



**Karolinska
Institutet**

Programme syllabus for

Bachelor's Programme in Biomedicine, 180 credits

Kandidatprogrammet i biomedicin, 180 hp

Basic programme information

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|-----------------------------------|---|
| Programme code | 1BI17 |
| Name of the programme | Bachelor's Programme in Biomedicine |
| Number of credits | 180.0 credits (180.0 ECTS credits) |
| Starting date | The syllabus applies to students who commence their studies in or after autumn 2017. |
| | Approved revisions of the syllabus are described under the heading Transitional Provisions. |
| Decision date | 2016-04-14 |
| Decided by | Board of Higher Education |
| Last revision | 2021-11-10 |
| Revised by | Committee for Higher Education |
| Reference number | 3-4795/2021 |
| Specific eligibility requirements | General eligibility (with exemption from Swedish language proficiency) and Biology 2, Chemistry 2, Mathematics 4 or Mathematics D, English 6. |
| Main field of study | Biomedicine |
| Qualification | Medicine kandidatexamen med huvudområdet biomedicin <i>Degree of Bachelor of Medical Science with a Major in Biomedicine</i> |
| | A student who fulfils the requirements for the award of a qualification shall, upon request, be provided with a certificate. |

Outcomes

Outcomes of first cycle education according to the Higher Education Act

First-cycle courses and study programmes shall be based fundamentally on the knowledge acquired by pupils in national study programmes in the upper-secondary schools or its equivalent. The Government may, however, permit exceptions for courses and study programmes in the fine, applied or performing arts.

First-cycle courses and study programmes shall develop:

- the ability of students to make independent and critical assessments
- the ability of students to identify, formulate and solve problems autonomously, and
- the preparedness of students to deal with changes in working life.

In addition to knowledge and skills in their field of study, students shall develop the ability to:

- gather and interpret information at a scholarly level
- stay abreast of the development of knowledge, and
- communicate their knowledge to others, including those who lack specialist knowledge in the field.

Outcomes of the Degree of Bachelor according to the Higher Education Ordinance

Knowledge and understanding

For a Degree of Bachelor of Science student shall

- demonstrate knowledge and understanding in the main field of study, including knowledge of the disciplinary foundation of the field, understanding of applicable methodologies in the field, specialised study in some aspect of the field as well as awareness of current research issues.

Competence and skills

For a Degree of Bachelor of Science student shall

- demonstrate the ability to search for, gather, evaluate and critically interpret the relevant information for a formulated problem and also discuss phenomena, issues and situations critically
- demonstrate the ability to identify, formulate and solve problems autonomously and to complete tasks within predetermined time frames
- demonstrate the ability to present and discuss information, problems and solutions in speech and writing and in dialogue with different audiences, and
- demonstrate the skills required to work autonomously in the main field of study.

Judgment and approach

For a Degree of Bachelor of Science student shall

- demonstrate the ability to make assessments in the main field of study informed by relevant disciplinary, social and ethical issues
- demonstrate insight into the role of knowledge in society and the responsibility of the individual for how it is used, and
- demonstrate the ability to identify the need for further knowledge and ongoing learning.

Outcomes of the study programme at Karolinska Institutet

In addition to the national objectives, the following objectives apply for the study programme at Karolinska Institutet:

Knowledge and understanding

After completion of the degree programme the student shall

- demonstrate general knowledge of molecular and cellular processes which regulate human physiology, based on extensive scientific knowledge,
- demonstrate general knowledge of pathological molecular and cellular processes and their link with genes, the environment and diseases amongst people,
- demonstrate general knowledge of biomedically relevant experimental methods within the degree programme's subject areas, including the theoretical backgrounds of the methods, their executions, applications and limitations in addition to necessary precautionary measures.

Competence and skills

After completion of the degree programme the student shall

- demonstrate the capability, individually and in collaboration, to plan and carry out studies and experiments within the field of biomedicine, and to document and analyse observations,
- demonstrate knowledge of how to apply for relevant permits and grants to carry out studies within the field of biomedicine,
- demonstrate the capability to search for, analyse and summarise scientific information within the field of biomedicine,
- demonstrate the capability of using basic statistical methods and to be aware of other mathematical methods that may be used within fields of biomedicine and bioinformatics.
- demonstrate the capability, both orally and in writing, to report on biomedical problems/projects for both the general public and experts.

Judgement and approach

After completion of the degree programme the student shall

- demonstrate insight into research ethics and the ethical aspects of human and animal research, as well as respect for the integrity of patients, and
- demonstrate the capability to evaluate information and to relate it to established knowledge within the field of biomedicine.

