Master studies in Biology
Master Week 2021, BIOLOGY

Program:

14.00 - 14.15  General introduction to Biology Master programs*
14.15 - 14.30  MSc in Molecular Life and Health Sciences*
14.30 - 14.45  MSc in Environmental Biology
14.45 - 15.00  Time for questions

* Dr Alessandro Puoti (Study advisor Biology and Biochemistry, BSc, MSc, and minors)

Department of Biology
Chemin du Musée 10
Laboratoire 0.325 (PER 05)
1700 Fribourg

email: alessandro.puoti@unifr.ch

Tel: 026 300 8878
The Department of Biology

Biochemistry

“Zoology”
The Department of Biology

Ecology and Evolution

Plant and Microbial Sciences
## Research activities of the Department of Biology

### Research domains
- Autophagy
- Cell differentiation
- Growth control
- Biochemistry
- Biosynthesis
- Molecular interactions
- Regulatory pathways
- Community ecology
- Conservation biology
- Evolution
- Interactions between organisms
- Environment
- Control of gene expression
- Neurobiology
- Regeneration
- Biological clocks
- Behaviour
- Marine Biology

### Methodologies/Tools
- Molecular Biology
- Histology
- Microscopy
- Proteomics
- Metabolomics
- Cell Biology
- Bioinformatics
- Field work
- Statistics
- Modelling
- Forward and reverse genetics
- Classical model organisms
- New model organisms

### Applications
- Basic knowledge of Life
- Molecular medicine
- Industrial biotechnology
- Transmission of knowledge
- Applied research
- Gov. / non-gov. offices
New Master programs

Current

MSc in Biology, 90 ECTS
Master thesis 45 ECTS
Options:
- Biochemistry
- Animal molecular life sciences
- Ecology and evolution
- Plant and microbial sciences

MSc in Bioinformatics and Computational Biology, 90 ECTS
Master thesis 30 ECTS

From Fall 2021

Research MSc in Molecular Life and Health Sciences, 120 ECTS
Master thesis 60 ECTS
Teaching MSc in Molecular Life and Health Sciences, 90 ECTS
Master thesis 45 ECTS

Research MSc in Environmental Biology, 120 ECTS
Master thesis 60 ECTS
Teaching MSc in Environmental Biology, 90 ECTS
Master thesis 45 ECTS

MSc in Bioinformatics and Computational Biology, 120 ECTS
Master thesis 45 ECTS
Structure of Biology MSc Programs from September 2021

**MSc in Molecular Life and Health Sciences**
- 4 options
- 120 ECTS
- 49 ECTS courses and general skills
- 11 ECTS seminars
- 60 ECTS Master thesis

**MSc in Molecular Life and Health Sciences Teaching**
- 90 ECTS
- 36.5 ECTS courses and general skills
- 8.5 ECTS seminars
- 45 ECTS Master thesis

**MSc in Environmental Biology 3 options**
- 120 ECTS
- 50 ECTS courses and general skills
- 7.5 ECTS seminars
- 45 ECTS Master thesis

**MSc in Environmental Biology Teaching**
- 90 ECTS
- 37.5 ECTS courses and general skills
- 10 ECTS seminars
- 45 ECTS Master thesis

**MSc in Molecular Life and Health Sciences 4 options**
- 120 ECTS
- 49 ECTS courses and general skills
- 11 ECTS seminars
- 60 ECTS Master thesis

**MSc in Molecular Life and Health Sciences Teaching**
- 90 ECTS
- 36.5 ECTS courses and general skills
- 8.5 ECTS seminars
- 45 ECTS Master thesis

**MSc in Environmental Biology 3 options**
- 120 ECTS
- 50 ECTS courses and general skills
- 7.5 ECTS seminars
- 45 ECTS Master thesis

**MSc in Environmental Biology Teaching**
- 90 ECTS
- 37.5 ECTS courses and general skills
- 10 ECTS seminars
- 45 ECTS Master thesis

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DBR: Developmental Biology and Regeneration
NEU: Neurobiology
BCB: Biochemistry and Cell Biology
MAR: Marine Biology
EE: Ecology and Evolution
PMS: Plant and Microbial Sciences
AEB: Applied Environmental Biology
Option-specific mandatory courses

**MSc in Molecular Life and Health Sciences**
- 4 options
- 120 ECTS
- Courses and general skills
  - DBR
  - NEU
  - BCB
  - MAR
  - 26-30 ECTS

Teaching option
- 90 ECTS
- Courses and general skills
  - 19 ECTS

**MSc in Environmental Biology**
- 3 options
- 120 ECTS
- Courses and general skills
  - EE
  - PMS
  - AEB
  - 9-20 ECTS

Teaching option
- 90 ECTS
- Courses and general skills
  - 14 ECTS
## General skills

