Programme-specific Section of the Curriculum for the MSc Programme in Biochemistry at the Faculty of Science, University of Copenhagen 2009 (Rev. 2021)

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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 Biochemistry with a specialisation in Molecular Cell Biology and Immunology leads to a Master of Science (MSc) in Biochemistry with a specialisation in Molecular Cell Biology and Immunology with the Danish title: Cand.scient. (candidatus/candidata scientiarum) i biokemi med en specialisering i molekylær cellebiologi og immunologi.

The MSc Programme in Biochemistry with a specialisation in Molecular Genetics leads to a Master of Science (MSc) in Biochemistry with a specialisation in Molecular Genetics with the Danish title: Cand.scient. (candidatus/candidata scientiarum) i biokemi med en specialisering i molekylær genetik.

The MSc Programme in Biochemistry with a specialisation in Molecular Microbiology leads to a Master of Science (MSc) in Biochemistry with a specialisation in Molecular Microbiology with the Danish title: Cand.scient. (candidatus/candidata scientiarum) i biokemi med en specialisering i molekylær mikrobiologi.

The MSc Programme in Biochemistry with a specialisation in Protein Chemistry leads to a Master of Science (MSc) in Biochemistry with a specialisation in Protein Chemistry with the Danish title: Cand.scient. (candidatus/candidata scientiarum) i biokemi med en specialisering i proteinkemi.

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 Biology (biologi).

1.4 Language
The language of this MSc Programme is English.

2 Academic profile
2.1 Purpose
The MSc Programme in Biochemistry is a research-based programme that aims to provide students with competences, skills and knowledge within one of the biochemistry subject areas, with an individually chosen specialisation centred on an independent, experimental research project.

2.2 General programme profile
The student chooses one of the four different specialisations (Molecular Cell Biology and Immunology, Molecular Genetics, Molecular Microbiology, and Protein Chemistry). In addition, the student follow supplementary courses where restricted optional courses are within their specialisation and optional courses can be in other disciplines. Thus, it is possible to create an individual academic profile within one of the five broad specialisations.
Biochemistry is the key subject area of the programme. The student will be trained to critically understand, analyse and evaluate theoretical and experimental methods in biochemistry and evaluate scientific conclusions within their specialization. Both from original scientific literature and in relation to their own experiments carried out during the thesis.

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

The MSc Programme in Biochemistry consists of the following elements:
- Specialisation, 120 ECTS, including the thesis.

The student must choose one of the following specialisations:
- Molecular Cell Biology and Immunology.
- Molecular Genetics.
- Molecular Microbiology.
- Protein Chemistry.

2.4 Career opportunities
The MSc Programme in Biochemistry qualifies students to become professionals within business functions and/or areas such as:
- A PhD programme
- Within their area of specialisation, graduates will attain a high level of theoretical and experimental expertise that will qualify them to work independently, be part of a research team and manage projects at universities, biotech and pharmaceutical industry and hospitals.

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 Molecular Cell Biology and Immunology
On completion of the programme, an MSc in Biochemistry with a specialisation in Molecular Cell Biology and Immunology has acquired the following:

Knowledge about:
- Research at a high international level, including an overview of the latest research in Molecular Cell Biology and Immunology and relevant adjacent main subject areas.
- Industrial and medical applications of their subject.
- The latest research and relevant theoretical and experimental methods in Molecular Cell Biology and Immunology

Skills in/to:
- Master relevant theoretical and experimental scientific methods in Molecular Cell Biology and Immunology.
- Read and understand original biochemistry literature.
- Document the results of experiments.
- Use the subject’s main databases and relevant IT Technology.
Competences in/to:

- Formulate, structure and manage a research project.
- Develop and apply biochemical methodology to generate new knowledge.
- Generate, evaluate and analyse data, including its degree of uncertainty, potential sources of error, the relevance of the methodology used and the validity of the data.
- Organise their own work, both individually and as part of a research group.
- Manage projects in public- and private-sector institutions and companies.
- Critically read and evaluate original biochemical literature within Molecular Cell Biology and Immunology, identify scientific issues, reflect on the model solutions used and develop alternative solutions.
- Discuss the application of biochemistry research results in social, environmental and ethical contexts on the basis of academic arguments.
- Disseminate the results of their own and other people's experiments and complex problems using correct academic terminology, both orally and in writing.
- Take independent responsibility for their own academic development and specialisation.

3.2 Molecular Genetics

On completion of the programme, an MSc in Biochemistry with a specialisation in Molecular Genetics has acquired the following:

Knowledge about:

- Research at a high international level, including an overview of the latest research in Molecular Genetics and relevant adjacent main subject areas.
- Industrial and medical applications of their subject.
- The latest research and relevant theoretical and experimental methods in Molecular Genetics.

Skills in/to:

- Master relevant theoretical and experimental scientific methods in Molecular Genetics.
- Read and understand original biochemistry literature.
- Document the results of experiments.
- Use the subject’s main databases and relevant IT Technology.

