Programme-specific Section of the Curriculum for the MSc Programme in Biotechnology at the Faculty of Science, University of Copenhagen 2012 (Rev. 2020)

Contents

1 Title, affiliation and language ................................................................. 2
  1.1 Title .................................................................................................. 2
  1.2 Affiliation ......................................................................................... 2
  1.3 Corps of external examiners ............................................................. 2
  1.4 Language .......................................................................................... 2

2 Academic profile .................................................................................... 2
  2.1 Purpose .............................................................................................. 2
  2.2 General programme profile ............................................................. 2
  2.3 General structure of the programme ................................................. 2
  2.4 Career opportunities ....................................................................... 3

3 Description of competence profiles ....................................................... 3
  3.1 Competence profile ......................................................................... 3

4 Admission requirements ......................................................................... 4
  4.1 Applicants with a Bachelor’s degree in Biotechnology ...................... 4
  4.2 Applicants with a related Bachelor’s degree ...................................... 4
  4.3 Other applicants .............................................................................. 4
  4.4 Language requirements .................................................................. 4
  4.5 Supplementary subject elements ..................................................... 4

5 Prioritisation of applicants .................................................................... 5

6 Structure of the programme .................................................................... 5
  6.1 Programme components .................................................................. 5

7 Exemptions ............................................................................................. 7

8 Commencement etc. ............................................................................. 7
  8.1 Validity ............................................................................................. 7
  8.2 Transfer ............................................................................................ 7
  8.3 Amendment ....................................................................................... 7

Appendix 1 Tables ..................................................................................... 8
Appendix 2 Interim arrangements ............................................................. 9
Appendix 3 Description of objectives for the thesis .................................. 16
1 Title, affiliation and language
A shared section that applies to all BSc and MSc Programmes at the Faculty of Science is linked to this programme-specific curriculum.

1.1 Title
The MSc Programme in Biotechnology leads to a Master of Science (MSc) in Biotechnology with the Danish title: Cand.scient. (candidatus/candidata scientiarum) i bioteknologi.

1.2 Affiliation
The programme is affiliated with the Study Board for the Biological Area and the students can both elect, and be elected, to this study board.

1.3 Corps of external examiners
The following corps of external examiners is used for the central parts of the MSc Programme:
- Corps of External Examiners for Agricultural Science (jordbrugsvidenskab).

1.4 Language
The language of this MSc Programme is English.

2 Academic profile
2.1 Purpose
The purpose is to educate candidates in Biotechnology who can develop the building blocks for innovation and sustainable solutions to major global challenges.

The objective of the programme is to offer students a coherent profession-oriented education within the field of biotechnology. On completion of the program, students will be able to perform research at all levels and analyse and solve questions and problems within the broad field of biotechnology.

The MSc programme is primarily within the field of natural sciences, supplied with aspects of innovation and business. The biotechnology programme is an international degree and will be conducted in English.

2.2 General programme profile
The aim of the programme is to give students:
- Both theoretical knowledge and method-oriented practical skills in applied biotechnology and biochemistry within the fields of micro-organisms, plants and animals. Insight on how to apply these organisms as model and production systems.
- The knowledge required to analyse complex biotechnology problems of importance for the biotechnological industry, governmental agencies or educational programmes.
- The ability to communicate knowledge at all levels, and a general understanding of the interactions between biotechnology, industry, society and the environment.

Biotechnology is the key subject area of the programme.

2.3 General structure of the programme
The MSc Programme is set at 120 ECTS.

There are no defined specialisations in this programme.
2.4 Career opportunities
The MSc Programme in Biotechnology qualifies students to become professionals within business functions and/or areas such as:

- Researcher/quality manager in biotechnological industry
- Scientist at research institutions
- Advisor and consultant in governmental agencies
- Product specialist in biotech sales organisations
- Biotech entrepreneur
- A PhD programme
- Educational establishments

3 Description of competence profiles
Students following the MSc Programme acquire the knowledge, skills and competences listed below. Students will also acquire other qualifications through elective subject elements and other study activities.