<table>
<thead>
<tr>
<th>Code</th>
<th>Course</th>
<th>Term</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>SBL.00501</td>
<td>Introduction to data analysis</td>
<td>Fall</td>
<td>1 ECTS</td>
</tr>
<tr>
<td>SBL.30001</td>
<td>Introduction to R</td>
<td>Fall</td>
<td>2 ECTS</td>
</tr>
<tr>
<td></td>
<td>plus, depending on the option:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SBL.00427</td>
<td>Visual communication of data</td>
<td>Spring</td>
<td>1 ECTS</td>
</tr>
<tr>
<td>SBL.20005</td>
<td>Critical reading</td>
<td>Fall/Spring</td>
<td>3 ECTS</td>
</tr>
<tr>
<td>SBL.00410</td>
<td>Scientific writing</td>
<td>Fall</td>
<td>3 ECTS</td>
</tr>
<tr>
<td>SBL.20001</td>
<td>Biostatistics I</td>
<td>Fall</td>
<td>3 ECTS</td>
</tr>
<tr>
<td>SBL.20002</td>
<td>Biostatistics II</td>
<td>Fall</td>
<td>3 ECTS</td>
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## Technical skills

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester</th>
<th>ECTS</th>
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<tbody>
<tr>
<td>SBL.00125</td>
<td>Light and fluorescence microscopy</td>
<td>Fall</td>
<td>3</td>
</tr>
<tr>
<td>SBL.20003</td>
<td>Methods in plant pathogen interactions</td>
<td>Fall</td>
<td>2</td>
</tr>
<tr>
<td>SBL.20004</td>
<td>Introduction to metabolomics</td>
<td>Spring</td>
<td>2</td>
</tr>
<tr>
<td>SBL.00451</td>
<td>Introduction to mass spectrometry and proteomics</td>
<td>Fall</td>
<td>1</td>
</tr>
<tr>
<td>SBL.00452</td>
<td>Advanced quantitative proteomics</td>
<td>Spring</td>
<td>2</td>
</tr>
<tr>
<td>SBL.06002</td>
<td>Classical models in biology (with exercises)</td>
<td>Fall</td>
<td>3</td>
</tr>
<tr>
<td>SBC.04203</td>
<td>Genotyping</td>
<td>Fall</td>
<td>2.5</td>
</tr>
<tr>
<td>SBC.07110</td>
<td>Introduction to UNIX and BASH</td>
<td>Fall</td>
<td>2.5</td>
</tr>
<tr>
<td>SBC.07107</td>
<td>Bioinformatics</td>
<td>Fall</td>
<td>3</td>
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<tr>
<td>SBL.05001/2</td>
<td>Master thesis</td>
<td></td>
<td>45 / 60</td>
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Admission with a BSc from UniFr

- **Biology I** (120 ECTS)
  - Minor (30 ECTS)
  - Minor (30 ECTS)

- **Biology II** (120 ECTS)
  - Minor (30 ECTS)

- **Biochemistry** (120 ECTS)
  - Minor (30 ECTS)

**MSc Environmental Biology**
3 options 120 ECTS
1 option 90 ECTS

**MSc Molecular Life and Health Sciences**
4 options 120 ECTS
1 option 90 ECTS

**MSc in Bioinformatics and Computational Biology** (120 ECTS)
Admission with a BSc from another University

**MSc in Environmental Biology**

BSc in Biology, BSc in Biochemistry, or equivalent

**Prerequisites** (may vary, depending on the option):
- Propaedeutics in Biology, Math, Chemistry, and Physics
- Vertebrates
- Invertebrates
- Botanics
- Comparative anatomy
- Microbiology
- Ecology
- Evolution
- Statistics
- Plant physiology
- Animal physiology
- Molecular biology
- Population genetics
- Experience in the laboratory

**MSc in Molecular Life and Health Sciences**

BSc in Biology, BSc in Biochemistry, or equivalent

**Prerequisites** (may vary, depending on the option):
- Propaedeutics in Biology, Math, Chemistry, and Physics
- Cell Biology
- Biochemistry
- Organic chemistry, kinetics,
- Microbiology
- Methods in molecular biology
- Methods in biochemistry
- Animal physiology
- Molecular biology
- Developmental biology
- Neurobiology
- Advanced genetics
- Experience in the laboratory
Master in Environmental Biology

Major environmental problems, in particular global change and its consequences for biodiversity and ecosystem functioning, are intimately interconnected and pose a threat to our future. Solving these problems requires an integrative and synergistic approach in terms of both fundamental and applied research.

The Department of Biology of the Faculty of Science and Medicine offers a multidisciplinary Master of Environmental Biology. The program ranges from fundamental concepts in ecology and evolution, molecular aspects of plant and microbial sciences to applied solutions for environmental policies and sustainable development. It provides students with state-of-the-art training and background in conceptual, technical, and applied aspects of environmental biology, from genes to ecosystems.

Master students are integrated into active research teams and can thus gain extensive experience in basic and applied academic research in environmental biology. Students will have the opportunity to choose between four options. English is the official language for all activities.

