Reg. no HNT 2024/804
Approved 12 December 2024

Programme Syllabus

Biomedical Scientist Programme

Programme code:	VGBMA
Programme title:	Biomedical Scientist Programme *Biomedicinska analytikerprogrammet*
Credits:	180
Programme approval:	The programme syllabus was approved by the Faculty Board of Health, Science and Technology on 12 December 2024, effective from the autumn semester of 2025.
Language of instruction:	Swedish
Education cycle:	First (Bachelor's level)
Degree type:	Professional and Degree of Bachelor
Degree title:	Degree of Bachelor of Science in Biomedical Laboratory Science Degree of Bachelor of Science Main field of study: Biomedical Laboratory Science
Entry requirements:	General admission requirements and Biology 1, Physics 1a/1b1+1b2, Chemistry 1 and Mathematics 3b/3c/C.

General information

The Biomedical Scientist Programme at Karlstad University is designed to give students the opportunity to acquire the knowledge and professional skills required to work as a registered

biomedical scientist. Completion of the programme also awards a Degree of Bachelor in Biomedical Laboratory Science.

Biomedical scientists play a key role in the healthcare chain and are responsible for the entire process from sampling to analysis results, which requires expertise in laboratory methodology, medicine, science and technology. The programme also provides students with skills in oral and written communication, and prepares them for further studies and research in the main field, biomedical laboratory science. Biomedical scientists must also be able to adapt to current societal developments with new methods and more patient-centred analyses, which means that they take on a more guiding and informative role.

Programme outcomes

The Higher Education Ordinance, System of Qualifications, specifies the outcomes required for certain degrees. The outcomes for a Degree of Bachelor of Science in Biomedical Laboratory Science are as follows:

The student shall demonstrate the knowledge and skills required for registration as a biomedical scientist.

Knowledge and understanding
For a Degree of Bachelor of Science in Biomedical Laboratory Science the student shall
-demonstrate knowledge of the disciplinary foundation of the field and awareness of current research and development work as well as the links between research and proven experience and the significance of these links for professional practice
- demonstrate knowledge of relevant methods in the field, and
- demonstrate knowledge of the relevant statutory provisions.

Competence and skills
For a Degree of Bachelor of Science in Biomedical Laboratory Science the student shall
- demonstrate the ability to plan and undertake analyses and examinations autonomously and to cooperate in these with patients and those close to them
- demonstrate the ability to develop, use and assure the quality of biomedical laboratory and testing methods
- demonstrate the ability to apply his or her knowledge to deal with different situations, phenomena and issues on the basis of the needs of individuals and groups
- demonstrate the ability to inform and instruct different audiences
- demonstrate the ability to gather, appraise and critically interpret the findings of analyses and examinations, notice and deal with deviations, as well as to present and discuss the results in speech and writing with those concerned and to document them in accordance with the relevant statutory provisions
- demonstrate the capacity for teamwork and cooperation with other professional categories, and
- demonstrate the ability to review, assess and use relevant information critically and to discuss new data, phenomena and issues with various audiences and so contribute to the development of the profession and professional practice.

Judgement and approach
For a Degree of Bachelor of Science in Biomedical Laboratory Science the student shall
- demonstrate self-awareness and the capacity for empathy
- demonstrate the ability to make assessments using a holistic approach to individuals informed by the relevant disciplinary, social and ethical aspects and taking particular account of human rights
– demonstrate the ability to adopt a professional approach to clients or patients, those close to them and other groups, and

- demonstrate the ability to identify the need for further knowledge and undertake ongoing development of his or her skills.

The national outcomes for a Degree of Bachelor are as follows:

Knowledge and understanding

For a Degree of Bachelor the student shall
- demonstrate knowledge and understanding in the main field of study, including knowledge of the disciplinary foundation of the field, knowledge 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 the 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.

Judgement and approach

For a Degree of Bachelor the student shall
- demonstrate the ability to make assessments informed by relevant disciplinary, social and ethical aspects
- 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.

Independent project (degree project)

A requirement for the award of a Degree of Bachelor is completion by the student of an independent project (degree project) for at least 15 credits in the main field of study.

Additional information

Specific requirements determined by each higher education institution itself within the parameters of the requirements laid down in this qualification descriptor shall also apply for a Degree of Bachelor with a defined specialisation.

Programme structure

The first year of the degree programme provides a solid foundation in chemistry and medical science. The second year includes courses with a specialisation in medical science and basic knowledge of biomedical laboratory science. Courses in the second year also cover knowledge about the profession in preparation for the first clinical placement (VFU) at a primary care laboratory, and an introduction to scientific method. The third year includes a gradual specialisation in the main field of biomedical laboratory science. Students develop their ability to solve various laboratory science questions of theoretical and practical nature through a specialisation in scientific methods, clinical placements at different clinical laboratories, an advanced course in methodology, and a degree project. Students may incur additional travel and accommodation expenses in connection with their clinical placement if the placement is located outside Karlstad. There are good opportunities to complete parts of the clinical placement periods or the degree project abroad, but this may incur additional costs for the student.