3.1 Competence profile
On completion of the programme, an MSc in Biotechnology has acquired the following:

Knowledge about:
- The biological complexities with the field of cell and organism biology and molecular biology at an advanced level including the principles of cell functions and genetic control of these processes.
- Critically reflect on the theory behind biotechnological methods.
- Model systems to obtain and integrate fundamental knowledge about organisms and to understand complex biological processes.
- The usefulness of different organisms as expression hosts in research and as production units.
- Integrated approaches to address biotechnological questions using genetics, physiology, biochemistry and bioinformatics in order to relate phenotypes to genotype and as platforms for modelling organism metabolism at the molecular level.
- Intellectual property rights as related to scientific discovery and biological material and business development.

Skills in/to:
- Use basic knowledge from other disciplines in an integrated manner when analysing and solving current problems in biotechnology.
- Discuss and choose techniques in molecular biology, design of laboratory protocols and safety procedures in relation to handling and use of organisms in biotechnology.
- Transfer techniques and principles to new hypotheses based on biotechnological/biochemical, and/or mathematical/statistical descriptions, which can be statistically and experimentally tested.
- Use digitalisation such as scripting to handle and analyse large and complex data sets within biotechnology.
- Use advanced methods and solutions in molecular biology in the context of a project.
- Set up preparations for a research plan, including critical discussion of literature and identification of problems, develop hypotheses and concrete research questions, determine data requirements and select appropriate methods.
- Read, discuss and present original scientific articles within the field.
- Read and interpret patents within the biotechnological field.
• Communicate effectively to specialist and non-specialist audience at a variety of levels, using modern and appropriate information and communication tools.

**Competences in/to:**
• Transfer theories and principles from advanced state-of-the-art molecular biology to solve new questions posed by the research community, the industry and the society.
• Find innovative solutions based on sustainability perspectives and climate neutral development.
• Work effectively in teams as well as independently, apply project management in cross-disciplinary environments.
• Use lifelong learning as a principle to independently evaluate and structure learning processes and assume responsibility for continuous professional development.

### 4 Admission requirements

With a Bachelor’s degree in Biotechnology from the University of Copenhagen the student is granted reserved access and guaranteed a place on the MSc Programme in Biotechnology if the student applies in time to begin the MSc Programme within three years of the completion of the Bachelor’s degree.

#### 4.1 Applicants with a Bachelor’s degree in Biotechnology

Applicants with a Bachelor’s degree in Biotechnology from the University of Copenhagen, other Danish or Nordic universities are directly academically qualified for admission to the MSc Programme.

#### 4.2 Applicants with a related Bachelor’s degree

Applicants with a Bachelor’s degree in Biology, Biochemistry, Biotechnology, Natural Resources, Molecular Biomedicine or Molecular Biology from the University of Copenhagen or other Danish or international universities may also be admitted if their programme includes the following:
• 15 ECTS within a biological system (plants, animals or microbiology)
• 15 ECTS within biochemistry/organic chemistry
• 15 ECTS within biotechnology methods
• In total, the applicant must have a minimum of 30 ECTS derived from courses with experimental laboratory exercises.

#### 4.3 Other applicants

The Faculty may also admit applicants who, after an individual academic assessment, are deemed to possess educational qualifications equivalent to those required in Subclauses 4.1-2.

#### 4.4 Language requirements

Applicants must as a minimum document English language qualifications comparable to a Danish upper secondary school English B level or English proficiency corresponding to the tests and scores required. Accepted tests and required minimum scores are published online at [www.science.ku.dk](http://www.science.ku.dk).

#### 4.5 Supplementary subject elements

The qualifications of an applicant to the MSc program are assessed exclusively on the basis of the qualifying bachelor’s degree. Supplementary subject elements passed between the completion of the bachelor’s program and the admission to the MSc program cannot be included in the overall assessment.
However, subject elements passed before the completion of the bachelor’s program may be included in the overall assessment. This includes subject elements completed as continuing education as well as subject elements completed as part of a former higher education program. A maximum of 30 ECTS supplementary subject elements can be included in the overall assessment.

Subject elements passed before completing the BSc programme which are to form part of the MSc programme to which the student has a legal right of admission (§9-courses) cannot be included in the overall assessment.

5 Prioritisation of applicants
If the number of qualified applicants to the programme exceeds the number of places available, applicants will be prioritised as follows:

1) Applicants with a Bachelor’s degree in Biotechnology from the University of Copenhagen with reserved access to the programme.
2) Other applicants.

