ADVANCED BACHELOR OF
BIOINFORMATICS
YOUR FUTURE STARTS AT HOWEST

2024-2025

howest
hogeschool

ADVANCED BACHELOR OF BIOINFORMATICS
SOMETHING FOR YOU?

howest BIOINFORMATICS

Welcome!

The world of molecular biology is evolving rapidly, mainly due to the increasing importance of Next-Generation Sequencing and big data, alongside traditional research methods. The advanced bachelor's degree in Bioinformatics will arm scientist students with the necessary IT and programming skills to be able to work with these changes and thus continue to work in a data driven manner. In other words, this training will literally make you the **laboratory scientist of the future**.

The three roles

Do you have a Bachelor's degree in Biomedical Laboratory Science, or did you graduate from another programme in molecular biology? Then you can specialise with the advanced bachelor of Bioinformatics in the **IT and automation fields**, which are becoming increasingly important in molecular biology. In this way, you allow yourself to truly keep up with the new developments in your professional sector. Students without prior knowledge of molecular biology can also register for the **various course units**, via a credit contract.

To challenge yourself this program is taught entirely in English. As everything in bioinformatics is found online in English and the communication language in the biotech labs is more and more English, the choice for this language is obvious. Secondly it makes the program more international and studying in English is one more asset in your personal development.

The reason for setting up this unique training course in Flanders is the observation that molecular and biotechnological research no longer focuses solely on a single gene or protein, but on **all the genes and proteins** within a cell or organism. Bioinformatics addresses and eliminates the risks of excess experimental data and inadequate processing. The training, therefore, focuses on three aspects.

> **Thanks to this training you really allow yourself to keep up to speed with the new developments in the professional field.**

In the **first part, Informatics**, you will learn everything about storing, organizing and processing large quantities of biological data in (relational) database systems. In the **second part of Bioinformatics**, we discuss the processing and analysis of this data using bioinformatic tools and (web) applications. Finally, in the **third part, Programming** is all about storing and processing this data, integrated in the form of programming, with scripting and automating the individual tools into a bioinformatics pipeline.

International standing

As the programme focuses on students and professionals who want to deepen their **know-how as a laboratory scientist or other scientific researcher**, two tracks are possible. There is the day course which takes one year to complete. But there is also the possibility of a two-year @home programme, which enables you to combine studying, work and family. By offering the potential of distance learning and by organizing the course entirely in English, we also focus on foreign students - especially since they can take their exams remotely within the @home programme. This way, the advanced bachelor's course gets a strong international reputation, with all the professional opportunities that it entails.

In short, do you think it is essential to integrate computer methods from computer science in order to become (even) better at **storing and processing molecular biological data**? Do you (literally) want to get the most out of databases in order to be able to work in a predictive manner? If so, we recommend the advanced bachelor of Bioinformatics: in one or two years you will have perfected yourself in three roles: programmer, computer scientist and bioinformatician.

As a bioinformatician, you will have a wide range of applications in scientific research and you will constitute the perfect mix of IT expert and molecular biologist. Thus, the study programme is explicitly dedicated to this, by focusing on programming, informatics and bioinformatics.

THE MOST UP-TO-DATE PROGRAMMES? CHECK THE WEBSITE!

howest BIOINFORMATICS

DAYTIME PROGRAMME

SEMESTER	PERIOD	COURSE UNIT
SEMESTER 1	A	BIT 01 Linux operating systems (5 ECTS)
		BIT 02 Web technologies (5 ECTS)
		BIT 03 Structural bioinformatics (5 ECTS)
	B	BIT 04 Databases and data management (5 ECTS)
		BIT 05 Scripting (5 ECTS)
		BIT 06 Comparative genomic analysis (5 ECTS)
SEMESTER 2		BIT 09 High throughput analysis
	C	BIT 07 Machine Learning (5 ECTS)
		BIT 08 Data analysis, visualization and biostatistics using R (5 ECTS)
		BIT 10 Systems biology (5 ECTS)
	D	BIT 11 Traineeship in Belgium or abroad (10 ECTS)

The first three periods (A, B & C) have 6 weeks of lessons, each followed by exams

Programme subject to change

- Informatician
- Programmer
- Bioinformatician
- NYP

DISTANCE LEARNING TRACK

YEAR 1					
SEMESTER 1			**SEMESTER 2**		
BIT 01 Linux operating systems (5 ECTS)	BIT 02 Web technologies (5 ECTS)	BIT 03 Structural bioinformatics (5 ECTS)	BIT 04 Databases and data management (5 ECTS)	BIT 05 Scripting (5 ECTS)	BIT 06 Comparative genomic analysis (5 ECTS)

YEAR 2					
SEMESTER 3			**SEMESTER 4**		
BIT 07 Machine Learning (5 ECTS)	BIT 08 Data analysis, visualization and biostatistics using R (5 ECTS)	BIT 09 High throughput analysis	BIT 10 Systems biology (5 ECTS)	BIT 11 Traineeship in Belgium or abroad (10 ECTS)	

Each Course unit has 3 contactmoments every two weeks followed by an exam

Programme subject to change

- Informatician
- Programmer
- Bioinformatician
- NYP

OUR ASSETS

- **Strongly favours practical training:** this advanced bachelor includes an eight-week traineeship
- **International experience:** next to our English-taught international program we also facilitate students to do their traineeship abroad.
- **Real specialisation:** you learn programming languages such as PHP, Python and R and you will use the most relevant databases from which you will learn how to process and interpret the data.
- **Job security:** this training was set up at the request of the professional field, thus it creates a lot of professional opportunities.
- **Very affordable:** the cost of the @home course is around 700 euros per academic year - a very competitive rate.
- **Hot topic:** this training is simply necessary to prepare scientific staff for the latest developments.
- **Sound follow-up:** all contact moments are recorded, so they can be reviewed afterwards.
- **English-language study programme:** the international nature of the advanced bachelor's programme ensures that your professional opportunities are literally limitless.

