Hanze

Course: The Scientific Cycle — credits: 10

Course code	BFVP22CYCLUS
Name	The Scientific Cycle
Study year	2026-2027
ECTS credits	10
Language	Dutch, with parts in English
Coordinator	R. Wedema
Modes of delivery	Lecture Project-based learning Tutorial
Assessments	Professional Product - Other assessment Science Communication - Other assessment

Learning outcomes

This module has the following learning outcomes:

You formulate testable, relevant and feasible research questions and translate these into expected outcomes (hypotheses).

You design a feasible experiment to answer a research question and record this in a protocol, taking into account reliability (e.g. proper checks), quality assurance and (privacy) legislation. You conduct this experiment according to protocol.

You assess the quality of the experiment, the reliability of the protocol and also of the data obtained. You log this verifiably and reproducibly.

Using relevant data visualisations and statistical techniques, you perform a data exploration on obtained or self-collected data using the R programming language.

You distinguish different sources of variation in your measured values and estimate their size using statistical methods.

You use your computer system efficiently -if relevant with git- to manage your research documents and data according to standards applicable in the field.

You give constructive feedback on scientific products of others.

You write a paper according to scientific standards using a template.

You evaluate your own performance and identify strengths and areas for development.

You select relevant sources and can transfer their essence to fellow students.

Content

As a bioinformatician, you often have to conduct research and you do so according to the scientific cycle. In this module, you will learn about this cycle with a research project of your own choice.

The scientific cycle always starts with a research question. A research question is never just any question: it has to meet a number of conditions, with aspects such as measurability.

In addition to formulating the research question, the scientific cycle has a whole number of other elements: drawing up hypotheses, studying what is already known, designing experiments, carrying out those experiments reproducibly, analysing and modelling obtained data, and, of course, answering the research question. Ultimately, this entire process needs to be written down in a way so that the scientific community has a chance to check, repeat or build on your work.

A very important aspect in all this is being able to estimate how much data you need, how good the data is and how good the method you use to answer the question is. Thus, there are some standard steps and 'checks' you need to do in a research study.

In short, how do you do scientific research? You will learn that in this module!

Professional duties represented

- Conduct research within the domain of Life Sciences

- Set up and manage a basic bioinformatics infrastructure

Included in programme(s)

Bio-Informatics

School(s)

Engineering, Life Sciences & ICT

share your talent. move the world.

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