



# Master of Science in Biology

Two years, 120 ECTS  
4 specializations

- Genetics, Cell and Developmental Biology
- Environment, Biodiversity and Ecosystems, profile Ecology
- Environment, Biodiversity and Ecosystems, profile Herpetology
- Human Ecology



Vrije  
Universiteit  
Brussel

**Biology is by nature a multifaceted science. Biologists nowadays face a growing number of research challenges, like the link between climate change and the ongoing biodiversity crisis, or the emergence of multidrug-resistant bacteria. Such topics require integrative approaches, combining elements from different scientific domains. The Master of Biology at the Vrije Universiteit Brussel allows you to specialize in your research field of interest, while keeping the opportunity to develop a multidisciplinary career. After successfully completing the two-year master's programme (120 credits), you are:**

- Master of Science in Biology  
**Genetics, Cell and Developmental Biology**
- Master of Science in Biology  
**Environment, Biodiversity and Ecosystems, profile Ecology**
- Master of Science in Biology  
**Environment, Biodiversity and Ecosystems, profile Herpetology**
- Master of Science in Biology  
**Human Ecology, an International Course Programme (VLIR-scholarships)**

Regardless of the specializations you choose, our primary goal is to provide you with the optimal preparation to start your scientific career. Therefore, our Master of Biology programmes share a number of basic courses to develop your skills in indispensable aspects of scientific research:

- Master Thesis
- Manuscript and Project Writing
- Scientific Presentation
- Professional Internship
- Integrated Practicals and/or Fieldtrips

In addition, you can give a unique direction to your study programme by choosing from a broad range of electives from multiple specializations and profiles.

## Research

Since research is an important aspect of your master's programme, we want to ensure that it can be carried out in optimal circumstances. The subject of your master's research project is situated within the research of the biology laboratories at the Vrije Universiteit Brussel or at another institution with which we cooperate.

More information on the biological research conducted at the Vrije Universiteit Brussel is available @ <http://dbio.vub.ac.be/research/research.html>.

You either define the objectives of the subject yourself or you will receive a well-defined subject. You are encouraged to work together with other research teams in the departments of chemistry, biomedical sciences, geography, bioengineering sciences or engineering sciences. Such cooperation is also possible with foreign institutions. When you are bound to the seasons for the study of amphibian migration, spring vegetation, seed production of tropical mangrove trees, the flowering and pollination of primroses or the blooming of phytoplankton in lakes, you can already carry out field work for your master's research project during your first programme year by moving certain electives to the second programme year.

## Oceans and Lakes

The two-year master programme in "Master of Marine and Lacustrine Science and Management" (Oceans & Lakes) addresses any student with a background in Sciences. Oceans & Lakes is an International Course Programme (VLIR-scholarships) organized by the Vrije Universiteit Brussel, Antwerp University and Ghent University. The programme provides insight into the diversity and complexity of life and biological processes in oceans, seas, lakes and estuaries. It provides the students with strong fundamental and applied knowledge and prepares them for an active role in the scientific research and management of marine and lacustrine systems. 'Oceans and Lakes' adopts a multidisciplinary approach integrating physical, chemical, geological, ecological and societal aspects including nature conservation and sustainable development. [www.oceansandlakes.be](http://www.oceansandlakes.be)





## Master of Science in Biology

### Environment, Biodiversity and Ecosystems, profile **ECOLOGY (120 ECTS)**

This profile allows students to gain experience in the research methods used to study the ecology and evolution of organisms found in terrestrial, freshwater and coastal ecosystems. A staff of experts teaches up-to-date knowledge on individual organisms, populations, species communities and ecosystems, backed up by their active research experience in taxonomy and phylogeny, vertebrate and invertebrate ecology, evolutionary ecology, biogeography, plant ecology, plant-animal interactions, and nature management. In addition, students are introduced into ecological research by means of practical field training and excursions in Belgium and abroad.

Compulsory: 33 ECTS + 9 ECTS

Electives: 27 ECTS + 21 ECTS

Master Thesis: 30 ECTS

COMPULSORY	SP	ELECTIVES	SP
Analysis of Biological Data	3	Behavioural Ecology	3
Conservation Genetics	3	Biogeochemistry	3
Integrated Practica on Ecosystems	3	Biology of Animal Societies	3
Marine Biology	3	Dynamics of Biological Systems	3
Marine Biodiversity and Ecology	3	Toxins in Amphibians and Reptiles	3
River & Lake Ecology	3	Systematics, Phylogeny and Natural History of Amphibians	3
Biocomplexity	3	Hydrobiology	3
Biogeography	3	Molecular Phylogenetics and Evolution	6
Fieldtrip Ecology	6	Plant Molecular Biology	6
Molecular Microbiology	3	Plant Responses to Stress	3
		Plant-soil Interactions	3
Scientific Presentation	3	Integrated Coastal Zone Management: Mangroves, Seagrass Beds and Coral Reefs	3
Bioethics	3	Functional Plant Science	3
Manuscript and Project Writing	3	Tropical Marine Ecology and Restoration	3
		Management of Aquatic Resources: Fisheries	3
		Origin of Life and Paleontological Evolution	3
		Toxicology	3
		Environmental Impact Assessment	3
		Environmental Impact Assessment Project	3
		Tropical Marine Ecology and Restoration	3
		Genotoxicology and Public Health	3
		Professional Internship	6/9
		Guided Self-Study	6