WHERE CAN YOU GO FROM HERE?

This bioinformatics programme gives you the hands-on experience and skills to get started in the field of bioinformatics. Some alumni choose to combine "dry lab" skills with "wet lab" skills. In any case, you can be widely employed both within the private sector and in research or routine laboratories because of your newly acquired know-how in bioinformatics.

The bioinformatics work field is very diverse, from molecular diagnostics and medical genetics in (hospital) laboratories, where they increasingly make use of Next-Generation Sequencing within DNA diagnostics, to university research groups and private companies within biotechnology. Also many pharmaceutical companies are diligently looking for employees with an R&D background and a good knowledge of biostatistics and data processing.
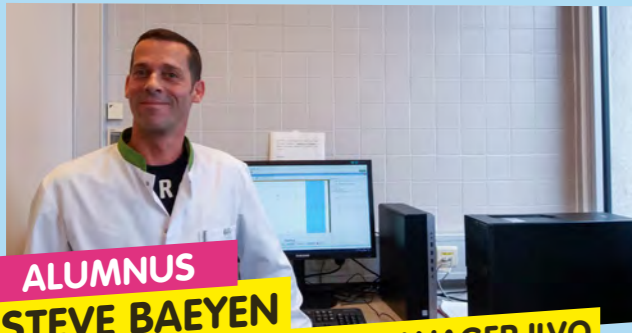
ALUMNA
MAXINE VANVUCHELEN
TEAM LEAD ACCURAMED

"I have been working as a laboratory technician for three years now and thought it was time to deepen and expand my knowledge - especially in the field of computer science, a field that has been of interest to me for a long time. That's why I thought this advanced bachelor's programme was the right one, as it links computer science directly to the biomedical world. In this way, experiments can now also be designed on the computer, instead of just standard in a lab. After completing this course, I intend to look for new professional opportunities, based on the new know-how that I have acquired, combined with the necessary self-study."

ALUMNUS
STEVE BAEYEN
CHIEF EXPERT AND LAB MANAGER ILVO

"In the molecular lab where I work as a lab manager, we started working on Next-Generation Sequencing techniques around 2008. I wanted to deepen and improve my know-how in this area, especially as this domain is developing rapidly. Hence, I made this advanced bachelor my choice, which moreover allowed me to combine studying with work and a family of four children. Initially, some subjects did not seem immediately usable to me for my job, but in the end, I was able to practically apply all the knowledge I had acquired in my work. I also got to know a lot about updates, insights and new methods for areas I already had a lot of experience with. This means that, today, I can work much faster and be more focused."

TRAINEESHIP PROVIDER
KRIS LAUKENS
ANTWERP UNIVERSITY

"This advanced bachelor's degree fulfils a very clear need: it provides the field with multifunctional bioinformatics technicians. Specialists who bridge the gap between the laboratory world and the world of IT. Trainees are deployed for a variety of tasks: data configuration, setting up and maintaining bioinformatics workflows, performing genomic data analysis, and so on. So far, we have only had positive experiences with Howest's trainees. What do they learn here? They have learned to work together within a multidisciplinary team and experience firsthand how you can contribute to a larger project in such a team."

IN THE PROFESSIONAL FIELD
PIETER DE BLESER
BIOINFORMATICS EXPERT, VIB-UGHENT

"Biological experiments are becoming more widespread and the need for streamlined analysis is increasing. There is a transition from gene-central to genome-wide studies with implications for the advanced use of computers and statistics. While large-scale experiments are becoming cheaper and faster, the analysis of the results is becoming more labour-intensive. One way of closing the gap between bioinformatics and traditional biology and biomedical research is the availability of "bioinformatics specialists". Howest plays an important pioneering role here. Thanks to the advanced bachelor of Bioinformatics course, which is unique in Flanders, valuable employees are now entering the labour market, fitting in perfectly with this niche."

CAMPUS
BRUGGE STATION

Bustling campus

The campus is close to Bruges' railway station and within walking distance of everything the city is so famous for: the Reien, the Grote Markt, the Burg and its many shops, cafés and coffee bars. We combine this ideal accessibility with perfectly equipped classrooms, a friendly atmosphere and personal guidance. On our campus, you will also find a cosy student restaurant serving delicious meals, pasta and sandwiches at student-friendly prices.

BRUGES,
ALSO FOR STUDENTS

The bioinformatics programme attracts students from all over the world. Together with (international) tourists, you can enjoy the beautiful shopping streets, cozy terraces and restaurants, breathtaking views on the Canals of Bruges (such as the famous Rozenhoedkaai) and the historic alleys and romantic squares (such as the Beguinage and the Minnewater) Bruges has to offer.

BOOK A COURSE-SPECIFIC CAMPUS VISIT
WWW.HOWEST.BE/MEET-US

ANY QUESTIONS ABOUT THIS COURSE?

Mail to:
bart.quartier@howest.be
or bit@howest.be

howest
BIOINFORMATICS

www.howest.be/bit

howest
hogeschool

MORE INFORMATION ABOUT STUDIES AND TRAININGS ON HOWEST.BE/BIT