



Programme-specific Section of the Curriculum for the MSc Programme in Biology-Biotechnology at the Faculty of Science, University of Copenhagen 2012 (Rev. 2019)

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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 Biology-Biotechnology leads to a Master of Science (MSc) in Biology-Biotechnology with the Danish title: *Cand.scient. (candidatus/candidata scientiarum) i biologi-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 objective of the program 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 domestic animals and livestock, plants, human and/or microorganisms.
- 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.

Biology-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 Biology-Biotechnology qualifies students to become professionals within business functions and/or areas such as:

- A PhD programme
- Biotechnological industry
- Research institutions
- Governmental agencies
- 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 Biology-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.
- The theory behind 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 biological 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.
- Critically reflect on the theory behind methods.

Skills in/to:

- Use advanced methods in molecular biology in the context of a research project.
- Use basic knowledge from other disciplines in an integrated manner when analysing current problems in biology-biotechnology.
- 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.
- 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 theories and principles to new hypotheses based on biochemical, and/or mathematical/statistical descriptions, which can be statistically and experimentally tested.
- Read, discuss and present original scientific articles within the field.
- Read and interpret patents within within the 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.
- Work independently and effectively on an individual basis, as well as in teams 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 Biology-Biotechnology from the University of Copenhagen the student is granted reserved access and guaranteed a place on the MSc Programme in Biology-Biotechnology if the student applies before the application deadline during the first application period after the completion of the Bachelor's degree.

4.1 Applicants with a Bachelor's degree in Biology-Biotechnology

Applicants with a Bachelor's degree in Biology-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 that stem 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.

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 Biology-Biotechnology from the University of Copenhagen seeking admission by way of direct extension of their completed BSc 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

• LBIK10135U	Genome and Cell Biology	Block 1	7.5 ECTS
• LBIK10214U	Frontiers in Plant Science	Block 1	7.5 ECTS
• SBIK19001U	Basic Immunology	Block 1	7.5 ECTS
• NPLK14032U	Advanced Carbohydrate Technologies	Block 2	7.5 ECTS
• LBIK10180U	Applied Microbiology	Block 2	7.5 ECTS
• SBIK19002U	Current and Experimental Immunology	Block 2	7.5 ECTS
• SBIA10210U	Applied Programming for Biosciences	Block 2	7.5 ECTS
• NNEK16003U	Bioactive Food Components and Health	Block 2	7.5 ECTS
• NBIK15009U	Cellular Signalling in Health and Disease	Block 2	7.5 ECTS
• SBIK10182U	From Gene to Function in Pathogenic Bacteria	Block 2	7.5 ECTS
• NPLK19004U	Enzymology and Experimental Biochemistry	Block 2	7.5 ECTS
• LPLK10360U	From Plants to Bioenergy	Block 2	7.5 ECTS
• NBIK15013U	Genome Sequence Analysis	Block 2	7.5 ECTS
• LBIK10202U	Molecular Plant-Microbe Interactions	Block 2	7.5 ECTS
• NFOK14025U	Quantitative Bio-spectroscopy	Block 2	7.5 ECTS
• SVEK17001U	Laboratory Animal Science Function ABD	Block 3	7.5 ECTS
• SMOK14002U	Gene Therapy	Block 3	7.5 ECTS
• LLEK10246U	Advanced Chemometrics	Block 3	7.5 ECTS
• LBIK10136U	Heterologous Expression	Block 3	15 ECTS
• NBIK14035U	Medical Bacteriology	Block 3	7.5 ECTS
• NPLK15003U	Plant Genome Editing and Selection	Block 3	7.5 ECTS
• NFYK14039U	Radioactive Isotopes and Ionizing Radiation	Block 3	7.5 ECTS
• LBIK10207U	Synthetic Biology	Block 3	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.

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 Biology-Biotechnology is placed in block 1+2 of the 1st year.

For students admitted in February the academic mobility for the MSc Programme in Biology-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 Biology-Biotechnology

	Block 1	Block 2	Block 3	Block 4
1st year	Big Data in Biotechnology	Elective	Restricted elective	Advanced Biotechnology and Intellectual Property Rights
	Restricted elective	Elective	Restricted elective	
2nd year	Thesis			

 Compulsory

 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 Biology-Biotechnology*

	Block 3	Block 4	Block 1	Block 2
1st year	Restricted elective	Advanced Biotechnology and Intellectual Property Rights	Big Data in Biotechnology	Elective
	Restricted elective		Restricted elective	Elective
2nd year	Thesis			

 Compulsory

 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 2018/19 and 2017/18

Students admitted to the MSc Programme in the academic year 2018/19 and 2017/18 must finish the programme as listed in the curriculum above with the following exceptions.

