Course: Project Genetic Engineering — credits: 10

Course code	BOVH25RPJGENETIC
Name	Project Genetic Engineering
Study year	2025-2026
ECTS credits	10
Language	English
Coordinator	M.J.J.B. Sibbald

Modes of delivery	Lecture Practical / Training Tutorial
Assessments	Molecular Biology Theory - Computer, organised by STAD examinations Project CRISPR - Other assessment

Learning outcomes

- You have an overview of various molecular biology methods and techniques used in biomedical and biotechnological research.
- You can simulate and perform various molecular genetic techniques in silico and in practice, such as DNA cloning and PCR.
- You can plan, simulate, and apply CRISPR-Cas9 technology or CRISPR interference techniques in a laboratory setting to modify specific genes and analyze the effects on the target organism.
- You are able to analyze research data from the experiment in a scientifically responsible manner and discuss the data based on literature and draw a conclusion.
- You can create an English report about the performed experiment according to established guidelines.

Content

In this module, the emphasis will be placed on several general molecular genetic techniques, such as restriction analysis, DNA cloning (ligation and transformation of bacterial cells), and PCR. During the theory lessons, you will gain knowledge of the various molecular biological techniques. In addition, you will learn to perform simulations on the computer before you carry out the techniques in the lab.
In the project, the CRISPR-Cas9 technique, specifically CRISPR interference, is used as a tool for genetic modification of *Bacillus subtilis*. CRISPR interference (CRISPRi) is a method used to downregulate specific genes in an organism. In the case of *Bacillus subtilis*, the *amyE* and *sunI* genes can be targeted with CRISPRi to reduce their expression levels. This technology utilizes the CRISPR-Cas9 system to bind to the promoter region of target genes and prevent transcription, leading to decreased gene expression. By downregulating the *amyE* and *sunI* genes in *Bacillus subtilis*, you will be able to study the function of these genes and potential applications in biotechnology. You will complete this project by writing a report in English, in which the research results are presented and discussed in an organized manner and according to established guidelines. You will receive support for this by following a series of writing skills lessons.

Included in programme(s)

Major Biology and Medical Research

School(s)

Institute for Life Science & Technology

share your talent. move the world.

Although every effort has been taken to ensure the accuracy of the information in the ECTS Course Catalogue, we cannot guarantee that the content and the information contained in it is always up-to-date, complete or true. Accordingly, no rights can be derived from the contents of the catalogue.