

## Faculty of Sciences



## BIOL1BA Baccalauréat en sciences biologiques (Bachelor of Biological Sciences)



### Study objectives

The programme aims at the acquisition of :

- General competence and skills in the principal disciplines of the Exact Sciences (Biology, Chemistry, Mathematics and Physics) and a deepening of the basic competence and skills in the different sectors of Biology
- The capacity to gain knowledge, such as through self-study, through rigorous application of the first stages of a general scientific approach (observation, analysis, summaries, criticism)
- Expertise in the written and oral presentation of scientific texts
- Transversal competence and skills ( Human Sciences, Computing, Management, English, Written and Oral Communication ), with a view to increasing both the general nature of the training and the chance of getting a foothold on the job market upon completion of the studies.

### General presentation of the programme

The programme consists of a major of 150 credits, completed :

- either by blocks of options orientated towards the main domains of Biology (30 credits). These course blocks are taken in the 3rd year of the bachelor's programme
- or by a minor with studies more directed towards Chemistry (30 credits) ; this minor in Chemistry begins in the 2nd year of the bachelor's programme with a prerequisite course for the same minor in the third year of the bachelor's programme
- or by another minor selected from the University programme in concertation with the study advisor. This minor will be taken in its entirety (30 credits) in the 3rd year of the bachelor studies.

The progressive orientation of the programme starts right from the first year of polyvalent studies. The first year programme aims at the acquisition of basic knowledge in Sciences, (Mathematics, Physics, Chemistry, Biology and Earth Sciences).

At the end of the first year, the students may re-orientate their studies, without the need for any complements, to the second year of the bachelor's of Biochemistry and of Bioengineering Science and also to that of Geographical Science, subject to an extra course in Geography (GEO 1111).

The second year is composed of a common pool of subjects totalling 54 credits, to which are added, in accordance with the student's personal choice, a project of 4 credits and a course in Philosophy of 2 credits, or a minor in Chemistry of 6 credits.

The third year again takes the form of a common pool of subjects (30 credits) and options in the form of personally selected blocks of courses (30 credits) or a minor. The programme groups different subjects together with the aim of breaking down the boundaries of the different disciplines. This interdisciplinary approach is also fostered in the context of the individual or group projects. Several courses are based on self-study. A part of the evaluation takes the form of ongoing assessment which also includes the wide number of seminars offered.

Language courses accompany the programme and are aimed at mastering scientific English.

### Principal Subjects

The major in Biology, totalling 150 credits, contains the following :

Philosophy (30) (2 credits)

Mathematics and Biostatistics (20 credits)

- General Mathematics I (75-60) (11 credits)
- Statistics in Natural Sciences (30-30) (5 credits)
- Biometrics (25-25) (4 credits)

*These courses are followed in the order indicated.*

Physics and Biophysics (18 credits)

- General Physics I (75-75) (12 credits)
- Biophysics (45-30) (6 credits)

*These courses are followed in the order indicated*

Earth Sciences (45-30) (6 credits)

Chemistry - Biochemistry (25 credits)

- General Chemistry (60-60) (10 credits)
- Organic Chemistry I (30-30) (5 credits)

- Bio-organic Chemistry (30-10) (3 credits)
- Elements of Biochemistry (30-24) (4 credits)
- Metabolic Biochemistry B (22,5-15) (3 credits)

*The first four courses are followed in the order indicated ; the next one may be followed independently after the course in Elements of Biochemistry.*

General Biology (34 credits)

- Biology (90-45) (11 credits)
- Complement of Vegetal Biology (60-25) (7 credits)
- Complements of Animal Biology (75-70) (12 credits)
- Microbiology and Virology (40-15) (4 credits)

*The Biology course must be followed before the other courses which may then be taken independently.*

Physiology and Histology (11 credits)

- Animal Biochemistry, Physiology and Histology (45-15) (6 credits)
- Vegetal Physiology (45-15) (5 credits)

*These courses may be followed after the course in Biology.*

Genetics (6 credits)