1.1 Specialisations

Students admitted to the MSc Programme in the academic year 2018/19 and 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:

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

1.1.2 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):

	Block 1	Block 2	Block 3	Block 4
1st year	Advanced Carbohydrate Technology	<i>Enzymology and Experimental Biochemistry</i>	Restricted elective	Advanced Biotechnology and Intellectual Property Rights
	Restricted elective	Elective	Elective	

2nd year	Thesis
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Compulsory	Restricted elective Elective	The table illustrates the recommended academic progression. The student is allowed to plan an alternative progression within the applicable rules.
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Subject elements in italics have been discontinued. See course specific changes below.

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

	Block 3	Block 4	Block 1	Block 2
1st year	Restricted elective	Advanced Biotechnology and Intellectual Property Rights	Advanced Carbohydrate Technology	<i>Enzymology and Experimental Biochemistry</i>
	Restricted elective		Elective	Elective
2nd year	Thesis			

Compulsory	Restricted elective Elective	The table illustrates the recommended academic progression. The student is allowed to plan an alternative progression within the applicable rules.
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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)*			
• SBIK10167U	Immunology - Theoretical	Discontinued**	7.5 ECTS
• NNEK14004U	Fundamentals of Beer Brewing and Wine Making	Discontinued**	7.5 ECTS

*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.

1.1.3 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):

	Block 1	Block 2	Block 3	Block 4
1st year	Frontiers in Plant Science	Elective	Restricted elective	Advanced Biotechnology and Intellectual Property Rights
	Restricted elective	Elective	Restricted elective	
2nd year	Thesis			

 Compulsory	 Restricted elective	 Elective	The table illustrates the recommended academic progression. The student is allowed to plan an alternative progression within the applicable rules.
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Table for students admitted to the programme in February (winter):*

	Block 3	Block 4	Block 1	Block 2
1st year	Restricted elective	Advanced Biotechnology and Intellectual Property Rights	Frontiers in Plant Science	Elective
	Restricted elective		Restricted Elective	Elective
2nd year	Thesis			

 Compulsory	 Restricted elective	 Elective	The table illustrates the recommended academic progression. The student is allowed to plan an alternative progression within the applicable rules.
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*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
• SBIK10167U	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.

1.1.4 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 biologibioteknologi med en specialisering i cellefysiologi.*

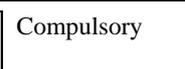
Structure of the programme

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

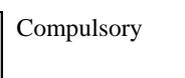
Table for students admitted to the programme in September (summer):

	Block 1	Block 2	Block 3	Block 4
1st year	Genome and Cell Biology	Elective	Restricted elective	Advanced Biotechnology and Intellectual Property Rights
	Restricted elective	Elective	Restricted elective	
2nd year	Thesis			

 Compulsory	 Restricted elective  Elective	The table illustrates the recommended academic progression. The student is allowed to plan an alternative progression within the applicable rules.
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Tables for students admitted to the programme in February (winter):

	Block 3	Block 4	Block 1	Block 2
1st year	Restricted elective	Advanced Biotechnology and Intellectual Property Rights	Genome and Cell Biology	Elective
	Restricted elective		Restricted elective	Elective
2nd year	Thesis			

 Compulsory	 Restricted elective  Elective	The table illustrates the recommended academic progression. The student is allowed to plan an alternative progression within the applicable rules.
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*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

*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.

1.1.5 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):

	Block 1	Block 2	Block 3	Block 4
1st year	<i>Immunology</i>	Elective	Restricted elective	Advanced Biotechnology and Intellectual Property Rights
		Elective	Restricted elective	
2nd year	Thesis			

 Compulsory

 Restricted elective
 Elective

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)*:

	Block 3	Block 4	Block 1	Block 2
1st year	Restricted elective	Advanced Biotechnology and Intellectual Property Rights	Immunology	Elective
	Restricted elective			Elective
2nd year	Thesis			

 Compulsory

 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).

Restricted elective subject elements

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

- | |
|--|
| <ul style="list-style-type: none"> • 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.

2 General changes for students admitted in the academic year 2016/17

Students admitted to the MSc Programme in the academic year 2016/17 must finish the programme as listed in the curriculum above with the following exceptions.

2.1 Specialisations

Students admitted to the MSc Programme in the academic year 2016/17 are allowed to finish their programme with one of the specialisations that were outlined in the curriculum.