Competences in/to:

- Formulate, structure and manage a research project.
- Develop and apply biochemical methodology to generate new knowledge.
- Generate, evaluate and analyse data, including its degree of uncertainty, potential sources of error, the relevance of the methodology used and the validity of the data.
- Organise their own work, both individually and as part of a research group.
- Manage projects in public- and private-sector institutions and companies.
- Critically read and evaluate original biochemical literature within Molecular Genetics, identify scientific issues, reflect on the model solutions used and develop alternative solutions.
- Discuss the application of biochemistry research results in social, environmental and ethical contexts on the basis of academic arguments.
- Disseminate the results of their own and other people's experiments and complex problems using correct academic terminology, both orally and in writing.
- Take independent responsibility for their own academic development and specialisation.
3.3 Molecular Microbiology
On completion of the programme, an MSc in Biochemistry with a specialisation in Molecular Microbiology has acquired the following:

Knowledge about:
- Research at a high international level, including an overview of the latest research in Molecular Microbiology and relevant adjacent main subject areas.
- Industrial and medical applications of their subject.
- The latest research and relevant theoretical and experimental methods in Molecular Microbiology

Skills in/to:
- Master relevant theoretical and experimental scientific methods in Molecular Microbiology.
- Read and understand original biochemistry literature.
- Document the results of experiments.
- Use the subject’s main databases and relevant IT Technology.

Competences in/to:
- Formulate, structure and manage a research project.
- Develop and apply biochemical methodology to generate new knowledge.
- Generate, evaluate and analyse data, including its degree of uncertainty, potential sources of error, the relevance of the methodology used and the validity of the data.
- Organise their own work, both individually and as part of a research group.
- Manage projects in public- and private-sector institutions and companies.
- Critically read and evaluate original biochemical literature within Molecular Microbiology, identify scientific issues, reflect on the model solutions used and develop alternative solutions.
- Discuss the application of biochemistry research results in social, environmental and ethical contexts on the basis of academic arguments.
- Disseminate the results of their own and other people's experiments and complex problems using correct academic terminology, both orally and in writing.
- Take independent responsibility for their own academic development and specialisation.

3.4 Protein Chemistry
On completion of the programme, an MSc in Biochemistry with a specialisation in Protein Chemistry has acquired the following:

Knowledge about:
- Research at a high international level, including an overview of the latest research in Protein Chemistry and relevant adjacent main subject areas.
- Industrial and medical applications of their subject.
- The latest research and relevant theoretical and experimental methods in Protein Chemistry.

Skills in/to:
- Master relevant theoretical and experimental scientific methods in Protein Chemistry.
- Read and understand original biochemistry literature.
- Document the results of experiments.
- Use the subject’s main databases and relevant IT Technology.
Competences in/to:

- Formulate, structure and manage a research project.
- Develop and apply biochemical methodology to generate new knowledge.
- Generate, evaluate and analyse data, including its degree of uncertainty, potential sources of error, the relevance of the methodology used and the validity of the data.
- Organise their own work, both individually and as part of a research group.
- Manage projects in public- and private-sector institutions and companies.
- Critically read and evaluate original biochemical literature within Protein Chemistry, identify scientific issues, reflect on the model solutions used and develop alternative solutions.
- Discuss the application of biochemistry research results in social, environmental and ethical contexts on the basis of academic arguments.
- Disseminate the results of their own and other people's experiments and complex problems using correct academic terminology, both orally and in writing.
- Take independent responsibility for their own academic development and specialisation.

4 Admission requirements
With a Bachelor’s degree in Biochemistry from the University of Copenhagen the student is granted reserved access and guaranteed a place on the MSc Programme in Biochemistry 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 closely related Bachelor’s degree
Applicants with a Bachelor’s degree in the following are directly academically qualified for admission to the MSc programme in Biochemistry:

- Applicants with a Bachelor’s degree in Biochemistry, Molecular Biomedicine or Nanoscience from the University of Copenhagen.
- Applicants with a Bachelor’s degree in Biotechnology or Molecular Biology from Aarhus University.

4.2 Applicants with a Bachelor’s degree within the field of Science
Applicants with one of the following:
- Bachelor’s degree in Biochemistry and Molecular Biology from the University of Southern Denmark
- Bachelor’s degree in Molecular Biology from Roskilde University
- Bachelor’s degree from the Faculty of Science, University of Copenhagen
- Bachelor's degree from a Danish, Nordic or international university

may also be admitted if their programme includes the following:

- A minimum of 60 ECTS within chemistry and biochemistry/molecular biology of which a minimum of 30 ECTS must be in chemistry and 22.5 ECTS in biochemistry/molecular biology.
- In total, the applicant must have a minimum of 30 ECTS that stem from courses with experimental laboratory exercises.

Subject elements in protein chemistry or biophysical chemistry may be counted either as chemistry or biochemistry/molecular biology.
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 programme are assessed exclusively on the basis of the qualifying bachelor’s degree. Supplementary subject elements passed between the completion of the bachelor’s programme and the admission to the MSc programme cannot be included in the overall assessment.