- Elements of Genetics (25-15) (3 credits)
- Molecular Genetics (25-15) (3 credits)

*Courses to be followed in the order indicated.*

Ecology (6 credits)

- Elements of Ecology (60-15) (6 credits)

Integrated tasks and exercises, projects and work experience (16 credits)

- Project 1 (0-45) (3 credits)
- Training course in Marine Biology (0-40) (3 credits)
- Project 2 (0-45) (4 credits)
- Integrated seminars (25-0) (2 credits)
- Internship (0-60) (4 credits)

*The projects are carried out in the order indicated. The training course in Marine Biology takes place after the courses in Animal and Vegetal Biology and Elements of Ecology. The integrated seminars and internship period take place at the end of the bachelor's programme.*

English : 6 credits

- English 1 (0-30) (2 credits)
- English 2 (30-0) (2 credits)
- English 3 (30-0) (2 credits)

*These courses must be followed in order (unless exemption is granted).*

### **Minors or other available options**

Besides the major in Biology, the students have the choice between three possibilities :

- either to opt for complementary sessions in Biology (30 credits), with complements in the various sub-disciplines of Biology (Vegetal Biology, Animal Biology, Cellular and Molecular Biology, Ecology)
- or to opt for a complementary minor in Chemistry (30 credits) which resumes the elements of Molecular Crystallography et Spectroscopy, Inorganic Chemistry, Organic Chemistry and Analytical Chemistry and contains an introduction to the chemistry of polymers
- or to opt for another minor on the University programme, based on a project to be elaborated together with the study advisor.

## **Admission to the programme**

### **Conditions of admission**

The conditions and regular admission requirements are specified on the web page "Access to Studies" :

<http://www.ucl.ac.be/etudes/libres/en/acces.html>

### **Special admission conditions**

Students from Colleges (Technical Higher Education Schools) who have followed a training in the domain of biological applications will have access to the programme at a level which will depend on degree of knowledge acquired or will be subject to following a tailored programme of courses.

Re-orientation of studies is possible from the bachelor's programmes in Sciences, Bioengineering, Medicine, Veterinary Medicine, Biomedical Sciences or Pharmacy.

### **Admission requests, special regulations**

In the case of re-orientation of studies, any admission request should be addressed to the academic secretary of the Faculty of Sciences.

Address : Place des sciences 2 - 1348 Louvain-la-Neuve

## Positioning of the programme

### Positioning of the programme within the University cursus

Whatever the minor or course blocks selected, the bachelor's degree in Biological Sciences automatically entitles access to one of the following masters :

- master's of Biochemistry and Molecular and Cellular Biology (120 credits)
- master's of Biology of Organisms and Ecology (120 credits)

With the minor in Chemistry and/or a programme of complementary training in Chemistry, the bachelor's degree in Biological Science also entitles access to the master's of Chemical Science.

The master's programme will be orientated toward the domains of application, research or teaching.

### Other studies accessible upon completion of the programme

Master's of Biological Science (60 credits)

## Useful contacts

### Programme management

BIOL Département de biologie

**Contact :** Nathalie Micha

and the Department of Mathematics

### Study Advisor

A. Lejeune

### Exam Juries

#### 1st Year

President : Cl. Remacle

Secretary : A. Lejeune

#### 2nd year

President : Still to be determined

Secretary : Still to be determined

#### 3rd year

President : Still to be determined

Secretary : Still to be determined

## List of accessible minors

- Minor in Theology
- Minor in Philosophy
- Minor in Law
- Minor in Criminology
- Minor in Information and Communication (\*)
- Minor in Political Sciences
- Minor in Sociology and Anthropology
- Minor in Human and Social Sciences
- Minor in Economics
- Minor in Business Studies
- Minor in Linguistics
- Minor in Hispanic Studies (\*)
- Minor in Italian Studies (\*)
- Minor in French Studies (\*)
- Minor in Latin Studies
- Minor in Greek Studies
- Minor in Oriental Studies
- Minor in Literature Studies
- Minor in History
- Minor in Medieval Studies
- Minor in Art History and Archaeology (\*)
- Minor in Musicology
- Minor in Psychology and Education (\*)
- Minor in Human Nutrition
- Minor in General Biomedical Sciences
- Minor in Medication Sciences (\*)
- Minor in Physical Activity, Health and Culture of Movement (\*)
- Minor in Chemistry
- Minor in Geography
- Minor in Statistics