If the number of qualified applicants within a category exceeds the number of places available, applicants will be prioritised according to the following criteria (listed below in prioritised order):
- Grades achieved in the areas concerned in 4.2. If different grading systems make comparison impossible, the Admission Committee will prioritise applicants on the basis of an individual evaluation.

6 Structure of the programme
The compulsory subject elements, restricted elective subject elements and the thesis constitute the central parts of the programme (Section 21 of the Ministerial Order on Bachelor and Master’s Programmes (Candidatus) at Universities).

6.1 Programme components
The programme is set at 120 ECTS and consists of the following:
- Compulsory subject elements, 22.5 ECTS.
- Restricted elective subject elements, 22.5 ECTS.
- Elective subject elements, 15 ECTS.
- Thesis, 60 ECTS.

6.1.1 Compulsory subject elements
- NPLK19000U Big Data in Biotechnology Block 1 7.5 ECTS
- SBIK10194U Advanced Biotechnology and Intellectual Property Rights Block 4 15 ECTS

6.1.2 Restricted elective subject elements
22.5 ECTS are to be covered as subject elements from the following list:
- NPLK13003U Advanced Analytical Chemistry - Sampling and Sample Preparation Block 1 7.5 ECTS
- NPLK17001U Advanced Microbial Biotechnology Block 1 7.5 ECTS
- NPLK15000U Basic Parasitology Block 1 7.5 ECTS
- NPLK19005U Fundamentals of Beer Brewing and Wine Making - Biochemistry, Organisms and Omics Techniques Block 1 7.5 ECTS
6.1.3 Elective subject elements
15 ECTS are to be covered as elective subject elements.
All subject elements at MSc level may be included as elective subject elements in the MSc Programme.

BSc subject elements corresponding to 7.5 ECTS may be included in the MSc Programme.

Projects outside the course scope may be included in the elective section of the programme with up to 15 ECTS. The regulations are described in Appendix 5 to the shared section of the curriculum.

Projects in practice may be included in the elective section of the programme with up to 15 ECTS. The regulations are described in Appendix 4 to the shared section of the curriculum.

Thesis preparation projects may not be included in the elective section of the programme. The regulations are described in Appendix 6 to the shared section of the curriculum.

6.1.4 Thesis
The MSc Programme in Biology-Biotechnology includes a thesis corresponding to 60 ECTS, as described in Appendix 2 to the shared curriculum. The thesis must be written within the academic scope of the programme.
6.1.5 Academic Mobility
The curriculum makes it possible to follow subject elements outside the Faculty of Science.

For students admitted in September the academic mobility for the MSc Programme in Biotechnology is placed in block 1+2 of the 1st year.

For students admitted in February the academic mobility for the MSc Programme in Biotechnology is placed in block 1+2 of the 1st year.

Academic mobility requires that the student follows the rules and regulations regarding pre-approval and credit transfer.

In addition the student has the possibility to arrange similar academic mobility in other parts of the programme.

7 Exemptions
In exceptional circumstances, the study board may grant exemptions from the rules in the curriculum specified solely by the Faculty of Science.

8 Commencement etc.
8.1 Validity
This subject specific section of the curriculum applies to all students enrolled in the programme – see however Appendix 2.

8.2 Transfer
Students enrolled on previous curricula may be transferred to the new one as per the applicable transfer regulations or according to an individual credit transfer by the study board.

8.3 Amendment
The curriculum may be amended once a year so that any changes come into effect at the beginning of the academic year. Amendments must be proposed by the study board and approved by the Dean.

Notification about amendments that tighten the admission requirements for the programme will be published online at www.science.ku.dk one year before they come into effect.