However, subject elements passed before the completion of the bachelor’s programme 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 programme. 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 (§12-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 Biochemistry 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 (all criteria apply):

- Applicant’s total number of ECTS in the areas metabolism, enzymology, protein science, cell biology, organic chemistry and physical chemistry and documented laboratory experience.
- Applicants ranked according to grades achieved in the areas concerned. If different grading systems make comparison impossible, applicants will be prioritised on the basis of an individual evaluation by the Admission Committee.
- Applicants with a Bachelor’s degree age of more than 5 years have low priority.

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).

Before the beginning of the MSc Programme the student must choose a specialisation.
6.1 Molecular Cell Biology and Immunology
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

6.1.1 Compulsory subject elements
All of the following subject elements are to be covered (22.5 ECTS):

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Title</th>
<th>Block</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>NBIK20003U</td>
<td>Principal Subject in Molecular Cell Biology and Immunology</td>
<td>Block 1+2</td>
<td>15 ECTS</td>
</tr>
<tr>
<td>NBIK13014U</td>
<td>Major Subject Project</td>
<td>Block 4</td>
<td>7.5 ECTS</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Title</th>
<th>Block</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>NBIK15006U</td>
<td>Advanced Cell Biology</td>
<td>Block 1</td>
<td>7.5 ECTS</td>
</tr>
<tr>
<td>NBIK10015U</td>
<td>Cell Cycle Control and Cancer</td>
<td>Block 1</td>
<td>7.5 ECTS</td>
</tr>
<tr>
<td>NBIK10017U</td>
<td>RNA Biology</td>
<td>Block 1</td>
<td>7.5 ECTS</td>
</tr>
<tr>
<td>NBIK15009U</td>
<td>Cellular Signalling in Health and Disease</td>
<td>Block 2</td>
<td>7.5 ECTS</td>
</tr>
<tr>
<td>NBIK10020U</td>
<td>Developmental Biology</td>
<td>Block 2</td>
<td>7.5 ECTS</td>
</tr>
<tr>
<td>NBIK14034U</td>
<td>Molecular Neurobiology</td>
<td>Block 2</td>
<td>7.5 ECTS</td>
</tr>
<tr>
<td>NBIK15010U</td>
<td>Epigenetics and Cell Differentiation</td>
<td>Block 2</td>
<td>7.5 ECTS</td>
</tr>
<tr>
<td>NBIA08004U</td>
<td>Evolutionary Medicine</td>
<td>Block 3</td>
<td>7.5 ECTS</td>
</tr>
<tr>
<td>SMOK14003U</td>
<td>Chronic Inflammation. From Basic Research to Therapy</td>
<td>Block 3</td>
<td>7.5 ECTS</td>
</tr>
<tr>
<td>NBIK20005U</td>
<td>Cellular and Integrative Physiology</td>
<td>Block 3</td>
<td>7.5 ECTS</td>
</tr>
<tr>
<td>NBIK13017U</td>
<td>Molecular Biotechnology</td>
<td>Block 4</td>
<td>7.5 ECTS</td>
</tr>
</tbody>
</table>

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 be included in the elective section of the programme with 7.5 ECTS. Thesis preparation projects may not exceed 7.5 ECTS in total of the programme. The regulations are described in Appendix 6 to the shared section of the curriculum.

Projects outside the course scope, projects in practice and thesis preparation projects may not exceed 45 ECTS of the programme.
6.1.4 Thesis
The MSc Programme in Biochemistry with a specialisation in Molecular Cell Biology and Immunology 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 in the MSc Programme in Biochemistry with a specialisation in Molecular Cell Biology and Immunology is placed in block 3+4 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.

6.2 Molecular Genetics
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

6.2.1 Compulsory subject elements
All of the following subject elements are to be covered (22.5 ECTS):

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject Name</th>
<th>Block</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>NBIK20002U</td>
<td>Principal Subject in Molecular Genetics</td>
<td>1+2</td>
<td>15</td>
</tr>
<tr>
<td>NBIK13014U</td>
<td>Major Subject Project</td>
<td>4</td>
<td>7.5</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject Name</th>
<th>Block</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>NBIK15017U</td>
<td>Theoretical Molecular Genetics</td>
<td>1</td>
<td>7.5</td>
</tr>
<tr>
<td>NBIK15011U</td>
<td>Experimental Molecular Genetics</td>
<td>1</td>
<td>7.5</td>
</tr>
<tr>
<td>NBIK10017U</td>
<td>RNA Biology</td>
<td>1</td>
<td>7.5</td>
</tr>
<tr>
<td>NBIK10015U</td>
<td>Cell Cycle Control and Cancer</td>
<td>1</td>
<td>7.5</td>
</tr>
<tr>
<td>NBIK10020U</td>
<td>Developmental Biology</td>
<td>2</td>
<td>7.5</td>
</tr>
<tr>
<td>NBIK15013U</td>
<td>Genome Sequence Analysis</td>
<td>2</td>
<td>7.5</td>
</tr>
<tr>
<td>NBIK13005U</td>
<td>Experimental Higher Model Organisms</td>
<td>2</td>
<td>7.5</td>
</tr>
<tr>
<td>NBIK15010U</td>
<td>Epigenetics and Cell Differentiation</td>
<td>2</td>
<td>7.5</td>
</tr>
<tr>
<td>NBIK15014U</td>
<td>Human Genetics</td>
<td>3</td>
<td>7.5</td>
</tr>
<tr>
<td>NBIA09043U</td>
<td>Population Genetics</td>
<td>3</td>
<td>7.5</td>
</tr>
<tr>
<td>LBIK10207U</td>
<td>Synthetic Biology</td>
<td>3</td>
<td>7.5</td>
</tr>
<tr>
<td>NBIK13017U</td>
<td>Molecular Biotechnology</td>
<td>4</td>
<td>7.5</td>
</tr>
<tr>
<td></td>
<td>Thesis Preparation Project</td>
<td>4</td>
<td>7.5</td>
</tr>
<tr>
<td>SGBK20010U</td>
<td>Forensic Geobiology</td>
<td>5</td>
<td>7.5</td>
</tr>
</tbody>
</table>