Available options
1. Ecology and Evolution | 120 ECTS
2. Plant and Microbial Sciences | 120 ECTS
3. Applied Environmental Biology | 120 ECTS
4. Teaching | 90 ECTS

Study Plan Available soon

https://www.unifr.ch/bio/en/studies/master/

Application deadline (Fall semester): April 30th (late admission: August 31st)

Master in Molecular Life and Health Sciences

Molecular mechanisms govern the fate and the function of every cell, from archaea living in the remotest trench in the ocean, to the highly connected cells of our brain. Interestingly, cells of various origins share common genes, and therefore use similar proteins and molecular pathways. These can be explored in a variety of model organisms and cultured cells, which you will discover in this exciting Master programme that bridges fundamental molecular science and potential applications to understanding human health and disease.

The Department of Biology of the Faculty of Science and Medicine offers a multidisciplinary study programme leading to the degree of Master of Science in Molecular Life and Health Sciences with four research options.

The programme consists of 120 ECTS credits and corresponds to 24 months of full-time study.

Students aiming at becoming high school teachers and having to acquire 30 additional ECTS credits in a different study domain, can choose the option “Teaching” consisting of 90 ECTS (18 months).

Available options
1. Developmental Biology and Regeneration | 120 ECTS
2. Neurobiology | 120 ECTS
3. Biochemistry and Cell Biology | 120 ECTS
4. Marine Biology | 120 ECTS
5. Teaching | 90 ECTS

https://www.unifr.ch/bio/en/studies/master/

Application deadline (Fall semester): April 30th (late admission: August 31st)
Language courses

We do not require a language test for admission, but students must at least be able to read and understand English.

Most students greatly improve their English and communication skills during the Master.

Our Master students often take:

**B2 - C1 Academic English for Master’s Students:**
presentation, discussion and team-working skills

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<tr>
<th>Mardi 13:15 - 15:00</th>
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https://www.unifr.ch/centredelanques/en/courses/students/
Courses in Bern and Neuchâtel

BeNeFri

Legal basis

All the BeNeFri network details are available on the University rules and regulations web page.

Registration

Registration requests to BeNeFri courses must be submitted on the MyUnifr portal within the following deadlines:

- Autumn semester: 30 September
- Spring semester: 28 February

Registrations are valid for one semester only. You will therefore have to reregister for each semester if you wish to remain registered with the BeNeFri network.

https://www3.unifr.ch/studies/en/organisation/administrative-services-unifr-students/benefri.html
Why continuing with a Master?

After the Bachelor, the Master is your second step towards becoming a biologist/biochemist

- Use the knowledge acquired during the Bachelor
- explore a more specialized topic
- independent and creative thinking
- learn how to communicate and present your results
- learn how to write a scientific paper in English
- learn how to have a critical approach of your and other’s results
- organize yourself in planning experiments

The duration of the 120 ECTS Master (Research options) is 4 semesters, including 1.5 years full-time dedicated to the thesis / laboratory work

For a 90 ECTS Master (Teaching options), the duration is 3 semesters, including 1 year full-time dedicated to the thesis / laboratory work
It is the right time to immerse yourself into biology research

Our assets

Diamandis, 2019
Doudna and Charpentier, 2014
CEEP Conference, 2022

Our challenges

Readers digest, 1974
WMO, 2018
Wikipedia
Perspectives with a Master degree in Science

The Master widens your job opportunities. Your next step might be in...

- starting a PhD
- working or being trained in a pharmaceutical company
- working as a lab manager in an academic research laboratory
- working as a salesperson
- working in patent offices
- working in regulatory affairs (GO and NGO)
- becoming a medical analyst (FAMH)
- getting a teaching diploma (DEEM / LDM)
Timeline (120 ECTS programmes)

Semester 1
- Take as many classes as possible (Master courses, complements)
- Start looking for a laboratory
- Follow the seminars (mandatory)

Semester 2
- Start the laboratory work
- Start organizing the written Master’s thesis, literature searches
- Take the mandatory classes offered in the Spring semester
- Take complementary courses, if this applies
- Follow the seminars, give your first progress report

Semester 3
- Carry on your laboratory work. New questions? New perspectives?
- Read and organize the literature related to your thesis project
- Seminars: mandatory presentations (progress report, Journal club)
- Take additional classes

Semester 4
- Carry on and bring your laboratory work to an end
- Finish writing the thesis (50-100 pages)
- Take remaining classes
- Prepare and present the Master thesis (30 minutes).
Timeline (90 ECTS programmes)

Semester 1
• **Take as many classes as possible** (Master courses, minor)
• Start looking for a laboratory
• Follow some mandatory seminars

Semester 2
• **Start the laboratory work**
• Start organizing the written Master’s thesis. Literature study.
• Take the mandatory classes offered in the Spring semester
• Take complementary courses
• Take courses for the 30-ECTS minor
• Follow the seminars, give your first progress report

Semester 3
• Carry on and bring your laboratory work to an end
• Read and organize the literature related to your thesis project
• Seminars: mandatory presentations (progress report, Journal club)
• Finish writing the thesis (50-100 pages)
• Take remaining classes, if this applies
• Prepare and present the Master thesis (30 minutes).