If amendments are made to this curriculum, an interim arrangement may be added if necessary to allow students to complete their MSc Programme according to the amended curriculum.
## Appendix 1 Tables

### Table for students admitted to the programme in September (summer):

**Table – MSc Programme in Biotechnology**

<table>
<thead>
<tr>
<th></th>
<th>Block 1</th>
<th>Block 2</th>
<th>Block 3</th>
<th>Block 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st year</td>
<td>Big Data in Biotechnology</td>
<td>Elective</td>
<td>Restricted elective</td>
<td>Advanced Biotechnology and Intellectual Property Rights</td>
</tr>
<tr>
<td></td>
<td>Restricted elective</td>
<td>Elective</td>
<td>Restricted elective</td>
<td></td>
</tr>
<tr>
<td>2nd year</td>
<td></td>
<td></td>
<td></td>
<td>Thesis</td>
</tr>
</tbody>
</table>

![Compulsory](image) | Restricted elective | Elective | The table illustrates the recommended academic progression. The student is allowed to plan an alternative progression within the applicable rules.

### Table for students admitted to the programme in February (winter):

**MSc Programme in Biotechnology**

<table>
<thead>
<tr>
<th></th>
<th>Block 3</th>
<th>Block 4</th>
<th>Block 1</th>
<th>Block 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st year</td>
<td>Restricted elective</td>
<td>Advanced Biotechnology</td>
<td>Big Data in Biotechnology</td>
<td>Elective</td>
</tr>
<tr>
<td></td>
<td>Restricted elective</td>
<td>and Intellectual Property</td>
<td>Restricted elective</td>
<td></td>
</tr>
<tr>
<td>2nd year</td>
<td></td>
<td>Rights</td>
<td>Elective</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Thesis</td>
</tr>
</tbody>
</table>

![Compulsory](image) | Restricted elective | Elective | The table illustrates the recommended academic progression. The student is allowed to plan an alternative progression within the applicable rules.

*This table is only relevant for students who begin the MSc Programme in February (block 3)*
Appendix 2 Interim arrangements

The Shared Section of the BSc and MSc Curricula for Study Programmes applies to all students.

The interim arrangements below only consist of parts where the current curriculum differs from the rules and regulations that were previously valid. Therefore, if information about relevant rules and regulations are missing, it can be found in the curriculum above.

Different competence profiles may apply to students admitted to the programme in different academic years. Competence profiles applicable to previous admissions can be found in the Revision History for Competence Profiles at SCIENCE.

1 General changes for students admitted in the academic year 2019/20
Students admitted to the MSc Programme in the academic year 2019/20 must finish the programme as listed in the curriculum above with the following exceptions.

Title
From the academic year 2020/21, the programme has changed its title. Students admitted to the MSc Programme in the academic year 2019/20 can choose between the previous title and the new title.

Previous title:
The MSc Programme in Biotechnology leads to a Master of Science (MSc) in Biology-Biotechnology with the Danish title: Cand.scient. (candidatus/candidata scientiarum) i biologi-bioteknologi.

2 General changes for students admitted in the academic year 2018/19 or 2017/18
Students admitted to the MSc Programme in the academic year 2018/19 or 2017/18 must finish the programme as listed in the curriculum above with the following exceptions.

Title
From the academic year 2020/21, the programme has changed its title. Students admitted to the MSc Programme in the academic year 2018/19 or 2017/18 can choose between the previous title and the new title.

Previous title:
The MSc Programme in Biotechnology leads to a Master of Science (MSc) in Biology-Biotechnology with the Danish title: Cand.scient. (candidatus/candidata scientiarum) i biologi-bioteknologi.

2.1 Specialisations
Students admitted to the MSc Programme in the academic year 2018/19 or 2017/18 are allowed to finish their programme with one of the specialisations that were outlined in the curriculum.

The student must choose one of the following specialisations:

- Bio Products.
- Cell Physiology.
- Immunology.
2.1.1 Applied Enzymology

This specialisation is discontinued. It was offered for the last time in the academic year 2018/19.

Title

The MSc Programme in Biology-Biotechnology with a specialisation in Applied Enzymology leads to a Master of Science (MSc) in Biology-Biotechnology with a specialisation in Applied Enzymology with the Danish title: Cand.scient. (candidatus/candidata scientiarum) i biologi-bioteknologi med en specialisering i anvendt enzymology.

