1 Name and Scope of the Study Programme
The programme is provided by the University of Skövde and is named Biomarkers in Molecular Medicine - Master’s Programme. It comprises 120 credits.

2 General Objectives
Courses and study programmes on the advanced level shall involve the acquisition of specialist knowledge, competence and skills in relation to courses and study programmes on the basic level, and in addition to the requirements for courses and study programmes on the basic level shall:

- further develop the ability of students to integrate and make autonomous use of their knowledge,
- develop the students’ ability to deal with complex phenomena, issues and situations, and
- develop the students’ potential for professional activities that demand considerably autonomy, or for research and development work.

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

3 Programme Objectives
Main area of education is Systems Biology.

Objectives for Master’s Degree according to the Higher Education Ordinance

Knowledge and Understanding
For a Master’s Degree students shall be able to

- show knowledge and understanding within the main area of the education, inclusive of wide

• show in depth knowledge of methodology within the main area of the education.

Proficiency and Ability
For a Master’s Degree the students shall be able to

- show the ability to critically and systematically integrate knowledge and analyse, assess and manage complex phenomena, questions and situations even with limited information,
- show the ability to critically independently and creatively identify and formulate questions, as well as to plan and, with adequate methods, carry out advanced assignments within specified time limits and thereby contribute to the development of knowledge as well as to evaluate these efforts,
- show the ability in both national and international contexts to, orally and in writing, clearly account for and discuss their conclusions and the knowledge and arguments these are based on in dialogue with different groups, and
- show the proficiency required to participate in research and development in other advanced activity.

Ability to Evaluate and Relate
For the Master’s Degree students shall

• show the ability, within the main area of the education, to make assessments in accordance with relevant research, societal and ethical
aspects as well as show awareness of ethical aspects in research and development,

- show insight into the possibilities and limitations of research, its role in society and human beings' responsibility for how it is used, and

- show the ability to identify the need for further knowledge and to take responsibility for the development of their knowledge.

**Local Objective for the Programme at The University of Skövde**

Students shall

- after completion of the programme show deeper knowledge to applications and underlying theories to identify, verify and validate biomarkers in Molecular Medicine by the use of Systems Biology methods.

### 4 Programme Content

Initially, the training focus on providing the students with detailed laboratory skills. The students also learn to plan laboratory experiments as well as interpret and analyse the data that is generated. In addition, the students also get an insight into the concepts and practises about the use of biomarkers in molecular medicine.

Furthermore, the students learn additional methods for analysing experimental biological data, and to identify, verify and validate biomarkers in molecular medicine, as well as to generate and analyse sequencing data.

The programme ends with a Master Degree Project, during which the acquired knowledge is used to independently solve a research problem within Systems Biology.

**The following courses are included in the programme**

- Analysis of NGS Data 1 A1N, 4 credits
- Bioinformatics Analysis with R A1N, 7.5 credits
- Biomarkers in Molecular Medicine A1N, 7.5 credits
- Bioinformatics Concepts and Methods A1N, 7.5 credits
- Experimental Design and Data Analysis for Life Science A1N, 5 credits
- Experimental Methods and Design in Life Science A1N, 10 credits
- NGS Library: Preparation and Quality Control A1F, 5 credits
- Analysis of NGS Data 2 A1F, 6 credits
- Biomarkers - data analysis A1F, 7.5 credits
- Multivariate Biological Analysis with R A1F, 7.5 credits
- Systems Biology A1F, 7.5 credits
- Master Degree (two year) Project in Systems Biology A2E, 45 credits

### 5 Admission Requirements

To be eligible for the program a Bachelor’s Degree (equivalent to a Swedish Bachelor’s Degree) with a major in the biological or medical area is required. The biological area can be defined as e.g. Molecular Biology, Biochemistry, Microbiology or Physiology. The medical area is here defined as Biomedicine but can also include subjects like Pharmacology.

A further requirement is proof of skills in English equivalent of studies at upper secondary level in Sweden known as English course 6 / English course B. This is normally demonstrated by means of an internationally recognized test, e.g. IELTS or TOEFL or the 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

A student who passes the courses in the programme fulfills the requirements for obtaining a Degree of Master of Science (120 credits) with a major in Systems Biology.

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 20 Septem-
ber 2016. This programme syllabus was approved by the Curriculum Committee for Bioscience on 25 October 2018. It is valid from the autumn semester of 2020 and replaces the programme syllabus approved on 26 April 2018.

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.