COURSE DESCRIPTION CARD - SYLLABUS

Course name
Functional Genomics [S1Bioinf1>GFUN]

Course

Field of study
Bioinformatics

Year/Semester
3/5

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
15

Laboratory classes
30

Other (e.g. online)
0

Tutorials
0

Projects/seminars
0

Number of credit points

4,00

Coordinators

Małgorzata Marcinkowska-Swojak

Lecturers

Prerequisites

The student starting the course should know the basic concepts, mechanisms, and research methods in the field of molecular biology and genetics. Also, they should be committed and cognitive.

Course objective

To provide students with knowledge in the field of selected issues of functional genomics. To acquaint them with the available experimental methods of studying the human genome and the basic methods of analyzing the results of experiments. To get students acquainted with basic genomic databases and developing the ability to obtain the desired information from them. To develop students" ability to solve research problems based on modern analytical tools in the field of genomics. To develop the ability to integrate and interpret genetic and genomic data.

Course-related learning outcomes

Knowledge:
1. The student knows the organization and functions of the human genome, necessary to formulate and solve research problems in the field of genomics.
2. Knows the methods used in genomics and understands how to plan an experiment with their use.
3. Knows the issues related to the analysis and processing of genomic data.

4. Has up-to-date knowledge of the latest trends and achievements in the field of genomics.

Skills:
1. The student is able to choose the appropriate techniques of genomic analysis for a given research problem and plan an experiment with their use.
2. Can use basic genomic databases and obtain from them the information necessary in research planning.
3. Can perform a simple genome analysis under the supervision of a research tutor.
4. Can integrate genomic, transcriptomic, and proteomic data at the basic level.
5. Can interpret the obtained results and draw conclusions based on them.

Social competences:
1. The student understands the need to update knowledge on genomics research tools.
2. Is aware of the potential of genomic research and is ready to discuss the application of genomic methods in scientific research.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
The knowledge acquired during the lectures is verified during a written exam consisting of open and closed questions. A positive note can be obtained after exceeding half of the maximum number of points. Systematic participation in lectures is rewarded.
The skills acquired during the laboratories are verified based on the assessment of a short report on the completed exercise. All exercises should be passed positively, corrections are allowed. The final note is the arithmetic mean of the notes for all exercises.

Programme content

I. Lectures
The lecture covers the following issues:
1. Introduction. Main concepts of functional genomics, history of genomic research.
2. The organization and functions of the human genome. Human genome variability.
3. Genome, transcriptome, proteome - data integration in research.
4. Methods of studying the structure of the human genome. Genome mapping.
5. Methods of studying the functions of the human genome.
6. Large-scale methods of genome analysis. Sequencing of genomes.
7. Evolution of genomes and phylogenetics. Ancient genomes.
8. Genomic projects in Poland and in the world. Summary.
II. Laboratories
The content and tasks discussed in the laboratory classes are correlated with the issues presented during the lecture.

Teaching methods

1. Interactive lectures illustrated with a multimedia presentation. Lectures based on the current knowledge in the field of functional genomics and enriched with examples.
2. Laboratories in the form of 15 two-hour classes are held in a computer laboratory. Laboratories include practical tasks illustrating the issues discussed during lectures and a discussion of solutions proposed by students.

Bibliography

Basic
T.A. Brown "Genomy 3" Warszawa 2009 (or later)
K.M. Charon, M. Świtoński "Genetyka i genomika zwierząt" Warszawa 2012 (or later)
Additional
R. Słomski "Analiza DNA. Teoria i praktyka" Poznan 2008 (or later)
Berg, Tymoczko, Stryer "Biochemia" Warszwa 2011 (or later)
Papers indicated during lectures or laboratories

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,00
Classes requiring direct contact with the teacher	45	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	55	2,00