COURSE DESCRIPTION CARD - SYLLABUS

Course name

Bioinformatics

Course

Field of study

Education in Technology and Informatics

Year/Semester

1/2

Area of study (specialization)

Profile of study

general academic

Level of study

Second-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

Projects/seminars

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

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Wydział Informatyki i Telekomunikacji

ul. Piotrowo 3, 60-965 Poznań

Responsible for the course/lecturer:

Prerequisites

Fundamentals of computer science, including operating systems. Basic knowledge of databases. Basic skills in algorithm design. Basic programming in a selected high-level language (eg C / C ++, Python, Perl). The ability to acquire knowledge from the environment. Teamwork. Active attitude in solving problems, creativity, cognitive curiosity.

Course objective

1. Transfer of basic knowledge in bioinformatics and computational biology

2. Outlining and developing the ability to solve contemporary problems arising in the field of biological sciences, mainly molecular biology, using IT methods

3. Presentation of generally available bioinformatics resources and tools.

4. Developing teamwork skills to solve the bioinformatics problems posed.

Course-related learning outcomes

Knowledge

1. aa knowledge about development trends and the most important new achievements in bioinformatics [K2_W11], [K2_W14].

2. knows the basic methods, techniques and tools used to solve simple computer science tasks in the field of bioinformatics [K2_W07].

Skills

1. is able to obtain information from literature, databases and other sources in order to consolidate and expand knowledge in the field of bioinformatics [K2_U04].

2. is able to prepare a well-documented study of problems and algorithms in the field of bioinformatics in the native language [K2_U02].

3. is able to plan and carry out computational experiments with the use of bioinformatics tools, interpret the obtained results and draw conclusions [K2_U01], [K2_U10].

4. has the ability to formulate algorithms and their programming with the use of tools used in bioinformatics [K2_U23].

Social competences

1. can work on a designated task independently and work in a team [K_K03].

2. is able to properly determine the priorities for the implementation of the tasks set by himself or others [K_K04].

3. understands the need to expand their competences in the field of creating and applying tools for data analysis in bioinformatics and understands that in this field knowledge and skills quickly become obsolete [K2_K01].

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Formative assessment:

- in the field of lectures:

based on answers to questions about the material discussed in previous lectures;

- in the field of laboratories:

based on the assessment of the current progress in the implementation of tasks,

Summative assessment:

continuous assessment in class

final exam

assessment of student's preparation for individual sessions of laboratory classes

assessment of skills related to the implementation of laboratory exercises,

Earning additional points for attendance and activity during classes

Programme content

During the course, students will learn the basic issues of modern bioinformatics, as well as the basic concepts and issues in the field of molecular biology, necessary to understand the discussed bioinformatics issues. The following issues will be discussed:

1. Introduction to molecular biology and bioinformatics

2. Biological databases

3. Genomics

4. Sequencing and assembling of DNA

5. Structural bioinformatics

6. Systems biology

7. Molecular evolution

During the laboratory classes, students solve in a theoretical and practical way problems of a bioinformatics nature and get acquainted with the available bioinformatics resources and tools related to the subject of the lectures.

Teaching methods

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

2. Laboratory exercises: practical exercises, carrying out experiments, discussion, team work.

Bibliography

Basic

1. P.G.Higgs, T.K.Atwood. Bioinformatyka I ewolucja molekularna. PWN. Warszawa. 2012.

2. J.Xiong. Podstawy bioinformatyki. Wyd. Uniwersytetu Warszawskiego. Warszawa. 2009.

3. P. Biecek. Przewodnik po pakiecie R. Wyd. III Oficyna Wydawnicza GiS, Wrocław 2014

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	64	3,0
Classes requiring direct contact with the teacher	32	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	20	1,0

[1] delete or add other activities as appropriate