## Master of Science in Biology

### Environment, Biodiversity and Ecosystems profile HERPETOLOGY (120 ECTS)

Some of the world's finest herpetologists have joined forces to organize a two year Master specialization in Herpetology, the study of amphibians and reptiles. The Master programme in Herpetology addresses students with a Bachelor degree in Biology and prepares them for an active professional role in herpetological research. Although this specialized Master is organized in the capital of Europe, ecological and herpetological field courses in European and tropical countries form an important part of this programme. As a student, you will be in a stimulating environment, with fellow students and visiting top scientists sharing your passion for amphibians and reptiles. The goal of this programme is to prepare you in a unique way for a professional career in herpetology, but due to the integrative approach and embedding of this master in a standard Biology programme, this degree also leaves doors open for any other career in Biology.

Compulsory: 45 ECTS + 30 ECTS

Electives : 15 ECTS to be chosen from any master programme after approval of the examination commission.

Master Thesis: 30 ECTS

COMPULSORY	SP
Toxins in Amphibians and Reptiles	3
Bioinformatics	3
Analysis of Biological Data	3
Introduction to GIS	3
Fieldtrip Ecology	6+9
Origin of Life and Paleontological Evolution	3
Biogeography	3
Developmental Biology	3
Manuscript and Project Writing	3
Molecular Phylogenetics and Evolution	6
Functional Ecology of Amphibians and Reptiles	3
Natural History of Burrowing Herpetofauna	3
Amphibian and Reptile Diseases and Conservation	3
Systematics, Phylogeny and Natural History of Reptiles	3
Systematics, Phylogeny and Natural History of Amphibians	3
Ecological Physiology of Amphibians and Reptiles	3
Population and Conservation Genetics	3
Guided Self-Study	6
Conceptual and Integrative Taxonomy in Herpetology	3

## Master of Science in Biology

### Genetics, Cell and Developmental Biology (120 ECTS)

This profile introduces students into the study of animal and plant development, microbiology, cell signaling pathways, cytoskeleton dynamics, cancer biology, virology and immunology. Courses of this profile span multiple levels of biological organization, from whole organisms down to the molecular level. Students choosing this profile not only gain detailed insights in these topics but also acquire the laboratory skills required to engage in cutting-edge research. The presence of a highly experienced research staff and state-of-the-art equipment ensures an ideal training ground, and excellent opportunities to enter a PhD program after graduation.



Compulsory : 6 ECTS + 9 ECTS

Electives : 54 ECTS + 21 ECTS

Master Thesis: 30 ECTS

COMPULSORY		SP
Integrated Practical on Genetics, Cell and Developmental Biology		6
Scientific Presentation		3
Bioethics		3
Manuscript and Project Writing		3

ELECTIVES	SP		SP
Mechanisms in Mutagenesis & Carcinogenesis	4	Molecular Microbiology	3
Cellular Microbiology	3	Recombinant Antibody Engineering	3
Plant Molecular Biology	6	Microbial Life in Extreme Conditions	3
Plant Responses to Stress	3	Adult Stem and Progenitor Cells	6
Advanced Aspects of Molecular Pharmacology	3	Embryonic Stem Cells	6
Analysis of Biological Data	3	Bacterial Genetics and Genomics	3
Bioinformatics	3	Stem Cell Biology	3
Current Topics in Cell Biology	6	Molecular Host-Parasite Interactions	3
Genetics and Reproduction	5	Cellular Immunology	3
Beta Cell Therapy in Diabetes	5	Environmental Impact Assessment	3
Hematopoietic Cell Therapies	5	Environmental Impact Assessment Project	3
Functional Plant Science	3	Current Topics in Cell Biology	6
Developmental Biology	6	Genotoxicology and Public Health	3
Medical Biotechnology and Parasitology	3	Toxicology	3
Guided Self-Study	6	Professional Internship	6/9

## Master of Science in Biology

### Human Ecology (120 ECTS)

This two-year specialization deals with the interactions between humans and their natural environment. The increasing impact of the human population on ecosystems worldwide stresses the urgent need for researchers with a multidisciplinary background that engage in developmental plans for a durable use and management of natural resources. The specialization Human ecology addresses an international audience of students and offers a course programme that, besides scientific topics, also addresses technological, socio-economical and political aspects. This programme provides the ideal basis for young scientists that would like to contribute to play a key role in dealing with human ecological challenges in their home countries.



