

## Research methodology in biomedicine

Vetenskaplig forskningsmetodik inom biomedicin  
7.5 credits

Programme course

8MEA17

Valid from: 2024 Autumn semester

|                                                             |                                  |                                   |
|-------------------------------------------------------------|----------------------------------|-----------------------------------|
| <b>Determined by</b>                                        | <b>Main field of study</b>       |                                   |
| Chairman of The Board for First and Second Cycle Programmes | Medical Biology                  |                                   |
| <b>Date determined</b>                                      | <b>Course level</b>              | <b>Progressive specialisation</b> |
| 2023-08-25                                                  | Second cycle                     | A1N                               |
| <b>Revised by</b>                                           | <b>Disciplinary domain</b>       |                                   |
| Chairman of The Board for First and Second Cycle Programmes | Medicine, Natural sciences       |                                   |
| <b>Revision date</b>                                        | <b>Subject group</b>             |                                   |
|                                                             | Medical Biology                  |                                   |
| <b>Offered first time</b>                                   | <b>Offered for the last time</b> |                                   |
| Autumn semester 2024                                        |                                  |                                   |
| <b>Department</b>                                           | <b>Replaced by</b>               |                                   |
| Institutionen för biomedicinska och kliniska vetenskaper    |                                  |                                   |

## Specific information

The course is compulsory in semester one in the Master's Programme in Experimental and Medical Biosciences.

## Course offered for

- Master's Programme in Experimental and Medical Biosciences

## Entry requirements

Bachelor's degree in a major subject area with relevance for biomedical sciences, equivalent to a Swedish Kandidatexamen with a total of at least 90 ECTS credits in some of the following subjects:

- biochemistry
- cell biology
- molecular biology
- genetics
- gene technology
- microbiology
- physiology
- immunology
- histology
- anatomy
- pathology

English corresponding to the level of English in Swedish upper secondary education (Engelska 6/B) Exemption from Swedish.

## Intended learning outcomes

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 demonstrate understanding of how these can be applied in qualitative and quantitative research

### Competence and skills

- Explain the content of scientific articles
- Design research studies within the field of biosciences and epidemiology
- Use and interpret common statistical methods for rates and proportions, multivariate analysis and regression analysis

### Judgement and approach

- Critically evaluate statistical findings and their interpretations in epidemiological and biomedical studies
- Review and critically evaluate scientific investigations, articles and reports and in an insightful way
- Assess the quality of scientific literature within qualitative and quantitative research

## Course content

The course covers theoretical aspects of study design, data collection, analysis of data including statistics, with application in biomedicine and epidemiology. In addition, research methodology, qualitative and quantitative methods are included. The course also introduces problem-based learning as pedagogical methodology. More specifically, the course contain:

- Scientific theory, study design, data collection and analysis using 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
- Critical evaluation of scientific publications in experimental biosciences
- Application of problem-based learning (PBL) as pedagogical methodology

## Teaching and working methods

Within the Faculty of Medicine, student-centered and problem-based learning forms the basis of teaching. The student takes personal responsibility for the learning through an active and processing approach to the learning tasks. The working methods challenge the students to independently formulate questions for learning, to seek knowledge and to assess and evaluate acquired knowledge in dialogue with others. Students work together in groups based on real-life situations to develop their own learning, contribute to fellow students' learning and to practice cooperation. The teacher's role is to support students in this way of working.

This course includes lectures, tutorial groups and seminars.

## Examination

The examination in this course consists of an individual written exam and an individual written report including oral presentation and following group discussion.

Active participation in the compulsory parts is necessary to pass the course and assessment is carried out continuously. Active participation includes giving individual contributions and/or reflections with relevance to the learning tasks. The compulsory parts of this course are tutorial groups and seminars.

The course is examined in English.

### **Grades**

The grades for the course are Fail, Pass or Pass with Distinction. Grades for the individual written exam form the basis for the final course grade.

If special circumstances prevail, and if it is possible with consideration of the nature of the compulsory component, the examiner may decide to replace the compulsory component with another equivalent component.

### **Application for examination**

Instructions on how to apply for examinations are given prior to the beginning of each course.

### **Re-examination**

The date for re-examination should normally be announced by the date of the regular examination at latest; in which case the scope must be the same as at the regular examination.

### **Examination for students with disabilities**

If the LiU coordinator for students with disabilities has granted a student the right to an adapted examination for a written examination in an examination hall, the student has the right to it.

If the coordinator has recommended for the student an adapted examination or alternative form of examination, the examiner may grant this if the examiner assesses that it is possible, based on consideration of the course objectives.

An examiner may also decide that an adapted examination or alternative form of examination if the examiner assessed that special circumstances prevail, and the examiner assesses that it is possible while maintaining the objectives of the course.

### **Nomination of another examiner**

A student who has taken two examinations in a course or a part of a course without obtaining a pass grade is entitled to the nomination of another examiner, unless there are special reasons to the contrary.

## **Grades**

Three-grade scale, U, G, VG

## **Course literature**

List of relevant literature is available at least 2 months prior to the start of the course as decided by the programme board. There is no mandatory literature in the course.

## Other information

Planning and implementation of the course is to be based on the wordings in the course syllabus. A course evaluation is compulsory for each course and should include how the course is in agreement with the course syllabus. The course coordinator will analyse the course evaluation and propose appropriate development of the course. The analysis and proposal will be returned to the students, the Director of Studies, and as needed to the Education Board, if related to general development and improvement.

The course is conducted in such a way that there are equal opportunities with regard to sex, transgender identity or expression, ethnicity, religion or other belief, disability, sexual orientation and age.

If the course is cancelled or undergoes major changes, examination is normally offered under this course syllabus, at a total of three occasions, within/in connection to the two following semesters, of which one in close proximity to the first examination.

If special circumstances prevail, the vice-chancellor may in a special decision specify the preconditions for temporary deviations from this course syllabus, and delegate the right to take such decisions.