COURSE DESCRIPTION CARD - SYLLABUS

Course name
Genetic Engineering [S1Bioinf1>IGEN]

Course

Field of study
Bioinformatics

Year/Semester
3/6

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
0

Other
0

Tutorials
15

Projects/seminars
0

Number of credit points

2,00

Coordinators

dr hab. Agnieszka Żmieńko
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Lecturers

Prerequisites

The student starting this course should have knowledge of cell biology, molecular biology, biochemistry and genetics. He/She should also have the ability to obtain information from the indicated sources and be ready to cooperate within the team.

Course objective

The aim of the Genetic Engineering course is: -to provide students with knowledge of the basic tools and techniques of genetic engineering -acquainting students with the latest trends and applications of genetic engineering - teaching students the ability to design experiments involving DNA manipulation

Course-related learning outcomes

Knowledge:
The student knows and understands:
- principles of operation of molecular tools used in genetic engineering
- fields of application and the latest development trends in genetic engineering
- genetic engineering techniques and their limitations
-social and legal conditions of activities involving genetic engineering techniques

Skills:
The student is able to:
-Search for sources and retrieve information about the latest genetic engineering tools and applications
-use basic IT tools to identify sites amenablee to genetic manipulation with the use of molecular tools
-plan experiments and predict the effects of genome modification by genetic engineering techniques

Social competences:
Student:
-can work on a designated task independently and work in a team
-can properly define priorities for the implementation of a task set by himself or others
-understands the need to improve their competences and follow the latest discoveries and achievements of genetic engineering
-is aware of the dynamic development of modern genetic engineering techniques and the legal and ethical aspects of their application

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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Lecture - continuous verification based on answers to questions regarding the presented material and taking part in discussions. Final verification
based on a written test which involves test questions, open tasks and / or knowledge of simulation exercises carried out during the semester. The pass mark is to obtain more than 50% of the points in the test. Tutorials - the average of the marks obtained for accomplishing the tasks assigned during the class, written works and presentations and the grade for the essay / student presentation assigned by the instructor.

Programme content

Methods and molecular tools for DNA manipulations; DNA editing; DNA cloning; Plant and animal transgenesis

Course topics

Basic concepts in genetic engineering; Enzymes for DNA manipulation; DNA vectors and DNA cloning; Plant and animal transgenesis; Gene libraries and their searching; CRISPR/Cas9 technique; Bioinformatic tools used in genetic engineering; current applications of genetic engineering

Teaching methods

Lecture: presenting the material supported by multimedia presentations, discussion. Classes: Discussing the problem; doing the tasks related to genetic engineering experiment design, performing and analysis; Individual and / or team elaboration on selected topic.

Bibliography

Basic
Brown T. Genomy. Wydanie 3. Wydawnictwo Naukowe PWN. Warszawa 2019 / Brown T. Genomes. 3rd ed. New York: Garland Science, c2007.
Bal J. Red. nauk. Genetyka medyczna i molekularna. Wydanie czwarte. Wydawnictwo Naukowe PWN. Warszawa 2017.
Additional
Węgleński P. (red.) Genetyka Molekularna. Wyd. 6. Wydawnictwo Naukowe PWN, Warszawa 2006, 2021
Articles in scientific journals indicated by the teacher of the subject.

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,00
Classes requiring direct contact with the teacher	30	1,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	20	0,50