UNIVERSITY OF SKÖVDE

PROGRAMME SYLLABUS

Molecular Bioinformatics

180 credits

Programme code: MOBIG
Version number: 5
Valid from: Autumn term 2022
Ratified by: Curriculum Committee for Bioscience
Date of ratification: 25 February 2021

1. General information about the study programme

The study programme is provided by the University of Skövde and is named Molecular Bioinformatics (Molekylär bioinformatik). It comprises 180 credits and is a first-cycle programme. The main field of study is Bioinformatics.

2. Entry requirements

General entry requirements.
Additional requirements: Mathematics 3b or Mathematics 3c or Mathematics C, Science studies 2 and English 6 (or the equivalent).

The level of English proficiency is normally shown by an internationally recognized test, e.g. IELTS or TOEFL.

The entry requirements above are applicable for admission to the study programme. For further studies within the programme, the entry requirements for each course must be met. These entry requirements are specified in each separate course syllabus.

3. Study programme content

The studies in the programme are within the main field of study bioinformatics. Students learn the basics of information technology (operating systems, shells and command prompts, programming methodology, combinatorics and graph theory) and the basics of molecular biology (cells, molecular genetics, biochemical processes, microbiology, molecular biomarkers). To this is added broader studies (molecular diagnostics, sustainable developmen, entrepeneurship) and specialization in the core subject (bioinformatics algorithms, software development for bioinformatics, methods for analysis of data from massively parallel sequencing).

The program is concluded with a thesis project of 30 credits, during which the acquired knowledge though the study programme is used to independently formulate and solve a research- and/or development-related problem within Bioinformatics.

The following courses are included in the programme

Bioinformatic Analysis with Python 1 G1N, 7.5 credits

Cell biology G1N, 7.5 credits

Discrete Mathematics G1N, 7.5 credits

Genetics G1N, 7.5 credits

Basic Chemistry G1N, 15 credits

Sustainable development G1N, 7.5 credits

Introduction to Bioinformatics G1N, 7.5 credits

Introduction to Computational Tools for Bioinformatics G1N, 6.5 credits

Laboratory basic course G1N, 1 credit

Microbial Bioinformatics G1N, 7,5 credits

Bioinformatic Analysis with Python 2 G1F, 7.5 credits

Method and Design in Life Science G1F, 7.5 credits

Expression Analys with R G1F, 7.5 credits

Molecular Genetics G1F, 7.5 credits

Analysis of Data from Massively Parallel Sequencing G2F, 7.5 credits

Literature Review in Bioscience G2F, 7.5 credits

Bioinformatics Software Development G2F, 7.5 credits

Molecular Diagnostics and Biomarkers G2F, 7.5 credits

Programming Project in Bioinformatics G2F, 7.5 credits

Bachelor Project in Bioinformatics G2E, 30 credits

Eligible courses

Entrepreneurial Start Up G1N, 7.5 credits

Project Management - Basic Concepts and Methods G1N, 7.5 credits

4. General objectives

Objectives for education at the first-cycle level in The Higher Education Act

First-cycle courses and study programmes shall develop:

- the ability of students to make independent and critical assessments,
- the ability of students to identify, formulate and solve problems autonomously, and
- the preparedness of students to deal with changes in working life.

In addition to knowledge and skills in their field of study, students shall develop the ability to:

- gather and interpret information at a scholarly level,
- stay abreast of the development of knowledge, and
- communicate their knowledge to others, including those who lack specialist knowledge in the field.

5. Study programme objectives

The major field of study is bioinformatics.

Objectives of the Bachelor's degree in Higher Education are

Knowledge and understanding

For a Bachelor's Degree, the student should be able to

- demonstrate knowledge and understanding in the major subject area including knowledge of the scientific basis, methodologies in the field, specialization within a sub-area and understanding of

current research directions.

Skills and Abilities

For Bachelor's Degree, the student should be able to

- demonstrate the ability to search, evaluate and critically interpret relevant information in a study case and to critically discuss relevant phenomena, issues and situations,
- demonstrate the ability to identify, formulate and solve problems and to perform tasks within specified time limits,
- demonstrate the ability to orally and in writing explain and discuss information, problems and solutions in dialogue with different groups, and
- demonstrate the skills required to independently work within the educational field.

Critical judgment and approach

For Bachelor's Degree, the student should be able to

- demonstrate skills in the major field of study, make evaluations with respect to relevant scientific, social and ethical aspects,
- demonstrate an understanding of the role of knowledge in society and people's responsibility for application of knowledge, and
- demonstrate the ability to identify their individual needs for further knowledge and developing their skills.

Local goals of the programme at University of Skövde

After completion of the program the student should be able to

- demonstrate knowledge about and skills in development of algorithms for bioinformatics applications, and practical skills in developing software to solve bioinformatics problems,
- demonstrate knowledge about, and show ability to discuss, how bioinformatical methods are used to analyse data from massively parallel sequencing to understand complex diseases and thereby contribute to improvement of health and wellbeing,
- demonstrate good knowledge and understanding of how digitalization can be used in the efforts to improve health and wellbeing.

6. Language of instruction

The teaching is conducted in English.

7. Degree qualification

Students who complete the program with at least a pass grade meet the general requirements for obtaining a Degree of Bachelor of science with a major in Bioinformatics.

Degree certificates are issued after application. Information about how to submit an application can be found on the website of the University of Skövde.

8. Changes to the programme syllabus

The programme syllabus and its courses may be changed, within the framework of the objectives for the study programme.

9. Student influence

Student influence in the study programme is ensured by means of programme evaluations. The students are informed about the results of the evaluations and potential measures that have been taken or are planned, based on the course evaluations.

10. Additional information

Further information about the study programme, as well as national and local governing documents for higher education, is available on the website of the University of Skövde.