- Minor in Engineering Sciences : Chemistry and Applied Physics (\*)
- Minor in Urban Architecture
- Minor in Computing Science (\*)
- Minor in Bio-engineering
- Minor in Biomedical Engineering
- Minor in Mathematics and Mathematical Applications
- Minor in Gender Studies
- Minor in Culture and Creation
- Minor in European Studies

(\*) *Minor with access criteria.*

## Detailed content of standard programme

### BIOL 11BA First year of studies

|                 |  |   |
|-----------------|--|---|
| <u>BIO1111</u>  | A) Cell biology and introduction to prokaryotes, protists and fungi; B) Plant biology; C) Animal biology[90h+45h] (11 credits) (in French) | Jean-Marie Kinet, André Lejeune, Jean-François Rees, Claude Remacle |
| <u>CHM1111</u>  | General chemistry 1[60h+60h] (10 credits) (in French)  | Michel Devillers, Bernard Tinant                                    |
| <u>MAT1111A</u> | Mathématiques générales 1[75h+60h] (11 credits) (in French)  | Marielle Cherpion, Camille Debiève, Enrico Vitale                   |
| <u>PHY1113A</u> | General Physics 1[75h+75h] (12 credits) (in French)  | Thierry Fichet, Jacques Lega  |
| <u>CHM1141</u>  | Organic chemistry 1[30h+30h] (5 credits) (in French)   | Istvan Marko  |
| <u>BIR1130</u>  | Introduction to Earth sciences[45h+30h] (6 credits) (in French)  | Joseph Dufey, Philippe Sonnet                                       |
| <u>BIO1181</u>  | Project[0h+45h] (3 credits) (in French)  | Philippe Fonck, André Lejeune, Chantal Marchand, Jean-François Rees |
| <u>ANG1861</u>  | Reading and listening comprehension of scientific texts[6h] (2 credits) (in French)  | Ahmed Adriouèche, Isabelle Druant, Annick Sonck                     |

This year of studies entitles access, without any complementary courses, to the second year of studies of the bachelor programmes of Chemical Sciences and of Bioengineering and also to the second year of bachelor studies of Geographical Sciences, on condition the GEO 1111 course is added to the second year study programme in the case of the latter.

### BIOL 12BA Second year of studies

#### Compulsory courses

|                 |  |  |
|-----------------|--|--|
| <u>BIO1231</u>  | Complements of animal biology[75h+70h] (12 credits) (in French)                      | Thierry Hance, Bernard Knoops, Claude Remacle (coord.), Philippe van den Bosch Sanchez de Aguilar, Hans Van Dyck Jean-Marie Kinet, Stanley Lutts |
| <u>BIO1241</u>  | Complements of plant biology[55h+30h] (7 credits) (in French)                        |  |
| <u>BIO1251</u>  | Introductory ecology[60h+15h] (6 credits) (in French)                                | Michel Baguette (coord.), Thierry Hance, Anne-Laure Jacquemart, Eric Le Boulengé, Hans Van Dyck, Renate Wesselingh                               |
| <u>BIO1221</u>  | Introduction to genetics[25h+15h] (3 credits) (in French)                            | André Lejeune  |
| <u>BIO1211</u>  | Marine biology field course[0h+40h] (3 credits) (in French)                          | Jérôme Mallefet  |
| <u>BIO1261</u>  | Biophysics[45h+30h] (6 credits) (in French)  | Alain Cornet, Pierre Defrance, Patrick Gilon, Jean-François Rees (coord.)  |
| <u>CHM1242</u>  | Chimie bio-organique[30h+10h] (3 credits) (in French)                                | Jacques Fastrez, Patrice Soumillion  |
| <u>CHM1271A</u> | Eléments de biochimie[30h+20h] (4 credits) (in French)                               | Robert Crichton  |
| <u>CHM1371B</u> | Biochimie métabolique[22.5h+15h] (3 credits) (in French)                             | Yves-Jacques Schneider   |
| <u>MAT1275</u>  | Statistics in the natural sciences[30h+30h] (5 credits) (in French)                  | Eric Le Boulengé   |
| <u>ANG1862</u>  | Reading and listening comprehension of scientific texts[30h] (2 credits) (in French) | Ahmed Adriouèche   |
| <u>BIO1281</u>  | Project[10h+35h] (4 credits) (in French)   | Jean Delcour, André Lejeune, Jean-François Rees (coord.), Hans Van Dyck  |
| <u>SC1120</u>   | Philosophy[30h] (2 credits) (in French)  | Bernard Feltz  |