2.1.1 Applied Enzymology

Table – Applied Enzymology

	Block 1	Block 2	Block 3	Block 4
1st year	Advanced Carbohydrate Technology	Enzymology and Experimental Biochemistry	Restricted elective	Advanced Biotechnology and Intellectual Property Rights
	Restricted elective	Elective	Elective	
2nd year	Thesis			



Compulsory



Restricted elective

Elective

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

Table – Applied Enzymology*

	Block 3	Block 4	Block 1	Block 2
1st year	Restricted elective	Advanced Biotechnology and Intellectual Property Rights	Advanced Carbohydrate Technology	Enzymology and Experimental Biochemistry
	Restricted elective		Elective	Elective
2nd year	Thesis			



Compulsory



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).

Restricted elective subject elements

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

•	Restricted elective subject elements offered as part of this curriculum (see above)			
•	NKEK14015U	The Chemistry of Metal Ions in Biological Systems	Block 1	7.5 ECTS
•	NIFK16002U	Ethics, Environment and Society	Block 1	7.5 ECTS
•	LBIK10202U	Molecular Plant-Microbe Interactions	Block 2	7.5 ECTS
•	NNEK14004U	Fundamentals of Beer Brewing and Wine Making	Discontinued*	7.5 ECTS
•	SBIK10167U	Immunology - Theoretical	Discontinued*	7.5 ECTS

* See course specific changes below.

2.1.2 Bio Products

Table – Bio Products

	Block 1	Block 2	Block 3	Block 4
1st year	Frontiers in Plant Science	Elective	Restricted elective	Advanced Biotechnology and Intellectual Property Rights
	Restricted elective	Elective	Restricted elective	
2nd year	Thesis			



Compulsory



Restricted elective

Elective

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

Table – Bio Products*

	Block 3	Block 4	Block 1	Block 2
1st year	Restricted elective	Advanced Biotechnology and Intellectual Property Rights	Frontiers in Plant Science	Elective
	Restricted elective		Restricted Elective	Elective
2nd year	Thesis			



Compulsory



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).

Restricted elective subject elements

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

•	Restricted elective subject elements offered as part of this curriculum (see above)			
•	NIFK16002U	Ethics, Environment and Society	Block 1	7.5 ECTS
•	SBIK10154U	Basic Pharmacology and Toxicology	Discontinued*	7.5 ECTS
•	NNEK14004U	Fundamentals of Beer Brewing and Wine Making	Discontinued*	7.5 ECTS
•	SBIK10167U	Immunology - Theoretical	Discontinued*	7.5 ECTS

* See course specific changes below.

2.1.3 Cell Physiology

Table – Cell Physiology

	Block 1	Block 2	Block 3	Block 4
1st year	Genome and Cell Biology	Elective	Restricted elective	Advanced Biotechnology and Intellectual Property Rights
	Restricted elective	Elective	Restricted elective	
2nd year	Thesis			



Compulsory



Restricted elective

Elective

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

Table – Cell Physiology*

	Block 3	Block 4	Block 1	Block 2
1st year	Restricted elective	Advanced Biotechnology and Intellectual Property Rights	Genome and Cell Biology	Elective
	Restricted elective		Restricted elective	Elective
2nd year	Thesis			

 Compulsory
  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).

Restricted elective subject elements

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

Restricted elective subject elements offered as part of this curriculum (see above)			
• NKEK14015U	The Chemistry of Metal Ions in Biological Systems	Block 1	7.5 ECTS
• NIFK16002U	Ethics, Environment and Society	Block 1	7.5 ECTS
• SBIK10154U	Basic Pharmacology and Toxicology	Discontinued*	7.5 ECTS
• SVEK14001U	Laboratory Animal Science category C	Discontinued*	7.5 ECTS
• SVEK13099U	Laboratory Animal Science category C for the Biomedical Sciences	Discontinued*	7.5 ECTS
• SBIK10167U	Immunology - Theoretical	Discontinued*	7.5 ECTS

* See course specific changes below.

2.1.4 Immunology

Table – Immunology

	Block 1	Block 2	Block 3	Block 4
1st year	Immunology	Elective	Restricted elective	Advanced Biotechnology and Intellectual Property Rights
		Elective	Restricted elective	
2nd year	Thesis			

 Compulsory
  Restricted elective
 Elective

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

Table – Immunology*

	Block 3	Block 4	Block 1	Block 2
1st year	Restricted elective	Advanced Biotechnology and Intellectual Property Rights	Immunology	Elective
	Restricted elective			Elective
2nd year	Thesis			



Compulsory



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).

Restricted elective subject elements

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

<ul style="list-style-type: none"> • Restricted elective subject elements offered as part of this curriculum (see above) 			
• LBIK10202U	Molecular Plant-Microbe Interactions	Block 2	7.5 ECTS
• NPLK15003U	Plant Genome Editing and Selection	Block 3	7.5 ECTS
• SBIK10154U	Basic Pharmacology and Toxicology	Discontinued*	7.5 ECTS
• SVEK14001U	Laboratory Animal Science category C	Discontinued*	7.5 ECTS
• SVEK13099U	Laboratory Animal Science category C for the Biomedical Sciences	Discontinued*	7.5 ECTS

* See course specific changes below.

