Analytical Techniques in Experimental Biosciences

Programme course

7.5 credits

Analytiska tekniker för experimentell biovetenskap

8MEA02

Valid from: 2019 Autumn semester

Determined by
The Board for First and Second Cycle Programmes at the Faculty of Health Sciences

Date determined
2012-12-07

Revision date
2014-10-06

Main field of study
Medical Biology

Course level
Second cycle

Advancement level
A1X

Course offered for
- Master's Programme in Experimental and Medical Biosciences

Entry requirements
The special eligibility requirement is the possession of the Degree of Bachelor of Sciences in a major subject area with relevance for biomedical sciences. This could include previous studies at faculties of medicine, technology/natural sciences, odontology or veterinary medicine. A major part of courses included in the Bachelor degree should be in subjects such as biochemistry, cell biology, molecular biology, genetics, gene technology, microbiology, physiology, immunology, histology, anatomy, and pathology.

Applicants must also have documented skills in English corresponding to the level of English in Swedish upper secondary education (English B). For applicants who have not studied in Swedish upper secondary education, skills in English are normally attested to by means of an international language test.

Intended learning outcomes

The aim of the course is for the student to obtain a more advanced knowledge of theoretical aspects of study design as well as data collection, data analysis and general statistics used within the field of biosciences and of epidemiology. The student will also gain deeper knowledge in bioinformatics, scientific methodologies including the philosophical and scientific aim of research, quantitative and qualitative methodologies, and the educational methodology problem-based learning. The course is compulsory in semester one in Master's Programme in Experimental and Medical Biosciences.

By the end of the course the student will be able to:
Knowledge and understanding

- Describe and analyze different strategies for study design, data sampling, data collection, and statistical analysis to be used in qualitative and quantitative research

Competence and skills

- Design research studies within the field of biosciences and epidemiology
- Use and interpret common statistical methods for rates and proportions, multivariate statistics and regression analysis
- Use internet-based tools and computer programs to be able to identify, compare and analyze biological molecules

Judgement and approach

- Critically evaluate statistical findings and their interpretations in epidemiological and biomedical studies
- Demonstrate a knowledgeable and critical attitude regarding scientific investigations and articles
- Interpret and evaluate results from databank searches in a biomedical relevant context

Course content

- Philosophy of science, research design, data collection and analysis, as well as qualitative and quantitative methodologies
- Basic statistical principles and common methods applicable for biomedical studies
- Design of studies in biomedicine and epidemiology
- Reasoning on causality, precision, validity and bias that could have an impact on data
- Computer-based methods for studies of biological molecules
- Application of Problem-based learning (PBL) as pedagogical methodology

Teaching and working methods

General: Linköping University Master's Programme in Experimental and Medical Biosciences applies student-centered learning among which Problem Based Learning (PBL) is one pedagogical philosophy and method. To prepare the students for future employment, practical and experimental work in laboratory settings are important parts of the programme in courses as well as in individual projects.
Specific: In this course lectures, tutorial groups and seminars are used.

Examination

Compulsory items
Active participation in the compulsory parts is necessary to pass the course, and assessment of them is carried out continuously. Compulsory parts in this course are: tutorial groups and seminars.

Examination
Individual written examination.
Individual written reports and oral presentation of them.

Scope of re-examination
The extent of a re–examination shall be similar to the regular examination.

Change of examiners
Students who have failed the course or part of the course twice are entitled to request another examiner for the following examination occasion, unless specific reasons are present.

Registration for examination
The procedure for registration should be stated prior to the commencement of each course. In other respects, regulations concerning examination and examiners are applied in accordance with Linköping University policy.

Grades

Three-grade scale, U, G, VG

Other information

The planning and implementation of a course must take its starting point in the wording of the course plan. The course evaluation included in each course must therefore take up the question how well the course agrees will the course plan.

The course is carried out in such a way that both men's and women's experience and knowledge is made visible and developed.

If the course is withdrawn, or is subject to major changes, examinations according to this course plan are normally offered on a total of three occasions within one year, one of them in close connection to the first examination.

Department

Institutionen för klinisk och experimentell medicin