The forms of instruction vary and include independent study, laboratory work, lectures and seminars. The programme is characterised by practical components aimed at developing the practical skills required for working as a biomedical scientist, which complement the theoretical part of the programme. Throughout the programme, a series of practical examinations are conducted to assess these skills. There is also an emphasis on establishing the professional role of a biomedical scientist and the importance of quality and control in clinical laboratory methodology. The programme includes studies grounded in clinical practice through clinical cases and skills training on campus, as well as clinical placements in laboratories.

Internationalisation

Karlstad University wants to promote collaboration and exchange with other universities and has partnerships with many other universities in Sweden and abroad, as well as an organisation in place to support students who want to make use of this opportunity. Students are therefore encouraged to complete part of the programme at a university abroad.

Programme curriculum

The programme comprises 180 credits and includes mandatory courses in the main field of biomedical laboratory science (94 credits), as well as medical science (41 credits), chemistry (30 credits) and biology (15 credits). Mandatory participation is specified in each course syllabus and mainly includes participation in laboratory work, clinical studies during clinical placements, seminars and examinations.

Biomedical laboratory science, which the main field of study for a biomedical scientist, centres on laboratory methodology. Great emphasis is placed on theoretical and methodological knowledge integration, practical skills, laboratory safety, and quality and control in laboratory methodology. Immunological and microbiological methods, genetic engineering, methods in clinical chemistry, as well as methods in morphological cell biology and hematology, are the disciplines included in programme. Applied biomedical laboratory science is conducted in clinical laboratories or other relevant laboratories and constitutes a total of 30 credits, with 15 weeks spent in a clinic.

Medical science focuses on the function and structure of the human organism in normal and pathological conditions. Anatomy, physiology, medical microbiology, pathology, clinical chemistry, immunology, transfusion medicine, morphological cell biology and hematology are included as components of the programme.

Chemistry describes reality from a molecular perspective. Studies include introductory chemistry, chemical calculations, organic chemistry and biochemistry. The courses encompass both theory and laboratory components.

Biology describes and explains the diversity of life at all levels, from genes to ecosystems. Studies include a course in cell biology with both theory and laboratory components.

Within the main field of biomedical laboratory science, there is a gradual specialisation and broadening related to both the area of biomedical laboratory science and the future professional practice as a biomedical scientist through theoretical, methodological and clinical courses. Of the total 180 credits, 94 are dedicated to the main field of study. A requirement for the award of a Degree of Bachelor of Science in Biomedical Laboratory Science is completion by the student of an independent project (degree project) of at least 15 credits in biomedical laboratory science.

The programme comprises the following courses.

Main field of study, biomedical laboratory science (94 credits):

Introduction to the biomedical scientist profession, 4 credits
Clinical chemistry, 7.5 credits
Clinical placement I, 7.5 credits
Methods in microbiology and immunology, 7.5 credits
Methods in hematology, morphological cell biology and transfusion medicine, 7.5 credits
Scientific method, 7.5 credits
Research integration in biomedical laboratory science, 15 credits
Clinical placement II, 7.5 credits
Degree project, 15 credits
Clinical placement III, 15 credits

Other courses (86 credits):

Anatomy and physiology, 15 credits
Medical microbiology and immunology, 7.5 credits
Pathology I, 7.5 credits
Introductory chemistry, 7.5 credits
Chemical calculations, 7.5 credits
Organic chemistry, 7.5 credits
Biochemistry, 7.5 credits
Transfusion medicine, 3.5 credits
Cell biology, 15 credits
Pathology II, 7.5 credits

Note that the programme courses can have other titles and be offered in a different order than listed below.

Credit transfer

Students have the right to transfer credits from previously completed university courses in Sweden or abroad. Credit transfer is subject to approval according to the current regulations.

Additional information

The local regulations for first and second cycle education at Karlstad University stipulate the obligations and rights of students and staff.

Students may incur additional travel and accommodation expenses in connection with mandatory on-campus meetings or practical placement.

A student who suffers from mental disorder, abuses alcohol or drugs, or has committed a serious offence endangering others or valuable property may be expelled until further notice. In such a case, the vice-chancellor files a complaint to the Higher Education Expulsions Board, where the matter will be investigated and decided on. A decision of expulsion shall always entail the student's discontinuation of the studies until further notice. The jurisdiction of the Higher Education Expulsions Board encompasses all higher education institutions in the country (Higher Education Act Chap. 4, 6 Sect. 6, SFS 1992:1434; Ordinance on the Expulsion of Students from Higher Education, SFS 2007:989).