Structure of the programme

The specialisation is set at 120 ECTS and consists of the following:

- Compulsory subject elements, 30 ECTS
- Restricted elective subject elements, 15 ECTS
- Elective subject elements, 15 ECTS
- Thesis, 60 ECTS

Table for students admitted to the programme in September (summer):

<table>
<thead>
<tr>
<th>Block 1</th>
<th>Block 2</th>
<th>Block 3</th>
<th>Block 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced Carbohydrate Technologies</td>
<td>Enzymology and Experimental Biochemistry</td>
<td>Restricted elective</td>
<td>Advanced Biotechnology and Intellectual Property Rights</td>
</tr>
<tr>
<td>Restricted elective</td>
<td>Elective</td>
<td>Elective</td>
<td></td>
</tr>
</tbody>
</table>

2nd year

The table illustrates the recommended academic progression. The student is allowed to plan an alternative progression within the applicable rules.

Subject elements in italics have been discontinued. See course specific changes below.

Table for students admitted to the programme in February (winter):

<table>
<thead>
<tr>
<th>Block 3</th>
<th>Block 4</th>
<th>Block 1</th>
<th>Block 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restricted elective</td>
<td>Advanced Biotechnology and Intellectual Property Rights</td>
<td>Advanced Carbohydrate Technologies</td>
<td>Enzymology and Experimental Biochemistry</td>
</tr>
<tr>
<td>Restricted elective</td>
<td>Elective</td>
<td>Elective</td>
<td></td>
</tr>
</tbody>
</table>

2nd year

The table illustrates the recommended academic progression. The student is allowed to plan an alternative progression within the applicable rules.

This table is only relevant for students who begin the MSc Programme in February (block 3). Subject elements in italics have been discontinued. See course specific changes below.

Restricted elective subject elements

15 ECTS are to be covered as subject elements from the following list:

- Restricted elective subject elements offered as part of this curriculum (see above)*
<table>
<thead>
<tr>
<th></th>
<th>Immunology - Theoretical</th>
<th>Discontinued**</th>
<th>7.5 ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NNEK14004U</td>
<td>Fundamentals of Beer Brewing and Wine Making</td>
<td>Discontinued**</td>
</tr>
</tbody>
</table>

*Except for Advanced Carbohydrate Technologies, which is a mandatory course for students admitted in the academic year 2018/19 and 2017/18.

** See course specific changes below.

### 2.1.2 Bio Products

This specialisation is discontinued. It was offered for the last time in the academic year 2018/19.

#### Title

The MSc Programme in Biology-Biotechnology with a specialisation in Bio Products leads to a Master of Science (MSc) in Biology-Biotechnology with a specialisation in Bio Products with the Danish title: Cand.scient. (candidatus/candidata scientiarum) i biologi-bioteknologi med en specialisering i bioprodukter.

#### Structure of the programme

The specialisation is set at 120 ECTS and consists of the following:

- Compulsory subject elements, 22.5 ECTS
- Restricted elective subject elements, 22.5 ECTS
- Elective subject elements. 15 ECTS
- Thesis, 60 ECTS

#### Table for students admitted to the programme in September (summer):

<table>
<thead>
<tr>
<th></th>
<th>Block 1</th>
<th>Block 2</th>
<th>Block 3</th>
<th>Block 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st year</td>
<td>Frontiers in Plant Science</td>
<td>Elective</td>
<td>Restricted elective</td>
<td>Advanced Biotechnology and Intellectual Property Rights</td>
</tr>
<tr>
<td></td>
<td>Restricted elective</td>
<td></td>
<td>Restricted elective</td>
<td></td>
</tr>
</tbody>
</table>

| 2nd year | Thesis                             |

The table illustrates the recommended academic progression. The student is allowed to plan an alternative progression within the applicable rules.

#### Table for students admitted to the programme in February (winter):*

<table>
<thead>
<tr>
<th></th>
<th>Block 3</th>
<th>Block 4</th>
<th>Block 1</th>
<th>Block 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st year</td>
<td>Restricted elective</td>
<td>Advanced Biotechnology and Intellectual Property Rights</td>
<td>Frontiers in Plant Science</td>
<td>Elective</td>
</tr>
<tr>
<td></td>
<td>Restricted elective</td>
<td></td>
<td>Restricted elective</td>
<td>Elective</td>
</tr>
</tbody>
</table>

| 2nd year | Thesis                             |

The table illustrates the recommended academic progression. The student is allowed to plan an alternative progression within the applicable rules.

