



Programme syllabus

Faculty of Health and Life Sciences

Biomedicinska analytikerprogrammet, 180 högskolepoäng

Biomedical Laboratory Science Programme, 180 credits

Level

First Level

Date of Ratification

Approved 2009-09-15

Revised 2017-01-25 by the Faculty Board within the Faculty of Health and Life Sciences

The programme syllabus is valid from autumn semester 2017

Prerequisites

General entry requirements and Biology 2, Chemistry 2, Mathematics 3b / 3c, Physics 1a/1b1 + 1b2 or Biology B, Chemistry B, Mathematics C, Physics A (Field-specific entry requirements 12/A12).

Description of Programme

The Biomedical Laboratory Science Programme is designed so that students upon completion of the programme will possess the knowledge and skills needed to work as biomedical scientists. The programme also prepares for further studies at an advanced level, postgraduate studies and continuing studies within the profession.

Biomedical laboratory science is the main subject area of the programme. This area focuses on laboratory methodology and provides laboratory training in various techniques and methods that are applied in clinical work and other activities within the biomedical field, and quality assurance of laboratory work.

Biomedical laboratory science is an interdisciplinary subject including knowledge of medicine, natural science, applied statistics and technology.

The programme is broad and has a clear emphasis on health care, with a focus on the patient. It prepares for laboratory work in clinical laboratories, primary care, veterinary medicine, in pharmaceutical and food industries and in research and development.

Objectives

Central degree objectives in accordance with the Higher Education Ordinance

For a Bachelor of Science in Biomedical Laboratory Science the student must demonstrate the knowledge and skills required to qualify as a biomedical scientist.

Knowledge and understanding

For the degree of Bachelor of Science in Biomedical Laboratory Science the student must

- demonstrate knowledge of the scientific foundation of the subject and an understanding of current research and development, as well as knowledge of the relationship between science and best practice, and the importance of this relationship for professional practice,
- demonstrate knowledge of relevant methods within the field, and
- demonstrate knowledge of relevant regulations.

Skills and abilities

For the degree of Bachelor of Science in Biomedical Laboratory Science the student must

- demonstrate an ability to plan and perform analyses and investigations independently,
- and in connection to these interact with patients and their relatives,
- demonstrate an ability to develop, apply and assure the quality of biomedical laboratory and investigation methods,
- demonstrate an ability to apply skills in order to handle different situations, phenomena and questions depending on the different needs of individuals and groups,
- demonstrate an ability to inform and educate different groups,
- demonstrate an ability to gather, process and critically interpret the results of analyses and investigations, identify and handle deviations, present and discuss the results with the individuals concerned both orally and in writing, and document the results in accordance with relevant regulations,
- demonstrate an ability to work in teams and collaborate with other professionals, and
- demonstrate an ability to critically scrutinize, evaluate and use relevant information and to discuss new facts, phenomena and questions with different groups, and thereby contribute to the development of the profession and its practice.

Judgement and approach

For the degree of Bachelor of Science in Biomedical Laboratory Science the student must

- demonstrate selfawareness and empathy,
- demonstrate an ability to make assessments based on relevant scientific, social and ethical aspects, using a holistic view of human beings, while paying special consideration to human rights,
- demonstrate an ability to use a professional approach towards patients and their relatives, and
- demonstrate an ability to identify their own need for further knowledge and to continuously develop their skills.

Degree project

For the degree of Bachelor of Science in Biomedical Laboratory Science the student must within the framework of course requirements have completed a degree project of a minimum of 15 credits.

Content

Programme overview

The programme consists of 180 higher education credits, which correspond to three years of fulltime studies. The programme is taught on a fulltime basis with 30 credits per term.

The programme includes theoretical, laboratory as well as workplace training.

Subsequent courses build upon previous courses, providing a gradually deepening knowledge.

The main subject is biomedical laboratory science. The theoretical and laboratory parts of laboratory methodology are thus central and are taught within laboratory courses or sub-courses, corresponding to at least 90 credits, which provide a gradual deepening knowledge within the main subject area.

Courses within laboratory methodology are combined with theoretical courses within the natural sciences, and biomedical and clinical fields.

Workplace training is an important part of the programme. Under supervision the students apply and develop their knowledge of biomedical laboratory science at clinical laboratories, and develop a professional approach to their work with patients and patient samples.

The programme is based on a scientific approach and aims to stimulate critical thinking and an independent and inquiring approach to working. Great emphasis is placed on the documentation and presentation of results, and on oral and written reports, including the giving and receiving of feedback.

The programme is research-oriented. Current scientific articles are included as study material. During their studies the students will come into contact with different research projects run by teachers involved in the programme.

There are one or several examinations within each course. The student's performance is assessed based on knowledge of the subject, practical skills, ability to solve problems theoretically and practically and to present and communicate knowledge of the subject, methods and results both orally and in writing.

In the courses within applied laboratory methodology (workplace training) the student's theoretical knowledge of and practical skills within biomedical laboratory science are examined. The student's ability to care about the patient and patient samples is also examined, as are the oral presentation and workbook.

Course or sub-course within the programme might be taught in English.