Compulsory: 30 ECTS + 21 ECTS  
Electives: 30 ECTS + 9 ECTS  
Master Thesis: 30 ECTS

COMPULSORY	SP
River & Lake Ecology	5
Biogeochemistry	3
Mechanisms in Mutagenesis & Carcinogenesis	4
Forestry and Agroforestry	3
Biocomplexity	3
Management of Aquatic Resources: Fisheries	3
Toxicology	3
International Environmental Policy and Law	3
Medical Biotechnology and Parasitology	3
Globalization and Development: Disciplines, Actors and Systems of Knowledge	3
Environmental Geology	5
Bioethics	3
Environmental Impact Assessment Project	3
Scientific Presentation	4
Manuscript and Project Writing	3

ELECTIVES	SP
<b>INTRODUCTORY COURSES (based on student background)</b>	
Mathematics & Basic Statistics	3
Analysis of Biological Data	3
Governance and Policy in Development and Cooperation - Part I	3
Introduction to Environmental Chemistry	3
Urban Geography	6
Introduction to GIS	3
Global Change	3

Theme:	SP	Theme: Environmental Policy	SP
<i>Sustainable Biodiversity and Biological Resources</i>			
Conservation Genetics	3	Governance and Policy in Development and Cooperation - Part II	3
Marine Biology	3	Social and Economical Aspects of Biotechnology	5
Integrated Coastal Zone Management	3	Social, Political, Economical and Environmental Aspects of Water Engineering	5
Tropical Marine Ecology and Restoration	3	Geography of Globalisation	6
Molecular Phylogenetics and Evolution	6		
Professional Internship	6/9		
Integrated practical on ecosystems	6		
<b>Theme: Monitoring Methods</b>	<b>SP</b>	<b>Theme: Human Health and Risk</b>	<b>SP</b>
Geographical Research Methods I: Earth Observation	3	Genotoxicology and Public Health	3
Hydrological Measurements and Remote Sensing	6	Epidemiology : Study Design and Analysis	4
Aquatic Environmental Chemistry	6	Exposure to Contaminants via Food and the Environment: Bioaccumulation	6
Field Sampling and Analysis	6	Risk Assessment	6
Environmental Analysis	6	Natural Risk Management	3
Applied Geomorphology	5		

## Studying and living in Brussels

The Vrije Universiteit Brussel (VUB) is a dynamic and modern university with almost two centuries of history. The university and the university hospital are spread over two green campuses in the Brussels Capital Region. It counts over 11,000 students, of which 2,500 are international. The campus has everything a student needs: an extensive library, modern computer labs, sport facilities, a restaurant, a job service, cultural activities and language courses. There are also rooms on the campus. For more information: [www.vub.ac.be/housing](http://www.vub.ac.be/housing).

Brussels is the heart of Europe with cities like Antwerp, Bruges, Amsterdam, Paris and London very close by. It is an open invitation to exploring a truly international city. With its 1.1 million inhabitants, of whom 31 % are of foreign origin, Brussels is the center of international politics and business.

The cosmopolitan city has something to offer for every taste and interest. Visit a museum, enjoy the many events and festivals, get to know the Belgian cuisine with its famous chocolate and world renowned beers, relax in one of the many parks (f.e. Zonien forest) that make Brussels one of the greenest capitals.

## Admission Requirements

The Master of Science in Biology is open to holders of a Bachelor degree in Biology.

For other academic bachelors in science, applied science and life sciences, equivalency will be evaluated based on scientific competences and skills of the students by the Master of Biology Steering Committee.

All necessary information regarding the admission requirements and application forms can be found here:

[www.vub.ac.be/admission](http://www.vub.ac.be/admission)

Students who want to apply for a VLIR-UOS scholarship (Human Ecology) check [www.humanecology.be](http://www.humanecology.be).

In order to be admitted, you need to be proficient in English.

## International possibilities

Via the Erasmus programme, you can complete one or two semesters of your master's programme in another country in Europe. You can also follow part of your master's programme in a French-language university in Belgium via the Erasmus Belgica programme. These exchanges do not lengthen your period of study since you remain a student of the Vrije Universiteit Brussel within your programme.

Furthermore, it is also possible to work together with a foreign university on your master's research project or to do field work abroad for a specific period of time.

## After your diploma

As a Master in Biology, you will find work in many sectors. Most Biology masters play an active role in research, in universities as well as in the business world (medical and pharmaceutical industry, agro-industry). In addition to this, as a Master in Biology, you can also perform policy and governance work at the municipal, regional, federal or international levels.

Biologists also find their way into education (secondary, higher and university) and into the educational sector (nature and environment, among others).

In each job, the knowledge and skills that you have acquired during your education at the Vrije Universiteit Brussel will be an important trump card.





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## MASTER OF SCIENCE IN BIOLOGY

[www.vub.ac.be/biology/master](http://www.vub.ac.be/biology/master)

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