*This table is only relevant for students who begin the MSc Programme in February (block 3).
Restricted elective subject elements
22.5 ECTS are to be covered as subject elements from the following list:

- Restricted elective subject elements offered as part of this curriculum (see above)*
- LKEK10081U Enzymology and Experimental Biochemistry Discontinued** 7.5 ECTS
- SBK10167U Immunology - Theoretical Discontinued** 7.5 ECTS
- NNEK14004U Fundamentals of Beer Brewing and Wine Making Discontinued** 7.5 ECTS

*Except for Frontiers in Plant Science, which is a mandatory course for students admitted in the academic year 2018/19 and 2017/18.
** See course specific changes below.

2.1.3 Cell Physiology
This specialisation is discontinued. It was offered for the last time in the academic year 2018/19.

Title
The MSc Programme in Biology-Biotechnology with a specialisation in Cell Physiology leads to a Master of Science (MSc) in Biology-Biotechnology with a specialisation in Cell Physiology with the Danish title: Cand.scient. (candidatus/candidata scientiarum) i biologi-bioteknologi med en specialisering i cellefysiologi.

Structure of the programme
The specialisation is set at 120 ECTS and consists of the following:
- Compulsory subject elements, 22.5 ECTS
- Restricted elective subject elements, 22.5 ECTS
- Elective subject elements, 15 ECTS
- Thesis, 60 ECTS

Table for students admitted to the programme in September (summer):

<table>
<thead>
<tr>
<th>Block 1</th>
<th>Block 2</th>
<th>Block 3</th>
<th>Block 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Genome and Cell Biology</td>
<td>Elective</td>
<td>Restricted elective</td>
<td>Advanced Biotechnology and Intellectual Property Rights</td>
</tr>
<tr>
<td>Restricted elective</td>
<td>Elective</td>
<td>Restricted elective</td>
<td>Thesis</td>
</tr>
</tbody>
</table>

1st year

2nd year

Tables for students admitted to the programme in February (winter):

<table>
<thead>
<tr>
<th>Block 3</th>
<th>Block 4</th>
<th>Block 1</th>
<th>Block 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restricted elective</td>
<td>Advanced Biotechnology and Intellectual Property Rights</td>
<td>Genome and Cell Biology</td>
<td>Elective</td>
</tr>
<tr>
<td>Restricted elective</td>
<td>Restricted elective</td>
<td>Elective</td>
<td></td>
</tr>
</tbody>
</table>
The table illustrates the recommended academic progression. The student is allowed to plan an alternative progression within the applicable rules.

*This table is only relevant for students who begin the MSc Programme in February (block 3).

**Restricted elective subject elements**
22.5 ECTS are to be covered as subject elements from the following list:

- Restricted elective subject elements offered as part of this curriculum (see above)*

<table>
<thead>
<tr>
<th>Subject Element</th>
<th>ECTS</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>LKEK10081U Enzymology and Experimental Biochemistry</td>
<td>7.5 ECTS</td>
<td>Discontinued**</td>
</tr>
</tbody>
</table>

*Except for Genome and Cell Biology, which is a mandatory course for students admitted in the academic year 2018/19 and 2017/18.

** See course specific changes below.

### 2.1.4 Immunology

This specialisation is discontinued. It was offered for the last time in the academic year 2018/19.

**Title**
The MSc Programme in Biology-Biotechnology with a specialisation in Immunology leads to a Master of Science (MSc) in Biology-Biotechnology with a specialisation in Immunology with the Danish title: Cand.scient. (candidatus/candidata scientiarum) i biologi-bioteknologi med en specialisering i immunologi.