Year 1

The programme begins with studies that provide a comprehensive basic knowledge of physiology and biomedical science and an insight into the professional role of a biomedical scientist. These studies are followed by basic studies in chemistry and biochemistry. Practical training in laboratory methodology is now introduced, including the use of basic laboratory equipment and quality assurance. The structure of the eukaryotic cell and the regulations of the processes that control cell functions are dealt with, and the student will gain practical training within laboratory methodology for cell and molecular biology. During the first year of study, ethical issues, patient treatment, and laws and regulations within health and medical care are also addressed.

Year 2

During the second year the structure of the healthy human being and the function of the body are studied. Subjects studied include training in physiological laboratory methodology and sampling are provided. Disease occurrence, pathogenesis and treatment are studied, as are the structure and function of the immune system, as well as microorganisms, pathogens and the treatment of human pathogen microorganisms. Subjects studied include training in immunological and microbiological laboratory methodology. General pathology is studied and pathological changes in tissues and cells are dealt with within histopathology and cytology laboratory methodology. Workplace training is conducted at clinical laboratories within microbiology and pathology/cytology respectively. The students will thereby expand their ability to apply and integrate theoretical knowledge with practical skills and develop a professional approach. Blood diseases and application of laboratory methods for blood cell morphology are dealt within hematology.

Year 3

During the third year the students will develop their knowledge of biomedical changes in various diseases and will receive training in clinical chemistry laboratory methodology. Blood group systems are studied and the student will apply laboratory methods for blood group serology. During workplace training the students will expand their ability to apply and integrate theoretical knowledge and practical skills at a clinical chemical laboratory, at a unit for transfusion medicine and at a primary care laboratory. This training will provide further opportunities to develop a professional approach. The programme teaches pharmacology and the effects of drugs and toxic substances on human health and provides further practical skills in clinical laboratory methodology. The student will receive a theoretical and practical depth within molecular biological, genetic, and immunological laboratory methodology. Thereafter the student will have the opportunity to specialize by choosing practical specialization within any of the laboratory disciplines or at a research laboratory. The programme finishes with an independent degree project within biomedical laboratory science.

Programme courses

Year 1

- Introductory Course for Biomedical Scientists 7.5 hec, G1N

The course offers a biomedical review and covers the construction and function of the human body in a comprehensive way. A workplace part in laboratory medicine is included.

- General Chemistry 7.5 hec*, G1N

The course covers the basics within the chemistry field of study, and basic statistics. The course also includes laboratory work.

- Fundamental Laboratory Methodology 7.5 hec*, G1F

The course focuses on fundamental theoretical and practical laboratory methodology, knowledge of instruments and quality assurance.

- Biochemistry 7.5 hec, G1F

The course covers fundamental theoretical biochemistry and a literature assignment in the field of study.

- Biochemical Laboratory Methodology 7.5 hec*, G1F

The course focuses on fundamental theoretical and practical laboratory methodology in the biochemical field of study.

- Knowledge of Biomedical Scientist Profession 7.5 hec, G1N

The course focuses on the biomedical scientist profession. How are healthcare regulations applied in specific care situations? Ethical aspects and social, environmental and cost-related sustainability are being discussed. The course includes an auscultation visit at a ward.

- Cell and Molecular Biology with Laboratory Methodology 15 hec*, G1F

The course teaches fundamental cell and molecular biology and genetics. Laboratory work in cell and molecular biology is applied in the course.

Year 2

- Anatomy and Physiology with Fundamental Clinical Laboratory Methodology 15 hec*, G1F

The course focuses on the construction and function of the healthy body. Fundamental clinical physiological laboratory methodology and histology are included.

- Clinical Immunology with Laboratory Methodology 7.5 hec*, G1F

The course holds the basics in clinical immunology, with focus on the construction and function of the immune system and various immunologically related medical conditions.

- Pathophysiology and Internal Medicine 7.5 hec, G1F

The course focuses on origin mechanisms, symptoms and progression and prognosis of various diseases.

- Clinical Microbiology with Laboratory Methodology 7.5 hec*, G1F

The course teaches fundamental clinical microbiology, such as the occurrence, properties, growth and genetics of microorganisms. Care hygiene. Microbiological laboratory methodology is applied within the course.

- Clinical Pathology with Laboratory Methodology 7.5 hec*, G2F

The course covers the biochemical and morphological processes at changes at cellular and histological lesion, as molecular and morphological tumour growth. Fundamental cytological and histological laboratory methodology is applied within the course.

- Applied Clinical Laboratory Methodology I 10.5 hec*, G2F

The course is a workplace training at laboratories within clinical pathology and clinical microbiology. The course includes fundamental routine diagnostics within each laboratory branch of study.

- Haematology with Laboratory Methodology 4.5 hec*, G2F

The course focuses on the normal development of blood and bone marrow cells and its morphology. Genetical, biochemical and cellular biological changes of diagnostic and prognostic importance are dealt with. Various haematological analyses are applied within the laboratory methodology

Year 3

- Clinical Chemistry with Laboratory Methodology 6 hec*, G2F

The course focuses on biochemical and cellular biological changes in organs, tissues and body fluids which are of importance for diagnosis and prognosis at various medical conditions. The course holds clinical chemical laboratory methodology.