6.2.3 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 be included in the elective section of the programme with 7.5 ECTS. Thesis preparation projects may not exceed 7.5 ECTS in total of the programme. The regulations are described in Appendix 6 to the shared section of the curriculum.

Projects outside the course scope, projects in practice and thesis preparation projects may not exceed 45 ECTS of the programme.

6.2.4 Thesis
The MSc Programme in Biochemistry with a specialisation in Molecular Genetics 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.

6.2.5 Academic mobility
The curriculum makes it possible to follow subject elements outside the Faculty of Science.

For students admitted in September the academic mobility in the MSc Programme in Biochemistry with a specialisation in Molecular Genetics is placed in block 3+4 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.

6.3 Molecular Microbiology
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

6.3.1 Compulsory subject elements
All of the following subject elements are to be covered (22.5 ECTS):

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject Name</th>
<th>Block</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>NBIK20000U</td>
<td>Principal Subject in Molecular Microbiology</td>
<td>1+2</td>
<td>15</td>
</tr>
<tr>
<td>NBIK13014U</td>
<td>Major Subject Project</td>
<td>4</td>
<td>7.5</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject Name</th>
<th>Block</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>NBIK15003U</td>
<td>Advanced Bacteriology 1</td>
<td>1</td>
<td>7.5</td>
</tr>
<tr>
<td>NBIA05008U</td>
<td>Biological Sequence Analysis</td>
<td>1</td>
<td>7.5</td>
</tr>
</tbody>
</table>
6.3.3 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 be included in the elective section of the programme with 7.5 ECTS. Thesis preparation projects may not exceed 7.5 ECTS in total of the programme. The regulations are described in Appendix 6 to the shared section of the curriculum.

Projects outside the course scope, projects in practice and thesis preparation projects may not exceed 45 ECTS of the programme.

6.3.4 Thesis
The MSc Programme in Biochemistry with a specialisation in Molecular Microbiology 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.

6.3.5 Academic mobility
The curriculum makes it possible to follow subject elements outside the Faculty of Science.

For students admitted in September the academic mobility in the MSc Programme in Biochemistry with a specialisation in Molecular Microbiology is placed in block 3+4 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.

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

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Block</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>NBIK15016U</td>
<td>The Human Microbiome</td>
<td>Block 1</td>
<td>7.5</td>
</tr>
<tr>
<td>NBIK15005U</td>
<td>Advanced Bacteriology 2</td>
<td>Block 2</td>
<td>7.5</td>
</tr>
<tr>
<td>LLFK10219U</td>
<td>Control of Foodborne Microorganism</td>
<td>Block 2</td>
<td>7.5</td>
</tr>
<tr>
<td>NBIK15013U</td>
<td>Genome Sequence Analysis</td>
<td>Block 2</td>
<td>7.5</td>
</tr>
<tr>
<td>NBIK14035U</td>
<td>Medical Bacteriology</td>
<td>Block 3</td>
<td>7.5</td>
</tr>
<tr>
<td>LBK10136U</td>
<td>Heterologous Expression</td>
<td>Block 3</td>
<td>15</td>
</tr>
<tr>
<td>NBIK16003U</td>
<td>Marine Microbiology and Virology</td>
<td>Block 3</td>
<td>7.5</td>
</tr>
<tr>
<td>NBIK13017U</td>
<td>Molecular Biotechnology</td>
<td>Block 4</td>
<td>7.5</td>
</tr>
<tr>
<td>NBIK16000U</td>
<td>The Human Microbiome - Experiments</td>
<td>Block 4</td>
<td>7.5</td>
</tr>
<tr>
<td></td>
<td>Thesis Preparation Project</td>
<td>Block 4</td>
<td>7.5</td>
</tr>
</tbody>
</table>
- Compulsory subject elements, 22.5 ECTS
- Restricted elective subject elements, 22.5 ECTS
- Elective subject elements, 15 ECTS
- Thesis, 60 ECTS

6.4.1 Compulsory subject elements

All of the following subject elements are to be covered (22.5 ECTS):

<table>
<thead>
<tr>
<th>Code</th>
<th>Subject</th>
<th>Block</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>NBIK20001U</td>
<td>Principal Subject in Protein Chemistry</td>
<td>1+2</td>
<td>15</td>
</tr>
<tr>
<td>NBIK13014U</td>
<td>Major Subject Project</td>
<td>4</td>
<td>7.5</td>
</tr>
</tbody>
</table>