Content and structure

During the first year of the degree programme the students are introduced to the main field of study and take courses in chemistry and cellular- and molecular biology which lay the foundation for subsequent courses. The second year is focused on how the human body functions in health and disease, primarily in a molecular perspective, and is completed with an introduction to how the life science industry operates. The first two years of studies lay a solid foundation for the courses in molecular medicine during the third year, as well as for the degree project. During the courses in molecular medicine the content of the preceding courses is integrated with medicine and pathology content, which leads to a stronger focus on translational medicine.

Scientific knowledge, competence and approach

The degree programme provides a broad theoretical knowledge within the main field of study with focus on methods and findings in the front of research. During the programme the students are trained to search and critically examine information and discuss both research ethics and the ethical aspects of research. Practical knowledge is an essential component of the entire programme through laboratory work. The individual degree project focuses on the scientific methodology and analysis as well as oral and written presentation.

Practice Integrated Learning

Practice integrated learning is a generic term for the pedagogical models based on collaboration and integration between higher education and working life. Practice integrated learning may take the form of placements, study visits, observing teaching activities, staff exchange training schemes or field studies within in-patient and out-patient healthcare, social care or other relevant activities.

The degree programme is for most of the part carried out in an academic environment with research-active teachers and practical training at research laboratories. A number of courses on the programme include study visits to potential future workplaces such as life science companies and research institutes. During the degree programme, representatives from various work places are invited to courses to talk about possible career paths and how it is to work within the academia, companies and organizations. The degree project is carried out within a research field of choice in the field of biomedicine, performed in an academic setting or in the life science industry, in Sweden or abroad.

Internationalisation

Biomedicine is an international subject and the students therefore have to be prepared for work in an international arena. The programme accepts both national and international students and the teachers on the programme have an international background and/or experience. The multicultural classroom is seen as a vital asset for the programme that facilitates discussions on the multinational/multicultural aspects of the subject areas included in the programme. Global health aspects are included in relevant courses during the programme. The students are given the option to go on exchange studies at research-intensive universities in the world during their education.

Elective courses

In order to facilitate exchange studies during semester 6 there is the possibility, for those undertaking exchange studies at a partner university requiring the students to also take courses, to combine a shorter degree project with one or more elective courses in a total of 7.5 credits.

Transitional provisions

For students admitted in 2021 or earlier, the specific eligibility requirements were written as follows: *General requirements (with exemption from Swedish proficiency) and Biology 2, Chemistry 2, Mathematics 4.*

Or: Biology B, Chemistry B, Mathematics D. And proficiency in English equivalent to English 6/English B.

Other guidelines

Grading scale

The grades used are Fail, Pass or Pass with Distinction. Alternative grading scales may apply to elective courses or cross-programme courses. The grading scale is detailed in the course syllabus.

Language of instruction

The teaching language is English.

Specific eligibility requirements within the programme

There are specific eligibility requirements for the courses within the programme. The eligibility

requirements can be found in the syllabi. There may also be specific eligibility requirements within a specific term if a course requires certain prior knowledge.

Study plan with constituent courses

| Term | Name of the course | Credits | Main field of study | Cycle and depth of the course (for first cycle courses within the main field of study) |
|------|--|---------|---------------------|---|
| 1 | Introduction to Biomedical Science | 6 | Biomedicine | First (G1) |
| 1 | General and Organic Chemistry | 12 | Biomedicine | First (G2) |
| 1 | Cell-, stem cell and developmental biology | 12 | Biomedicine | First (G2) |
| 2 | Biochemistry | 12 | Biomedicine | First (G2) |
| 2 | Genetics, genomics and functional genomics | 10 | Biomedicine | First (G2) |
| 2 | Chemical biology | 8 | Biomedicine | First (G2) |
| 3 | Biostatistics | 4.5 | Biomedicine | First (G2) |
| 3 | Tissue Biology | 4 | Biomedicine | First (G2) |
| 3 | Immunology and microbiology | 13 | Biomedicine | First (G2) |
| 3 | Neuroscience | 8.5 | Biomedicine | First (G2) |
| 4 | Physiology | 13 | Biomedicine | First (G2) |
| 4 | Pathology | 3 | Biomedicine | First (G2) |
| 4 | Pharmacology and toxicology | 10 | Biomedicine | First (G2) |
| 4 | The life science industry | 4 | Biomedicine | First (G2) |
| 5 | Molecular medicine - oncology | 15 | Biomedicine | First (G2) |
| 5 | Molecular medicine - cardiometabolic and infectious diseases | 15 | Biomedicine | First (G2) |

Alternative 1:

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|---|-------------------------------|----|-------------|------------|
| 6 | Degree Project in Biomedicine | 30 | Biomedicine | First (G2) |
|---|-------------------------------|----|-------------|------------|

Alternative 2:

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|---|-------------------------------|------|-------------|--------------|
| 6 | Degree Project in Biomedicine | 22.5 | Biomedicine | First (G2) |
| 6 | Elective Course(s) | 7.5 | | First/Second |