MASTER OF SCIENCE IN BIOINFORMATICS (ENGINEERING)

120 ECTS CREDITS - LANGUAGE: ENGLISH

FACULTY OF SCIENCES

2021-22

WHAT

Recent technological advances have changed our view on life science research dramatically, and have turned biology into a data-driven science. It is in this context that bioinformatics, a booming interdisciplinary field, has evolved from a new research field into a basic discipline in only fifteen years. Bioinformatics aims at gaining a better and preferentially more quantitative molecular understanding of cellular processes by integrating and modelling high-throughput molecular data.

- Are you fascinated with both engineering/mathematics and the biological aspects of science?
- Do you like problem-solving through data analysis and data mining?
- Are you intrigued by understanding and modelling complex biological processes,
- Do you want to make biological discoveries by decoding big data?
- Do you like to work in an interdisciplinary environment?
- Do you want to study fundamental biological processes through integration of modern sequencing techniques and mathematical models?
- Do you want to apply individual genome sequencing for personalized health care?
- Do you want to contribute to facilitating the use of modern molecular technologies in the industry and the public sector?

If the answer to the questions above is a resounding 'yes', our Bioinformatics programme is the right choice for you!

As a bioinformatician you will become an interdisciplinary scientist or engineer who can develop or use state-of-the art statistical and computer science techniques to mine molecular data in order to answer fundamental or applied biological and biomedical questions. Ghent University offers an interfaculty Master of Science in Bioinformatics programme, which - depending on the chosen track - can result in an Engineering or Bioscience Engineering degree.

The programme

- offers a track tuned to your specific interests and background, which prepares you for different job profiles in the field of bioinformatics (bioinformatics scientist and bioinformatics engineer, respectively);
- offers both in-depth theoretical and data analytical/ problem-solving skills;
- is embedded in a strong bioinformatics and biotechnology research environment, located at the Faculties of Sciences, Medicine and Health Sciences, Bioscience Engineering, and Engineering and Architecture. It is also affiliated with VIB and IMEC.

Master of Science in Bioinformatics: Engineering

A Bachelor's degree in Engineering or Computer Science is the perfect preparation for entering the Engineering track, and becoming a bioinformatics engineer.

Bioninformatics engineers are skilled in the development of new algorithms and complex software implementations with a primary focus on the field of bioinformatics, but equally applicable beyond. Students take a biology-oriented module of 9 credits, which will provide you with the basic knowledge to understand a data-driven biology problem. The rest of the curriculum largely focuses on advanced engineering and computer science techniques (36-credit Engineering module) that elaborate on the already advanced knowledge obtained in the Bachelor's programme. The Applied Informatics module (33 credits) will familiarize you with the data specificities of bioinformatics (preprocessing techniques, noise and potential biases, assumptions, etc.), and will allow you to acquire the interdisciplinary skill set that is essential for success in modern science and engineering. The Master's dissertation takes up 30 credits and focuses on a research topic. In your curriculum there is opportunity to do a work placement to familiarize yourself with the role and expectations of a bioinformatics scientist in the industry or at a government agency.

STRUCTURE

LABOUR MARKET

Technological advances have turned biology into a data-driven science. The wealth of molecular data enables key discoveries in biology, ecology and molecular evolution, drives innovation in the biotech and pharma industry and supports medical and governmental decision-making. However, the power of using these data for innovation depends on interdisciplinary skills to analyse, integrate and interpret the data.

There is thus an urgent need for bioinformatics scientists and engineers with an interdisciplinary

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mindset. There is currently a large discrepancy between the exponential increase of biological data (28% each year) and the number of newly graduated bioinformaticians (increase of only 5.8%) who typically find a job in agro, biotech and pharma industry, in research and government agencies, and in genetics centres and hospitals. Because of their interdisciplinary and analytical skill sets, bioinformaticians also find their way into consultancy, spin-offs and data analytics.

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TOELATINGSVOORWAARDEN VOOR HOUDERS VAN EEN VLAAMS DIPLOMA

1 **Rechtstreeks:**
- Bachelor in de computerwetenschappen
- Bachelor in de informatica
- Bachelor in de ingenieurswetenschappen, afstudeerrichting: computerwetenschappen
- Bachelor in de ingenieurswetenschappen: computerwetenschappen

2 **Na het met succes voltooien van een voorbereidingsprogramma:**

60 SP
- Bachelor in de biochemie en de biotechnologie
- Een diploma van een opleiding 'Bachelor of Science in de bio-ingenieurswetenschappen'

aantal studiepunten te bepalen door de faculteit
- Een diploma van een opleiding 'Bachelor of Science in de ingenieurswetenschappen' (met inbegrip van 'architectuur')

3 **Op voorwaarde van toelating door de inrichtende faculteit: na het met succes voltooien van een voorbereidingsprogramma:**

60 SP
- Bachelor in de wiskunde, op voorwaarde dat het curriculum van de student een minor biowetenschappen of een minor informatica omvat.

4 **Rechtstreekse toelating voor het volgen van een brugprogramma (horizontale instroom):**

a opleidingen nieuwe structuur:
- Master in de industriële wetenschappen: elektronica en ICT: multimedia en informatietechnologie
- Master in de industriële wetenschappen: elektronica en ICT: ICT
- Master in de industriële wetenschappen: elektronica-ICT, afstudeerrichting: ingebedde systemen
- Master in de industriële wetenschappen: informatica
- Master of Electronics and ICT Engineering Technology

b opleidingen oude structuur:
- Industrieel ingenieur in elektronica, optie informatie- en communicatietechnieken
- Industrieel ingenieur in informatica

ADMISSION REQUIREMENTS FOR INTERNATIONAL DEGREE STUDENTS

Information on admission requirements and the administrative procedure for admission on the basis of a diploma obtained abroad, can be found on the following page: www.ugent.be/admission

Additional information:
Diploma equivalence of international bachelor's degree students will be checked by the OC on the base of their individual dossier.

LANGUAGE REQUIREMENTS

Language requirements	Dutch: no language requirements English: CEFR level B2

The language requirements for this study programme can be found on: www.ugent.be/languagerequirements

PRACTICAL INFORMATION

Study programme
studiekiezer.ugent.be/master-of-science-in-bioinformatics-engineering-en/programma

Information sessions
EVOLV
evolv.gent/en/students/further-studies

Enrolling institution
Information on enrolment at Ghent University.

Application Deadline (for International degree students)
For students who **need a visa**: 1st of April
For students who **do not need a visa**: 1st of June
Read more

Tuition fee
More information is to be found on: www.ugent.be/tuitionfee

Contact
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