- Transfusion Medicine with Laboratory Methodology 4.5 hec*, G2F

The course focuses on various blood group systems. The course also teaches laws and regulations within the field of transfusion medicine, and application of fundamental blood group serological laboratory methodology.

- Applied Clinical Laboratory Methodology II 12 hec*, G2F

The course is a workplace training at laboratories within clinical chemistry, transfusion medicine and at a primary care laboratory. The course teaches fundamental routine diagnostics within each laboratory branch of study.

- Pharmacology and Toxicology with Laboratory Methodology 7.5 hec*, G2F

The course covers fundamental pharmacology and toxicology. The laboratory methodology focuses on practical management and application within chromatography and mass spectrometry. The course includes statistics.

- Advanced Laboratory Methodology 7.5 hec*, G2F

The course covers clinical genetics where genetic diseases, origin mechanisms and diagnostics are dealt with. Theoretical and practical laboratory methodology is applied within molecular biology, molecular genetics, and cell biology. Theory of science is included.

- Applied Clinical Laboratory Methodology III 7.5 hec*, G2F

The course is a workplace training at a laboratory and this means that the student independently choose in-depth studies in a particular laboratory methodology. The student also writes a project plan for the degree project.

- Degree Project in Biomedical Laboratory Science 15 hec*, G2E

The course covers an independent laboratory advanced project which is performed and compiled in writing into a report arranged scientifically and reported orally. Critical evaluation and oral feedback of a manuscript is part of the course.

To obtain a general degree the completion of at least 90 credits in the main subject area Biomedical Laboratory Science is required, including a degree project of 15 hec and a further 90 hec of which at least 30 hec has to be outside the main subject area.

* Course in the main field of study biomedical laboratory science

All courses are mandatory; the student may take the course at Linnaeus University or obtain corresponding knowledge from another university.

The programme is continuously evolving in order to meet the demands of the surrounding world. This means that the name and the extent of courses may, to some extent, change during the course of the programme.

Community contacts

Early on in the programme the students get in contact with working life through assignments at clinical laboratories and wards. About 20 weeks of workplace training is included in the programme. The location of this training is preferably Blekinge, Dalarna, Kalmar and Kronoberg County, but may also take place outside this region. The degree project can be completed at a clinical laboratory or a research laboratory. Study visits and trips are included in the programme.

Studies abroad

Following consultation with the programme director, courses within the programme may be pursued at universities abroad.

Scope of the programme

Aspects of sustainable development that are discussed within the programme include waste management and working for a nontoxic environment, and economic and social sustainability.

A gender perspective is discussed in the course Knowledge of Biomedical Scientist Profession 7.5 hec, where Swedish legislation on equality and discrimination is brought up.

Issues of social and ethnic diversity are mainly raised in the course Knowledge of Biomedical Scientist Profession 7.5 hec. In this course the care and treatment of patients are discussed from an equality perspective, keeping in mind ethnic and social diversity, and from a generational perspective.

The students are also given the opportunity to reflect on what effect an entrepreneurial approach can have on the profession.

The course literature consists largely of international textbooks and articles. A great part of the knowledge that the students develop during the course of the programme is therefore of an international character.

Quality Development

The programme is headed by a programme director with an overall responsibility for the quality of the programme.

Course evaluations are conducted individually upon completion of each course and are summarized in accordance with established guidelines. The summary report of the evaluations is signed by student representatives and the course coordinator and is then archived by the department. The results of the evaluation, as well as possible measures taken, are presented to the new students at the start of the next course.

The programme has a programme committee, including the programme director, examiners/course coordinators and programme students, whose main function is to ensure the quality and development of the programme and its courses. The programme committee meets once a semester.

A programme advisory board, including representatives from potential employers, teachers from other institutions as well as teachers and students from the programme, is also connected to the program. The task of the programme advisory board is to ensure that the program maintains a high national and international standard, is adequate and meets the expectations of today's and tomorrow's labour market and prepares the students for advanced education and research education. The programme advisory board meets once a year.

The programme is included in a national network with delegates from other universities that offer Biomedical Laboratory Science programmes. The network discusses issues concerning the development of the programme. The network meets once a year.

Degree Certificate

Following completion of studies fulfilling the requirements as stated in the degree ordinance of the Higher Education Ordinance and the local degree ordinance for Linnaeus University, the student can apply for the award of the degree. Students who have successfully completed studies in the Biomedical Laboratory Science Programme may obtain the following degree:

Bachelor of Science in Biomedical Laboratory Science

The degree certificate is bilingual (Swedish / English). The degree certificate will be accompanied by a Diploma Supplement (English).

Other Information

Workplace training may be located outside Blekinge, Dalarna, Kalmar and Kronoberg County which may result in additional costs for the students.

In addition to a Bachelor of Science in Biomedical Laboratory Science (professional degree) the following degree may be obtained:

Bachelor of Science

Main field of study: Biomedical Laboratory Science

A degree certificate for Biomedical Laboratory Science (professional degree) is required in order to apply for a licence to practice from The National Board of Health and Welfare.