**Minor in Chemistry**

The students who opt for the minor in Chemistry will replace the BIO1281 and the SC1120 courses by this course.

CHM1211 General Chemistry 2[30h+54h] (6 credits) (in French) Michel Devillers (coord.), Bernard Tinant

**BIOL 13BA Third year of studies****Compulsory courses**

|                 |  |   |
|-----------------|--|---|
| <u>MAT1375</u>  | Biometry[25h+25h] (4 credits) ▲ (in French)                                      | N.  |
| <u>BIO1321</u>  | Molecular genetics[30h+10h] (3 credits) ▲ (in French)                            | N.  |
| <u>BIO1331</u>  | Animal Biochemistry, physiology and histology[60h+22.5h] (6 credits) (in French) | Bernard Knoops (coord.), Jean-François Rees, Yves-Jacques Schneider   |
| <u>BIO1341</u>  | Plant physiology[45h+15h] (5 credits) ▲ (in French)                              | N.  |
| <u>BIO1311</u>  | Microbiology and virology[40h+15h] (4 credits) ▲ (in French)                     | N.  |
| <u>ANG1863</u>  | Anglais - expression orale[30h] (2 credits) ▲ (in English)                       | Philippe Denis, Philippe Neyt (coord.), Colleen Starrs, Françoise Stas  |
| <u>VETE1300</u> | Integrated Seminars[25h] (2 credits) (in English)                                | Jean Delcour, Philippe Denis, André Moens, René Rezsóhazy (coord.), Yves-Jacques Schneider, Colleen Starrs, Renate Wesselingh |
| <u>BIO1312</u>  | Field work[0h+60h] (4 credits) ▲ (in French)                                     | N.  |

**Complementary studies or minor (30 credits)**

The students who opt to **further their training in biological studies** will choose one out of the four blocks of the following courses :

**Molecular and Cellular Biology**

|                |   |    |
|----------------|---|----|
| <u>BIO1332</u> | Animal embryology[25h+15h] (3 credits) ▲ (in French)  | N. |
| <u>BIO1335</u> | Immunology[25h+15h] (3 credits) ▲ (in French)   | N. |
| <u>BIO1322</u> | Integrated tutorials in biochemistry and molecular genetics[0h+60h] (5 credits) ▲ (in French) | N. |
| <u>BIO1333</u> | Animal physiology and morphology[60h+60h] (10 credits) ▲ (in French)                          | N. |

*In addition, the students, with the approval of the Study Advisor, will choose preference courses for 9 credits from among the blocks of Vegetal Biology, Animal Biology or Ecology, or elsewhere from the University programme.*

**Vegetal Biology**

|                 |  |                             |
|-----------------|--|-----------------------------|
| <u>BIO1342</u>  | Plant morphogenesis[45h+30h] (6 credits) ▲ (in French)   | N.                          |
| <u>BIO1351</u>  | Ecology of individuals and populations[50h] (4 credits) ▲ (in French)                            | N.                          |
| <u>BIO1352A</u> | Travaux pratiques intégrés d'écologie et de biogéographie[0h+50h] (4 credits) (in French)        | N.                          |
| <u>BIO1313</u>  | Morphology and physiology of fungi[15h+10h] (2 credits) ▲ (in French)                            | N.                          |
| <u>BIO1314</u>  | Systematics and evolution : Principles, methods and diversity[20h+20h] (3 credits) ▲ (in French) | N.                          |
| <u>BIR1332</u>  | Soil sciences[30h+7.5h] (3 credits) (in French)  | Bruno Delvaux, Joseph Dufey |