**Structure of the programme**
The specialisation is set at 120 ECTS and consists of the following:

- Compulsory subject elements, 30 ECTS
- Restricted elective subject elements, 15 ECTS
- Elective subject elements, 15 ECTS
- Thesis, 60 ECTS

**Tables for students admitted to the programme in September (summer):**

<table>
<thead>
<tr>
<th>Year</th>
<th>Block 1</th>
<th>Block 2</th>
<th>Block 3</th>
<th>Block 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st year</td>
<td>Immunology</td>
<td>Elective</td>
<td>Restricted elective</td>
<td>Advanced Biotechnology and Intellectual Property Rights</td>
</tr>
<tr>
<td>2nd year</td>
<td></td>
<td>Elective</td>
<td>Restricted elective</td>
<td>Thesis</td>
</tr>
</tbody>
</table>

Subject elements in italics have been discontinued. See course specific changes below.
Table for students admitted to the programme in February (winter)*:

<table>
<thead>
<tr>
<th></th>
<th>Block 3</th>
<th>Block 4</th>
<th>Block 1</th>
<th>Block 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st year</td>
<td>Restricted elective</td>
<td>Advanced Biotechnology and Intellectual Property Rights</td>
<td>Immunology</td>
<td>Elective</td>
</tr>
<tr>
<td></td>
<td>Restricted elective</td>
<td></td>
<td></td>
<td>Elective</td>
</tr>
<tr>
<td>2nd year</td>
<td></td>
<td></td>
<td>Thesis</td>
<td></td>
</tr>
</tbody>
</table>

*This table is only relevant for students who begin the MSc Programme in February (block 3).

**Restricted elective subject elements**

15 ECTS are to be covered as subject elements from the following list:

- Restricted elective subject elements offered as part of this curriculum (see above)*

*Except for Immunology, which is a mandatory course for students admitted in the academic year 2018/19 and 2017/18.

**3 Course specific changes**

<table>
<thead>
<tr>
<th>Discontinued course</th>
<th>Interim arrangement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fundamentals of Beer Brewing and Wine Making, 7.5 ECTS</td>
<td>The course was restricted elective on the specialisations Applied Enzymology and Bio Products in the academic year 2018/19 or earlier.</td>
</tr>
<tr>
<td></td>
<td>Offered for the last time: 2018/19.</td>
</tr>
<tr>
<td></td>
<td>The course is identical to Fundamentals of Beer Brewing and Wine Making - Biochemistry, Organisms and Omics Techniques (NPLK19005U), 7.5 ECTS.</td>
</tr>
<tr>
<td>Enzymology and Experimental Biochemistry (LKEK10081U), 7.5 ECTS</td>
<td>The course was restricted elective on the specialisations Bio Products and Cell Physiology in the academic year 2018/19 or earlier.</td>
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<tr>
<td></td>
<td>The course was compulsory on the specialisation Applied Enzymology in the academic year 2018/19 or earlier.</td>
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<td></td>
<td>Offered for the last time: 2018/19.</td>
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<tr>
<td></td>
<td>The course has changed title and is identical to Enzymology and Experimental Biochemistry (NPLK19004U), 7.5 ECTS.</td>
</tr>
<tr>
<td>Immunology – Theoretical (SBIK10167U), 7.5 ECTS</td>
<td>The course was restricted elective on the specialisations Bio Products, Cell Physiology and Applied Enzymology in the academic year 2018/19 or earlier.</td>
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<td>Offered for the last time: 2018/19.</td>
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<tr>
<td></td>
<td>The course has changed title and is identical to Basic Immunology (SBIK19001U), 7.5 ECTS.</td>
</tr>
</tbody>
</table>
| Immunology (SBIK10168U), 15 ECTS | The course was compulsory on the specialisation Immunology in the academic year 2018/19 and 2017/18.  
Offered for the last time: 2018/19  
Last exam if applicable (cf. SCIENCE's Teaching and exam rules): 2019/20.  
In this curriculum Current and Experimental Immunology (SBIK19002U), 7.5 ECTS and Basic Immunology (SBIK19001U), 7.5 ECTS replaces the course. |
Appendix 3 Description of objectives for the thesis

After completing the thesis, the student should have:

Knowledge about:
- Summarising a suitable combination of methodologies/theories in biotechnology based on international research for use in his/her work with the problem formulation.
- Discussing theories/models with a high degree of independence.

Skills in/to:
- Apply and critically evaluate biotechnological theories/methodologies, including their applicability and limitations.
- Draw conclusions in a clear societal perspective in relation to the problem formulation and, more generally, considering the topic and the subject area.
- Process data through a choice of digital analysis methods and present findings objectively and in a concise manner.

Competences in/to:
- Initiate, perform academic work and find solutions in a biotechnological research context.