



## Programme syllabus

Faculty Board of Science and Engineering  
School of Natural Sciences

Biomedicinska analytikerprogrammet, 180 högskolepoäng  
Biomedical Laboratory Science Programme, 180 credits

### **Level**

First Level

### **Establishment of Programme**

Established by Organisational Committee 2009-03-26

### **Date of Ratification**

Approved by Organisational Committee 2009-09-15

The programme syllabus is valid from autumn semester 2010

### **Prerequisites**

General entry requirements and Biology B, Chemistry B, Mathematics C and Physics A (Field-specific entry requirements 12).

## 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.

Biomedical laboratory science is an interdisciplinary subject where natural science, biomedicine and technology form the basis of laboratory science.

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 in 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 communicate and 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 self-awareness 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.

## Content

### *Organisation*

The programme is offered by the School of Natural Sciences. The programme is led by a programme director with overall responsibility for the quality of the education. A programme committee and a programme advisory board are connected to the programme as reference groups for quality assurance and development (see under the headline Quality Development).

### *Programme overview*

The programme consists of 180 higher education credits, which correspond to three years of full-time studies. The programme is taught on a full-time basis with 30 hec per semester.

The programme includes theoretical, experimental 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 laborative parts of laboratory methodology are thus central and are taught within laborative courses or subcourses, corresponding to at least 90 hec, 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.

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.

The student's performance is assessed based on subject knowledge, ability to solve problems theoretically and practically, and the ability to present and communicate subject knowledge, methods and results.

#### *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 histology and 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. Hygiene within medical care is discussed and the student is trained 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, diagnosis and application of laboratory methods for blood cell morphology are dealt with 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, 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

General Chemistry 7.5 hec (2.5 hec)\*, G1N

Fundamental Laboratory Methodology 7.5 hec (5 hec)\*

Biochemistry 7.5 hec, G1F

Biochemical Laboratory Methodology 7.5 hec\*, G1F

Care and Ethics, Clinical Course 7.5 hec, G1N

Cell- and Molecular Biology with Laboratory Methodology 15 hec, (7,5 hec)\*, G1F

#### *Year 2*

Anatomy and Physiology with Fundamental Clinical Laboratory Methodology 15 hec, (varav 4.5 hec\*), G1F

Pathophysiology and Internal Medicine 7.5 hec, G1F

Clinical Immunology with Laboratory Methodology 7.5 hec (3 hec)\*, G1F

Clinical Microbiology with Laboratory Methodology 7.5 hec (3 hec)\*, G1F

Clinical Pathology with Laboratory Methodology 7.5 hec (3 hec)\*, G2F

Applied Clinical Laboratory Methodology I 10.5 hec\*, G2F

Hematology with Laboratory Methodology 4.5 hec, (3 hec)\*, G2F

#### *Year 3*

Clinical Chemistry with Laboratory Methodology 6 hec, (3 hec)\*, G2F

Transfusion Medicine with Laboratory Methodology 4.5 hec, (3 hec)\*, G2F

Applied Clinical Laboratory Methodology II 12 hec\*, G2F

Pharmacology and Toxicology with Laboratory Methodology 7.5 hec, (4.5 hec)\*, G2F

Advanced Laboratory Methodology 7.5 hec\*, G2F

Applied Clinical Laboratory Methodology III 7.5 hec\*, G2F

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

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.

\* Course in the main field of study

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 students and 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 / workplace training*

Assignments to be completed through visits and studies to clinical laboratories and wards are included in the programme. About 20 weeks of workplace training is included in the programme. The location of this training is preferably Blekinge, 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. The degree project may be completed abroad.

#### *Scope of the programme*

Aspects of sustainable development that are discussed within the programme include waste management and working for a non-toxic environment.

A gender perspective is discussed in the course Care and Ethics, Clinical Course 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 Care and Ethics, Clinical Course 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 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

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, 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.