COURSE DESCRIPTION CARD - SYLLABUS

Course name

Introduction to Bioinformatics

Course

Field of study

Bioinformatics

Year/Semester

1/2

Area of study (specialization)

Profile of study

general academic

Level of study

First-cycle studies

Course offered in

polish

Form of study

full-time

Requirements

compulsory

Number of hours

Lecture

15

Laboratory classes

15

Other (e.g. online)

Tutorials

0

Projects/seminars

Number of credit points

2

Lecturers

Responsible for the course/lecturer:

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Faculty of Computing and Telecommunications

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Responsible for the course/lecturer:

Prerequisites

A student starting this module should have basic knowledge about computer science, including operating systems, knowledge of basic terminology, the ability to use programs in English and have basic programming skills in C/C++. In addition, the ability to obtain information from the indicated sources, the ability to acquire knowledge from the environment, as well as problem-solving attitude, creativity, cognitive curiosity and the ability to work in a team are important.

Course objective

1. Providing basic knowledge in bioinformatics and computational biology.

2. Developing the ability to solve contemporary problems in the field of biological sciences, mainly molecular biology, using computational techniques.

3. Presentation of generally available bioinformatics resources and tools.

4. Developing teamwork skills in solving bioinformatics problems.

Course-related learning outcomes

Knowledge

1. A student has knowledge about development trends and the most important new achievements in bioinformatics.

2. A student knows the basic methods, techniques and tools used to solve simple computer science tasks in the field of bioinformatics.

3. A student has knowledge necessary to understand the social determinants of activity and take them into account in practice.

Skills

1. A student is able to use basic techniques and bioinformatics tools to solve biological problems, and is also able to interpret the obtained results and draw conclusions.

2. A student is able to obtain information from the literature, databases and other sources in order to consolidate and expand knowledge in the field of bioinformatics.

3. A student understands the systems approach to bioinformatics tasks and sees in them not only a technic approach to the problem but also an important biological context. Simultaneously, a student knows the terminology and is able to use the language adequate to undertaken scientific discussions in communication with various environments.

Social competences

1. A student understands the need for lifelong learning and expanding their competencies in designing and application of data analysis tools in bioinformatics.

2. A student understands that in this field of knowledge and skills quickly become obsolete.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Formative assessment:

a) Verification of assumed learning objectives related to lectures:

- based on answers to questions concerning the material discussed in previous lectures.

b) Verification of assumed learning objectives related to laboratory classes:

- based on the assessment of the current progress in performing tasks and evaluation of correctness.

Summative assessment:

a) Verification of assumed learning objectives related to lectures:

- based on assessing the knowledge and skills demonstrated in the written test.

b) Verification of assumed learning objectives related to laboratory classes:

- assessment of the student's preparation for particular laboratory classes,

- assessment of skills related to carrying out laboratory tasks,

- obtaining additional points for activity during classes.

Programme content

During the lecture, students gain knowledge of the basic issues of bioinformatics, as well as the basic concepts and issues in the field of molecular biology (necessary to understand discussed bioinformatics issues). The following issues will be discussed:

1. Introduction to molecular biology and bioinformatics

2. Biological databases

3. Sequences comparison

4. Genomics and sequencing

5. Re-sequencing and genome assembly

6. Structural bioinformatics

7. Systems biology

During the laboratory classes, students solve in a theoretical and practical way bioinformatical problems and learn about the available resources and bioinformatics tools related to the subject of the lectures.

Teaching methods

1. Lecture: multimedia presentation illustrated with examples given on the blackboard.

2. Laboratory class: practical exercises, conducting experiments, discussion, teamwork.

Bibliography

Basic

1. P.G. Higgs, T.K. Atwood: Bioinformatics and Molecular Evolution

2. J. Xiong: Essential Bioinformatics

3. A.D. Baxevanis, B.F. F. Ouellette: Bioinformatics: A Practical Guide to the Analysis of Genes and Protein

Additional

1. RC Deonier, S.Tavare, MS Waterman. Computational Genome analysis. an Introduction. Springer 2005

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,0
Classes requiring direct contact with the teacher	30	1,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, projects preparation, preparation for test) [1]	20	1,0

[1] delete or add other activities as appropriate