*In addition, the students, with the approval of the Study Advisor, will choose preference courses for 8 credits from among the blocks of Molecular and Cellular Biology, Animal Biology or Ecology, or elsewhere from the University programme.*

**Animal Biology**

|                 |  |    |
|-----------------|--|----|
| <u>BIO1332</u>  | Animal embryology[25h+15h] (3 credits) ▲ (in French)                                   | N. |
| <u>BIO1333A</u> | Physiologie et morphologie animales[30h+20h] (4 credits) (in French)                   | N. |
| <u>BIO1334</u>  | Comparative animal physiology[35h+15h] (4 credits) ▲ (in French)                       | N. |
| <u>BIO1351</u>  | Ecology of individuals and populations[50h] (4 credits) ▲ (in French)                  | N. |
| <u>BIO1352B</u> | Travaux pratiques intégrés d'écologie et biogéographie[0h+50h] (4 credits) (in French) | N. |
| <u>BIO1315</u>  | Marine Biology[25h] (2 credits) ▲ (in French)  | N. |

*In addition, the students, with the approval of the Study Advisor, will choose preference courses for 9 credits from among the blocks of Vegetal Biology, Molecular and Cellular Biology or Ecology courses, or elsewhere from the University programme.*

**Ecology**

|                  |  |    |
|------------------|--|----|
| <u>BIO1351</u>   | Ecology of individuals and populations[50h] (4 credits) ▲<br>(in French)                         | N. |
| <u>GEO1332A</u>  | Biogéographie[40h] (3 credits) (in French)   | N. |
| <u>BIO1352</u>   | Practical work in ecology and biogeography[0h+100h] (8 credits) ▲ (in French)                    | N. |
| <u>BIO1313</u>   | Morphology and physiology of fungi[15h+10h] (2 credits) ▲ (in French)                            | N. |
| <u>BIO1314</u>   | Systematics and evolution : Principles, methods and diversity[20h+20h] (3 credits) ▲ (in French) | N. |
| <u>BRAI2101B</u> | Génétique quantitative et des populations[25h] (2 credits) (in French)                           | N. |

*In addition, the students, with the approval of the Study Advisor, will choose preference courses of 8 credits from among the blocks of Molecular and Cellular Biology, Vegetal Biology or Animal Biology courses, or elsewhere from the University programme.*

The students who opt for **the minor in Chemistry** will choose the following courses :

|                 |   |   |
|-----------------|---|---|
| <u>CHM1251</u>  | Elements of crystallography and molecular spectroscopy[60h+30h] (8 credits) (in French) | Jean-Paul Declercq, Jean-Louis Habib<br>Jiwan |
| <u>CHM1331</u>  | Inorganic chemistry I[30h+15h] (4 credits) ▲ (in French)                                | N.  |
| <u>BIR1317</u>  | Organic chemistry (part II)[30h+15h] (3.5 credits) (in French)                          | Jacqueline Marchand                           |
| <u>CHM1321A</u> | Chimie analytique 1[30h] (3 credits) (in French)  | N.  |
| <u>CHM1361</u>  | Introduction to polymer chemistry[22.5h] (2 credits) ▲ (in French)                      | N.  |
| <u>SC1120</u>   | Philosophy[30h] (2 credits) (in French)   | Bernard Feltz                                 |

*In addition, the students, with the approval of the Study Advisor, will choose an option of 6 credits, preferably from the bachelor programme of Chemical Sciences or from the block of courses in Molecular and Cellular Biology, or elsewhere in the University programme.*

The students who opt for another minor from the University programme, with the approval of the Study Advisor, will follow the totality of the course (30 credits) during the 3rd year of the bachelor programme of Biology.