PROGRAMME SYLLABUS

Molekylär bioinformatik
Molecular Bioinformatics
180 credits

Programme Code: MOBIG
Academic Level: Basic level
Version: 2.2

The Programme Syllabus is valid from: Autumn term 2021
Date of Approval: 24 September 2021

1 Name and Scope of the Study Programme
The programme is provided by the University of Skövde and is named Molecular Bioinformatics. It comprises 180 credits.

2 General Objectives
Courses and study programmes on the basic level 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.

(Objectives for courses and study programmes on the basic level, The Higher Education Act)

3 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.

### 4 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 development, entrepreneurship) 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

**5 Admission Requirements**

The special prerequisites for this programme, besides basic eligibility for university studies, are the following upper secondary school courses Mathematics C, Sci-
ence studies B, English B or Mathematics 3b/3c, Science studies 2, English 6.

The corresponding English proficiency can normally be shown by an internationally recognized language tests, such as IELTS or TOEFL (or equivalent).

The above admission requirements apply for admission to the programme. For further studies within the programme, the admission requirements for each course must be complied with. These admission requirements are specified in each separate course syllabus.

6 Degree
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.

Degrees are awarded after application. Information about how to submit an application can be found on the University’s website.

7 Approval of Study Programme and Programme Syllabus
The study programme was approved by the Vice-Chancellor at the University of Skövde on 3 June 2019. This programme syllabus was approved by the Curriculum Committee for Bioscience on 24 September 2021. It is valid from the autumn semester of 2021 and replaces the programme syllabus approved on 28 May 2020.

8 Changes to the Programme Syllabus
The programme studies are carried out in accordance with the current programme syllabus in effect at the time when the studies were initiated, provided that the structure of the programme is followed and that no leave of studies has been granted.

In the event of continued studies after a period of approved leave of studies, the students is to follow the programme syllabus in effect the term that the student resumes his/her studies. If substantial changes to the programme syllabus have been made, the student may contact a student and career counsellor in order to set up an individual study plan.

Reservations are made for the fact that the programme syllabus and its courses are subject to change, within the framework of the objectives of the programme.

9 Additional Information
The teaching is conducted in English.

Further information about the study programme will be available on the University’s web pages prior to a programme start.

National and local regulations for higher education are available on the University’s website.

During the programme, as well as after its completion, there are follow-ups. The main purpose of these follow-ups is to contribute to improvements of the programme. The students’ experiences and views constitute one of the criteria for the follow-up and are gathered by means of programme evaluations. The students will be informed of the results of the follow-up and any decisions regarding actions that are to be taken.