6.4.2 Restricted elective subject elements

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

<table>
<thead>
<tr>
<th>Code</th>
<th>Subject</th>
<th>Block</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>NKEK14015U</td>
<td>The Chemistry of Metal Ions in Biological Systems</td>
<td>1</td>
<td>7.5</td>
</tr>
<tr>
<td>NBIK19000U</td>
<td>Protein Research Lab</td>
<td>1</td>
<td>7.5</td>
</tr>
<tr>
<td>NKEA06015U</td>
<td>Crystallography</td>
<td>2</td>
<td>7.5</td>
</tr>
<tr>
<td>NBIA05014U</td>
<td>Structural Bioinformatics</td>
<td>2</td>
<td>7.5</td>
</tr>
<tr>
<td>NBIK16001U</td>
<td>NMR Spectroscopy</td>
<td>2</td>
<td>7.5</td>
</tr>
<tr>
<td>NBIK10023U</td>
<td>Advanced Protein Science 1 – Protein Interactions and Sequences</td>
<td>3</td>
<td>7.5</td>
</tr>
<tr>
<td>NFYK14039U</td>
<td>Radioactive Isotopes and Ionizing Radiation</td>
<td>3</td>
<td>7.5</td>
</tr>
<tr>
<td>NBIK10024U</td>
<td>Advanced Protein Science 2 – Protein Structure Determination</td>
<td>4</td>
<td>7.5</td>
</tr>
<tr>
<td>NBIK13017U</td>
<td>Molecular Biotechnology</td>
<td>4</td>
<td>7.5</td>
</tr>
</tbody>
</table>

6.4.3 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 be included in the elective section of the programme with 7.5 ECTS. Thesis preparation projects may not exceed 7.5 ECTS in total of the programme. The regulations are described in Appendix 6 to the shared section of the curriculum.

Projects outside the course scope, projects in practice and thesis preparation projects may not exceed 45 ECTS of the programme.

6.4.4 Thesis

The MSc Programme in Biochemistry with a specialisation in Protein Chemistry 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.
6.4.5 Academic mobility

The curriculum makes it possible to follow subject elements outside the Faculty of Science.

For students admitted in September the academic mobility in the MSc Programme in Biochemistry with a specialisation in Protein Chemistry is placed in block 3+4 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
Tables for students admitted to the programme in September (summer):

### Table – Molecular Cell Biology and Immunology

<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>Principal Subject in Molecular Cell Biology and Immunology</td>
<td>Restricted elective</td>
<td>Restricted elective</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Elective</td>
<td>Elective</td>
<td>Restricted elective</td>
<td>Major Subject Project</td>
</tr>
<tr>
<td>2nd year</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Thesis</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- 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 – Molecular Genetics

<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>Principal Subject in Molecular Genetics</td>
<td>Restricted elective</td>
<td>Restricted elective</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Elective</td>
<td>Elective</td>
<td>Restricted elective</td>
<td>Major Subject Project</td>
</tr>
<tr>
<td>2nd year</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Thesis</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- 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 – Molecular Microbiology

<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>Principal Subject in Molecular Microbiology</td>
<td>Restricted elective</td>
<td>Restricted elective</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Elective</td>
<td>Elective</td>
<td>Restricted elective</td>
<td>Major Subject Project</td>
</tr>
<tr>
<td>2nd year</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Thesis</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- 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 – Protein Chemistry

<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></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Principal Subject in Protein Chemistry</td>
<td></td>
<td></td>
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<tr>
<td>Elective</td>
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<td>Elective</td>
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<td>Elective</td>
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<tr>
<td>Elective</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2nd year</td>
<td>Thesis</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Compulsory | Restricted elective | Elective

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

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

#### Table– Molecular Cell Biology and Immunology*

<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></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elective</td>
<td></td>
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<tr>
<td>Elective</td>
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<tr>
<td>Elective</td>
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<tr>
<td>Elective</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2nd year</td>
<td>Thesis</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Compulsory | Restricted elective | Elective

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

#### Table– Molecular Genetics*

<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></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elective</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Elective</td>
<td></td>
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<tr>
<td>Elective</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Elective</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2nd year</td>
<td>Thesis</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Compulsory | Restricted elective | Elective

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

<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>Elective</td>
<td>Restricted elective</td>
<td><strong>Principal Subject in Molecular Microbiology</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Elective</td>
<td>Restricted elective</td>
<td>Major Subject Project</td>
<td>Restricted elective</td>
</tr>
<tr>
<td>2nd year</td>
<td></td>
<td></td>
<td></td>
<td><strong>Thesis</strong></td>
</tr>
</tbody>
</table>

- 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).

### Table – Protein Chemistry*

<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>Elective</td>
<td>Restricted elective</td>
<td><strong>Principal Subject in Protein Chemistry</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Elective</td>
<td>Restricted elective</td>
<td>Major Subject Project</td>
<td>Restricted elective</td>
</tr>
<tr>
<td>2nd year</td>
<td></td>
<td></td>
<td></td>
<td><strong>Thesis</strong></td>
</tr>
</tbody>
</table>

- 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 Revision History for Competence Profiles at SCIENCE.

