Course: NGS Mapping & Genetics — credits: 5

Course code	BFVH23NGS
Name	NGS Mapping & Genetics
Study year	2025-2026
ECTS credits	5
Language	Dutch, with parts in English
Coordinator	-
Modes of delivery	Assignment Tutorial
Assessments	Casus - Other assessment Theorie - Written, organised by School

Learning outcomes

This module has the following learning outcomes:

You know all the concepts of central dogma, the different types of macromolecules and enzymes, and you can describe the interrelationships between them

You can name different mechanisms of gene regulation, and predict the effects of various mutations on gene expression

You know the different genome structures and can detect, filter and annotate them in an NGS data set using appropriate tools and techniques.

You have a good understanding of the quality requirements of NGS data, depending on both the NGS technique used and the purpose. You can also apply the tools to provide insight into and improve this quality.

You know which tools and algorithms are available to map NGS reads against a reference genome and can justify which is the best for a given dataset and question.

You justify and present the choices made of steps performed to achieve a high-quality mapping.

DAS competencies

Competency	Level (I-IV)
Research	I
Experimentation	
Development	
management	
Advise	
Instruction	I
Leadership	
Self-management	

Content

In preparation for the genomics and transcriptomics project, we start with a comprehensive introduction to the required theory. This covers basic genetics (gene variation, gene regulation) for modern NGS techniques, the different forms of structural variation and the background of transcriptomics research. During this module, the various theoretical topics are practically implemented with small sub-tasks in the workflow manager Galaxy. Here the emphasis is on getting acquainted with the different types of NGS data and their associated techniques, performing a thorough quality control and mapping against a reference genome.

It is assumed that you are familiar with the central dogma as discussed in module 1.1.2: From DNA to Protein.

Included in programme(s)

Bio-Informatics

School(s)

Institute for Life Science & Technology

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