshort/polish/lshort2e.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