1 General changes for students admitted in the academic year 2019/20 or 2018/19

Students admitted to the MSc Programme in the academic year 2019/20 or 2018/19 must finish the programme as listed in the curriculum above with the following exceptions

1.1 Molecular Cell Biology and Immunology

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– Molecular Cell Biology and Immunology (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><strong>1st year</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Principal Subject in Molecular Cell Biology and Immunology 1</td>
<td>Principal Subject in Molecular Cell Biology and Immunology 2 (NB1K18003U)</td>
<td>Restricted elective</td>
<td>Principal Subject in Molecular Cell Biology and Immunology 3 (NB1K18004U)</td>
</tr>
<tr>
<td>Elective</td>
<td>Elective</td>
<td>Restricted elective</td>
<td>Major Subject Project</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Block 3</th>
<th>Block 4</th>
<th>Block 1</th>
<th>Block 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2nd year</strong></td>
<td>Thesis</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table– Molecular Cell Biology and Immunology* (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><strong>1st year</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Principal Subject in Molecular Cell Biology and Immunology 1</td>
<td>Restricted elective</td>
<td>Principal Subject in Molecular Cell Biology and Immunology 2 (NB1K18003U)</td>
<td>Principal Subject in Molecular Cell Biology and Immunology 3 (NB1K18004U)</td>
</tr>
<tr>
<td>Elective</td>
<td>Elective</td>
<td>Restricted elective</td>
<td>Major Subject Project</td>
</tr>
</tbody>
</table>

Legend: ☐ Compulsory ☐ Restrictive elective ☐ Elective

The table illustrates the recommended academic progression. The student is allowed to plan an alternative progression within the applicable rules.
### Restricted elective subject elements

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

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject</th>
<th>Block</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>NBIK15006U</td>
<td>Advanced Cell Biology</td>
<td>Block 1</td>
<td>7.5</td>
</tr>
<tr>
<td>NBIK10015U</td>
<td>Cell Cycle Control and Cancer</td>
<td>Block 1</td>
<td>7.5</td>
</tr>
<tr>
<td>NBIK10017U</td>
<td>RNA Biology</td>
<td>Block 1</td>
<td>7.5</td>
</tr>
<tr>
<td>NBIK15009U</td>
<td>Cellular Signalling in Health and Disease</td>
<td>Block 2</td>
<td>7.5</td>
</tr>
<tr>
<td>NBIK10020U</td>
<td>Developmental Biology</td>
<td>Block 2</td>
<td>7.5</td>
</tr>
<tr>
<td>NBIK14034U</td>
<td>Molecular Neurobiology</td>
<td>Block 2</td>
<td>7.5</td>
</tr>
<tr>
<td>NBIK15010U</td>
<td>Epigenetics and Cell Differentation</td>
<td>Block 2</td>
<td>7.5</td>
</tr>
<tr>
<td>NBIA08004U</td>
<td>Evolutionary Medicine</td>
<td>Block 3</td>
<td>7.5</td>
</tr>
<tr>
<td>SMOK14003U</td>
<td>Chronic Inflammation. From Basic Research to Therapy</td>
<td>Block 3</td>
<td>7.5</td>
</tr>
<tr>
<td>NBIK20005U</td>
<td>Cellular and Integrative Physiology</td>
<td>Block 3</td>
<td>7.5</td>
</tr>
<tr>
<td>NBIK13017U</td>
<td>Molecular Biotechnology</td>
<td>Block 4</td>
<td>7.5</td>
</tr>
</tbody>
</table>

### 1.2 Molecular Genetics

#### 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 – Molecular Genetics (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><strong>1st year</strong></td>
<td><strong>Principal Subject in Molecular Genetics 1</strong></td>
<td><strong>Principal Subject in Molecular Genetics 2</strong> (NBIA09015U)</td>
<td>Restricted elective</td>
<td>Principal Subject in Molecular Genetics 3 (NBIA09016U)</td>
</tr>
<tr>
<td></td>
<td>Elective</td>
<td>Elective</td>
<td>Restricted elective</td>
<td>Major Subject Project</td>
</tr>
<tr>
<td><strong>2nd year</strong></td>
<td></td>
<td></td>
<td>Thesis</td>
<td></td>
</tr>
</tbody>
</table>

### Table – Molecular Genetics (winter)*

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

- NBIK15017U Theoretical Molecular Genetics Block 1 7.5 ECTS
- NBIK15011U Experimental Molecular Genetics Block 1 7.5 ECTS
- NBIK10017U RNA Biology Block 1 7.5 ECTS
- NBIK10015U Cell Cycle Control and Cancer Block 1 7.5 ECTS
- NBIK10020U Developmental Biology Block 2 7.5 ECTS
- NBIK15013U Genome Sequence Analysis Block 2 7.5 ECTS
- NBIK13005U Experimental Higher Model Organisms Block 2 7.5 ECTS
- NBIK15010U Epigenetics and Cell Differentiation Block 2 7.5 ECTS
- NBIK15014U Human Genetics Block 3 7.5 ECTS
- NBIA09043U Population Genetics Block 3 7.5 ECTS
- LBIK10207U Synthetic Biology Block 3 7.5 ECTS
- NBIK13017U Molecular Biotechnology Block 4 7.5 ECTS
- SGBK20010U Forensic Geobiology Block 5 7.5 ECTS
- NBIK14020U Archaea Biology Discontinued* 7.5 ECTS

