COURSE DESCRIPTION CARD - SYLLABUS

Course name
Bachelor Laboratory [S1Bioinf1>PRAC]

Course

Field of study
Bioinformatics

Year/Semester
4/7

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
0

Laboratory classes
60

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

4,00

Coordinators

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Lecturers

Prerequisites

Students starting this module should have basic knowledge of problems in bioinformatics and biology whose solution requires the use of computer tools. They should have basic ability to identify such problems in order to select appropriate software, design dedicated algorithms and use appropriate programming technologies. In addition, in terms of social competence the students should demonstrate such attitudes as honesty, responsibility, perseverance, cognitive curiosity, creativity, personal culture, respect for other people.

Course objective

1. Providing students with basic knowledge about the recent tools in the scope of their later application in problem solving. 2. To acquaint students with the operation and use of advanced features of the discussed software. 3. To acquaint students with the LaTeX environment for preparing a bachelor thesis. 4. To develop students" problem-solving skills by selecting an appropriate tool, algorithm, and technology. 5. To develop students" ability to identify appropriate tools for the research problem.

Course-related learning outcomes

Knowledge:
1. Student understands the relationship between the achievements of biology and computer science and the possibilities of their use in practice
2. Student knows basic methods, techniques and tools used in the process of solving bioinformatics tasks, mainly of engineering nature
3. Student knows and understands the life cycle of information systems
4. Student has basic knowledge of intellectual and industrial property protection

Skills:
1. Student is able to acquire information from the literature, databases and other appropriately selected sources, also in English
2. Student integrates and interprets obtained information, as well as draws conclusions and formulates and justifies its opinions
3. Student uses basic techniques and computer tools to solve biological problems, can evaluate their usefulness
4. Under the guidance of a tutor, student applies analytical, simulation and experimental methods to formulate and solve research tasks
5. Student is able to engage in a scientific discussion in communication with different environments, using the language adequate for reaching an understanding with interlocutors
6. Student is able to prepare well-documented papers and oral presentations on bioinformatics issues in Polish and English
7. Student notices the systematic and non-technical aspects of undertaken bioinformatics tasks

Social competences:
1. Student understands the need for a systematic search for new solutions, reading scientific journals, also in English, in order to deepen bioinformatics knowledge
2. Student systematically updates his/her knowledge in the field of biology and computer science and recognizes the possibilities of its practical application
3. Student is ready to cooperate and work in a team, taking various roles in it
4. Student is able to prioritize partial tasks in the process of project realization

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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Formative assessment
Verification of the assumed educational results is realized by continuous evaluation during classes (oral answers, realization of simple tasks during classes, presentation of work results) - to reward the growth of skills in using known principles and methods.
Total assessment
Verification of the assumed effects of education is realized through the evaluation of knowledge and skills related to the content provided during the seminars.
The activity during the classes is rewarded with additional points, in particular for
- discussion of additional aspects of the issue,
- the effectiveness of the application of the acquired knowledge when solving the problem,
- comments leading to the improvement of teaching materials or the teaching process.

Programme content

The following issues are discussed in the Bachelor Laboratory
* bioinformatics software that can be used to implement projects carried out by students;
* presentation of the topics and issues carried out as part of engineering works
* searching literature databases related to the topic of the diploma thesis
* preparation for working with the LaTeX environment, discussion of sample diploma theses templates
* familiarization with the methodology of performing computational experiments and software testing;
* familiarization with the basic principles of data visualization
* discussion of how to prepare design documentation,
* discussion of basic issues related to intellectual and industrial property related to diploma projects.

Course topics

Laboratory exercises are conducted as thirty two-hour classes held in a computer laboratory. The first class is designed to familiarize students with the use of the laboratory and the credit for the exercises. Subsequent laboratory classes follow a program that includes the following: (1) familiarization of students with bioinformatics software that can be used in the implementation of projects carried out by students; (2) familiarization with the issues/problems implemented by students in the engineering work; (3) presentation of solutions implemented in the engineering project and discussion of proposed solutions; (4) provision of literature that can be used in the implementation of the engineering work; (5) search of literature databases related to the topic of the thesis; (6) preparation to work with LaTeX environment, discussion of sample templates of the thesis; (7) acquaintance with the methodology of computational experiments; (8) discussion of software testing methodology; (9) acquaintance with the basic principles of data visualization and preparation of selected visualizations of the results obtained in the diploma project; (10) discussion of how to prepare project documentation, acquaintance with sample documentation prepared for the previous years" engineering diploma projects; (11) acquaintance with basic issues of software engineering in the field of software maintenance; (12) discussion of basic issues related to intellectual and industrial property connected with diploma projects.

Teaching methods

Laboratory classes: practical exercises, implementation of the algorithms, discussions, working in groups, use cases

Bibliography

Basic
1. T. Oetiker, H. Partl, I. Hyna, E. Schlegl "Nie za krótkie wprowadzenie do systemy LATEX 2"
2. P. Biecek "Odkrywać! Ujawniać! Objasniać! Zbiór esejów o sztuce prezentowania danych"
3. C.O. Wilke "Podstawy wizualizacji danych"
4. K. Wójciszko "Jak napisać dokumentację"
5. R. Pawlak "Testowanie oprogramowania. Podręcznik dla początkujących"
Additional
Overleaf platform documentation: https://www.overleaf.com/learn

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,00
Classes requiring direct contact with the teacher	60	2,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	40	1,50