5 Course specific changes

Discontinued course	Interim arrangement
Basic Pharmacology and Toxicology, 7.5 ECTS	<p>The course was a restricted elective course on Bio Products, Cell Physiology and Immunology specialisations in the academic year 2016/17 or earlier.</p> <p>The course was offered for the last time in the academic year 2016/17 and a third exam is offered in the academic year 2017/18.</p>
Fundamentals of Beer Brewing and Wine Making, 7.5 ECTS	<p>The course was a restricted elective course on the specialisations Applied Enzymology and Bio Products in the academic year 2018/19 or earlier.</p> <p>The course was offered for the last time in the academic year 2018/19.</p> <p>The course is identical to Fundamentals of Beer Brewing and Wine Making - Biochemistry, Organisms and Omics Techniques (NPLK19005U), 7.5 ECTS.</p>
Bioactive Components and Health (NNEK14005U), 7.5 ECTS	<p>The course was a restricted elective course on all of the specialisations in the academic year 2015/16 or earlier.</p> <p>The course was offered for the last time in the academic year 2015/16.</p> <p>The course has changed title and is identical to Bioactive Components and Health (NNEK16003U), 7.5 ECTS.</p>
Enzymology and Experimental Biochemistry (LKEK10081U), 7.5 ECTS	<p>The course was a restricted elective course on the specialisations Bio Products, Cell Physiology in the academic year 2018/19 or earlier.</p> <p>The course was a restricted elective course on the specialisation Immunology in the academic year 2015/16.</p> <p>The course was a compulsory subject element on the specialisation Applied Enzymology in the academic year 2018/19 or earlier.</p> <p>The course was offered for the last time in the academic year 2018/19.</p> <p>The course has changed title and is identical to Enzymology and Experimental Biochemistry (NPLK19004U), 7.5 ECTS.</p>
Immunology – Theoretical (SBIK10167U), 7.5 ECTS	<p>The course was a restricted elective course on the specialisations Bio Products, Cell Physiology and Applied Enzymology in the academic year 2018/19 or earlier.</p> <p>The course was offered for the last time in the academic year 2018/19.</p> <p>The course has changed title and is identical to Basic Immunology (SBIK19001U), 7.5 ECTS.</p>

<p>Immunology (SBIK10168U), 15 ECTS</p>	<p>The course was a compulsory subject element on the specialisation Immunology in the academic year 2018/19 and 2017/18.</p> <p>The course was offered for the last time in the academic year 2018/19 and a third exam is offered in the academic year 2019/20.</p> <p>In this curriculum Current and Experimental Immunology (SBIK19002U), 7.5 ECTS and Basic Immunology (SBIK19001U), 7.5 ECTS replaces the course.</p>
<p>Laboratory Animal Science category C (SVEK14001), 7.5 ECTS</p>	<p>The course was a restricted elective course in the academic year 2016/17.</p> <p>The course was offered for the last time in 2016/17.</p> <p>The course is identical to Laboratory Animal Science Function ABD (SVEK17001U), 7.5 ECTS</p>
<p>Laboratory Animal Science category C for the Biomedical Sciences (SVEK13099), 7.5 ECTS</p>	<p>The course was a restricted elective course in the academic year 2016/17.</p> <p>The course was offered for the last time in 2016/17.</p> <p>The course is identical to Laboratory Animal Science Function ABD (SVEK17001U), 7.5 ECTS</p>

Appendix 3 Description of objectives for the thesis

After completing the thesis, the student should have:

Knowledge about:

- Identifying scientific problems within the study programme's subject areas.
- Summarising a suitable combination of methodologies/theories based on international research for use in his/her work with the problem formulation.
- Discussing theories/models on the basis of an organised value system and with a high degree of independence.

Skills in/to:

- Apply and critically evaluate theories/methodologies, including their applicability and limitations.
- Assess the extent to which the production and interpretation of findings/material depend on the theory/methodology chosen and the delimitation chosen.
- Discuss academic issues arising from the thesis.
- Draw conclusions in a clear and academic manner in relation to the problem formulation and, more generally, considering the topic and the subject area.
- Discuss and communicate the academic and social significance, if any, of the thesis based on ethical principles.
- Substantiate the idea of conducting experimental work/producing own data in order to shed light on the topic as formulated in the problem formulation.
- Process data through a choice of academic analysis methods and present findings objectively and in a concise manner.
- Assess the credibility of own findings based on relevant data processing.

Competences in/to:

- Initiate and perform academic work in a research context.
- Solve complex problems and carry out development assignments in a work context.