### 1.3 Molecular Microbiology

**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 – Molecular Microbiology (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><em>Principal Subject in Molecular Microbiology 1</em></td>
<td><em>Principal Subject in Molecular Microbiology 2 (NBIA09018U)</em></td>
<td>Restricted elective</td>
<td><em>Principal Subject in Molecular Microbiology 3 (NBIA09013U)</em></td>
</tr>
<tr>
<td></td>
<td>Restricted elective</td>
<td>Elective</td>
<td>Elective</td>
<td>Major Subject Project</td>
</tr>
</tbody>
</table>
The table illustrates the recommended academic progression. The student is allowed to plan an alternative progression within the applicable rules.

**Table – Molecular Microbiology* (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>Restricted elective</td>
<td><em>Principal Subject in Molecular Microbiology 1</em></td>
<td>Principal Subject in Molecular Microbiology 2 (NBIA09018U)</td>
</tr>
<tr>
<td>Elective</td>
<td>Elective</td>
<td>Major Subject Project</td>
<td>Principal Subject in Molecular Microbiology 3 (NBIA09013U)</td>
</tr>
</tbody>
</table>

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**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Block</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>NBIK15003U</td>
<td>Advanced Bacteriology 1</td>
<td>Block 1</td>
<td>7.5</td>
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<tr>
<td>NBIA05008U</td>
<td>Biological Sequence Analysis</td>
<td>Block 1</td>
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<tr>
<td>NBIK15016U</td>
<td>The Human Microbiome</td>
<td>Block 1</td>
<td>7.5</td>
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<tr>
<td>NBIK15005U</td>
<td>Advanced Bacteriology 2</td>
<td>Block 2</td>
<td>7.5</td>
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<tr>
<td>LLEK10219U</td>
<td>Control of Foodborne Microorganism</td>
<td>Block 2</td>
<td>7.5</td>
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<td>NBIK15013U</td>
<td>Genome Sequence Analysis</td>
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<td>NBIK14035U</td>
<td>Medical Bacteriology</td>
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<td>LBIK10136U</td>
<td>Heterologous Expression</td>
<td>Block 3</td>
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<td>NBIK16003U</td>
<td>Marine Microbiology and Virology</td>
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<td>NBIK13017U</td>
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<td>7.5</td>
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<tr>
<td>NBIK16000U</td>
<td>The Human Microbiome - Experiments</td>
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<tr>
<td>NBIK14020U</td>
<td>Archaea Biology</td>
<td>Discontinued*</td>
<td>7.5</td>
</tr>
</tbody>
</table>

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

1.4 Protein Chemistry

**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 – Protein Chemistry (summer)

<table>
<thead>
<tr>
<th></th>
<th>Block 1</th>
<th>Block 2</th>
<th>Block 3</th>
<th>Block 4</th>
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<tr>
<td><strong>1st year</strong></td>
<td><strong>Principal Subject in Protein Chemistry 1</strong></td>
<td>Restricted elective</td>
<td>Principal Subject in Protein Chemistry 2 (NBIA09021U)</td>
<td>Principal Subject in Protein Chemistry 3 (NBIA09022U)</td>
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<td>Elective</td>
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<td>Restricted elective</td>
<td>Major Subject Project</td>
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<tr>
<td><strong>2nd year</strong></td>
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</tr>
<tr>
<td></td>
<td>Thesis</td>
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</table>

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

### Table – Protein Chemistry* (winter)

<table>
<thead>
<tr>
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<th>Block 4</th>
<th>Block 1</th>
<th>Block 2</th>
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<td><strong>1st year</strong></td>
<td><strong>Principal Subject in Protein Chemistry 1</strong></td>
<td>Restricted elective</td>
<td>Principal Subject in Protein Chemistry 2 (NBIA09021U)</td>
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<td>Restricted elective</td>
<td>Major Subject Project</td>
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<td><strong>2nd year</strong></td>
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</tr>
<tr>
<td></td>
<td>Thesis</td>
<td></td>
<td></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

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

- NKEK14015U The Chemistry of Metal Ions in Biological Systems Block 1 7.5 ECTS
- NKEA06015U Crystallography - MSc Block 2 7.5 ECTS
- NBIA05014U Structural Bioinformatics Block 2 7.5 ECTS
- NBIK16001U NMR Spectroscopy Block 2 7.5 ECTS
- NBIK10023U Advanced Protein Science 1 – Protein Interactions and Sequences Block 3 7.5 ECTS
- NFYK14039U Radioactive Isotopes and Ionizing Radiation Block 3 7.5 ECTS
- NBIK10024U Advanced Protein Science 2 – Protein Structure Determination Block 4 7.5 ECTS
- NBIK13017U Molecular Biotechnology Block 4 7.5 ECTS
- NKEK12006U Surface Physical Chemistry Discontinued* 7.5 ECTS

