



## 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 (e.g. online)

0

Tutorials

0

Projects/seminars

0

### Number of credit points

2,00

### Coordinators

### 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 its 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:

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Oral and written tests. Assessment of individually made tasks.

### 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).

### 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	75	3,00
Classes requiring direct contact with the teacher	40	1,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	35	1,50