Bio-informatics (I700081)

Valid as from the academic year 2017-2018

Lecturers in academic year 2019-2020
Ameye, Maarten LA21 lecturer-in-charge

Offered in the following programmes in 2019-2020
Master of Science in Bioscience Engineering Technology: Food Industry

Teaching languages
Dutch

Keywords
Bio-informatics

Position of the course
Bioinformatics has become essential for basically every research field dealing with biological issues. Since the development of techniques to sequence DNA and proteins, enormous amounts of biological data have been generated. For instance, the entire human genome has been sequenced. Similarly, the genetic code of other model organisms has been elucidated as well. To allow the organization and the analysis of these data; databases and analysis tools have been created. In this course we will learn how to use these databases in order to extract particular information on specific genes or proteins. We will learn how to use freely available software on the internet to obtain a diversity of information on DNA sequences, genes, and proteins and to reveal phylogenetic relationships. We will also learn how bioinformatics can help us to design cloning strategies.

Contents
During the different classes short theoretical explanations will be combined with exercises. At the end of each class, the students will get an assignment that they have to complete at home and which will allow them to test the knowledge they have obtained on a particular subject during that class.
The following subjects will be dealt with:
• structure of diverse biological databases
• directed search for specific information
• analyzing nucleotide and amino acid sequences
• digital cloning techniques using in silico restriction analysis and primer design
• making alignments (pairwise alignment, multiple alignment, BLAST, local alignment, global alignment,...) and applying them for practical purposes
• generating phylogenetic trees

Initial competences
Insights into and mastering the jargon of genetics, biotechnology and biochemistry

Final competences
1 Obtaining insights into literature, nucleotide and protein databases
2 Being capable of retrieving, analyzing and working with sequences
3 Being able to interpret the obtained output of the programs
4 Being able to analyze an assignment

Credits 3.0
Study time 90 h
Contact hrs 48.0 h

Course size
Course offerings and teaching methods in academic year 2019-2020
A (semester 2) Dutch self-reliant study activities 24.0 h
seminar 24.0 h

Contact hrs
Study time 90 h
Credits 3.0
Course size

(Approved)
5. In function of a posed problem, being capable of actively choosing and applying appropriate tools and obtaining required additional information.
6. General competence: acquiring the capacity for interdisciplinary thinking.

Conditions for credit contract:
Access to this course unit via a credit contract is determined after successful competences assessment.

Conditions for exam contract:
This course unit cannot be taken via an exam contract.

Teaching methods:
Seminar, self-reliant study activities.

Learning materials and price:
PowerPoint slides, manuals for software applications, internet.

References:

Course content-related study coaching:
Continuous opportunity to ask questions, guided exercises.

Evaluation methods:
end-of-term evaluation.

Examination methods in case of periodic evaluation during the first examination period:
Open book examination, skills test.

Examination methods in case of periodic evaluation during the second examination period:
Open book examination, skills test.

Examination methods in case of permanent evaluation:

Possibilities of retake in case of permanent evaluation:
not applicable.

Extra information on the examination methods:
The exam consists of different complex problems that have to be solved using the acquired knowledge on the application of appropriate software. The student is allowed to use the ppt’s that have been used in the classes (comparable to “open book” exam). The questions are solved on the computer and the answers (used software and settings, print screens, interpretation of the results, conclusion) are handed in as a digital word document (saved on a memory stick by the lecturer).

Calculation of the examination mark:

(Approved)