* See course specific changes below. The course was restricted elective in the academic year 2018/19 and not in 2019/20.
## 2 Course specific changes

<table>
<thead>
<tr>
<th>Discontinued course</th>
<th>Interim arrangement</th>
</tr>
</thead>
</table>
| **Archaea Biology (NBIK14020U), 7.5 ECTS** | The course was restricted elective on the specialisation in Molecular Genetics and Molecular Microbiology in the academic year 2018/19 and 2019/20.  
Offered for the last time: 2019/20  
Last exam if applicable (cf. SCIENCE's Teaching and exam rules): 2020/21 |
| **Principal Subject in Molecular Cell Biology and Immunology 1 (NBIK18002U), 7.5 ECTS** | The course was compulsory on the specialisation in Molecular Biology and Immunology in the academic year 2019/20 and 2018/19.  
Offered for the last time: 2019/20  
In this curriculum, Principal Subject in Molecular Cell Biology and Immunology (NBIK20003U), 15 ECTS replaces the course if both Principal Subject in Molecular Cell Biology and Immunology 1 and 2 are not passed. |
| **Principal Subject in Molecular Genetics 1 (NBIA09014U), 7.5 ECTS** | The course was a compulsory course on the specialisation in Molecular Genetics in the academic year 2019/20 and 2018/19.  
Offered for the last time: 2019/20  
If both Principal Subject in Molecular Genetics 1 and 2 are not passed: In this curriculum, Principal Subject in Molecular Genetics (NBIK20002U), 15 ECTS replaces the two courses. |
| **Principal Subject in Molecular Microbiology 1 (NBIA09011U), 7.5 ECTS** | The course was a compulsory course on the specialisation in Molecular Microbiology in the academic year 2019/20 and 2018/19.  
Offered for the last time: 2019/20  
If both Principal Subject in Molecular Microbiology 1 and 2 are not passed: In this curriculum, Principal Subject in Molecular Microbiology (NBIK20000U), 15 ECTS replaces the two courses |
| **Principal Subject in Protein Chemistry 1 (NBIK09021U), 7.5 ECTS** | The course was a compulsory course on the specialisation in Protein Chemistry in the academic year 2019/20 and 2018/19.  
Offered for the last time: 2019/20  
If both Principal Subject in Protein Chemistry 1 and 2 are not passed: In this curriculum, Principal Subject in Protein Chemistry (NBIK20001U), 15 ECTS replaces the two courses |
| Surface Physical Chemistry (NKEK12006U), 7.5 ECTS | The course was a restricted elective course on the specialisation in Protein Chemistry in the academic year 2018/19.

Offered for the last time: 2018/19
Last exam if applicable (cf. SCIENCE's Teaching and exam rules): 2019/20. |
Appendix 3 Description of objectives for the thesis

After completing the thesis, the student should have:

Knowledge about:
- Theory and methods (experimentally and theoretically) within biochemistry and the selected specialisation (Molecular Cell Biology and Immunology, Molecular Genetics, Molecular Microbiology or Protein Chemistry).
- The strength and limitations of a broad range of experimental methods in biochemistry and chemistry.
- Formulation and analysis of problems.

Skills in/to:
- Define a professionally defined issue of biochemical relevance.
- Handle model organisms scientifically and safely.
- Select appropriate theories and methods to address one or more issues in a given academic frame within one or more selected fields (Molecular Cell Biology and Immunology, Molecular Genetics, Molecular Microbiology or Protein Chemistry).
- Communicate an issue clearly and manageable in a biochemical scientific context - both in writing and orally - to the appropriate audience using sound professional biochemical terminology.
- Organize and carrying out a major experimental work.
- Select and use a wide range of different methods and in silico analyses and equipment relevant to the experimental biochemical, chemical and biological analysis from their practical laboratory experience and within a given academic frame of one or more selected fields (Molecular Cell Biology and Immunology, Molecular Genetics, Molecular Microbiology or Protein Chemistry).
- Work on personal experimental data of biochemical, biological, or chemical in nature, exhaustively.
- Comply with applicable standards and regulations for laboratory work.
- Use standard and specialized software as well as modern information technology for biochemical work.
- Journalize own laboratory work in a level of detail so that others have the opportunity to recreate results.

Competences in/to:
- Implement a research-oriented project independently.
- Analyse, interpret and compare their own and others' experimental data from the underlying biochemical, biological and chemical Principals.
- Put their own results in scientific biochemical, biological and chemical relevant context.
- Discuss their own data generation and relate their own data to other people's data within the given academic frame of one or more selected fields (Molecular Cell Biology and Immunology, Molecular Genetics, Molecular Microbiology or Protein Chemistry).
- Critically assess the quality, relevance and probability of their own and others' data.
- Independently develop their knowledge and skills related to biochemistry, chemistry and biology.
- Assess the safety and environmental aspects of the biochemical, biological and chemical work.