

BIMA15, Biomedicine: Cell Biology, 22.5 credits

Biomedicin: Cellbiologi, 22,5 högskolepoäng

First Cycle / Grundnivå

Details of approval

The syllabus is an old version, approved by Committee for Biomedical, Medical and Public Health Education on 2015-03-25 and was valid from 2015-03-25, autumn semester 2015.

General Information

The course is a compulsory component of semester 1 and 2 of the Bachelor of Medical Science programme in Biomedicine.

The language of instruction is mainly Swedish but some components may be taught in English. The reading list includes titles in English.

Main field of studies

Biomedicine

Depth of study relative to the degree requirements

G1N, First cycle, has only upper-secondary level entry requirements

Learning outcomes

Knowledge and understanding

On completion of the course, the students shall be able to

- account for the general morphology, structural organisation and mechanisms for transport of ions and molecules across the cell membrane
- account for the structure and synthesis of proteins and nucleic acids and explain what a three-dimensional molecular structure means for the function of proteins
- describe the appearance and expression of genes, explain the concepts of transcription and translation and account for similarities and differences between eukaryotic and prokaryotic cells
- account for the sorting and transport of proteins to different destinations in, on and outside the cell

- account for important regulation points and different phases and processes of cell division and mechanisms of DNA replication and cell death (apoptosis),
- account for basic metabolic processes in the cell and how they interact and are regulated
- account for basic methodology of purifying and analysing DNA, proteins and bacteria, and for immunochemical visualisation techniques
- account for the differences between different types of scientific publishing
- account for different scales of measure, descriptive statistics, basic statistical analyses and hypothesis testing

Competence and skills

On completion of the course, the students shall be able to

- plan, execute, document and summarise laboratory work in writing
- search for previous research and manage referencing software
- statistically analyse and present their own data

Judgement and approach

On completion of the course, the students shall be able to

- reflect on the need of documentation of laboratory activities
- assess and critically review the work of fellow students (peer review)
- reflect on their future professional role
- reflect on and exemplify how the learning outcomes have been achieved

Course content

The course provides students with an introduction to modern cell biology and encompasses both eukaryotic, especially human, and prokaryotic cells. It deals with the building blocks, structures and organelles of cells, and with general thermodynamics and enzyme kinetics to enable understanding of the function of the cell. A large part of the course highlights the genetic information carriers of the cell and how this information is spread when the cell divides and when proteins are formed (chromosomes, replication, the cell cycle and mitosis, apoptosis, translation and transcription). Furthermore, the course addresses basic metabolic processes in the cell and how they interact and are regulated. The differences between prokaryotic and eukaryotic cells are described and considered from an evolutionary perspective.

The laboratory exercises of the course are intended to provide students with basic insights into: the morphology of the cell, different visualisation techniques for microscopy, basic techniques of biochemistry and molecular biology such as chromatography, electrophoresis, immunoblotting, measurement of enzyme activity and immunochemical analytical methods, and basic methods for cultivation and analysis of bacteria.

The group exercises and seminars mainly highlight the medical issues associated with cell biology.

The course also provides students with theoretical and practical knowledge of how to search for academic texts and manage references, and of basic biostatistics. A study visit to a research laboratory at a university or private company is included to illustrate professional tasks within biomedicine.

Course design

The first part of the course focuses on the human cell and the teaching consists of lectures on fundamental themes, group exercises and illustrative laboratory sessions. Subsequently, the course specialises in metabolic problems and academic writing, and concludes on the subject of bacterial cell biology. The final part of the course is executed with team-based learning.

Attendance is compulsory at all group and laboratory sessions, and at lectures linked to laboratory exercises. Compulsory components are indicated in the timetable.

Assessment

The assessment is based on three exams/components, a written exam, a biostatistics portfolio and a course portfolio.

The written exam is used for assessing the learning outcomes of knowledge and understanding about the human cell.

The biostatistics portfolio is used for assessing the learning outcomes of biostatistics on the basis of active participation in group exercises and written assignments.

The course portfolio is used for assessing the learning outcomes of knowledge and understanding, competence and skills and judgement and approach through active participation in group and laboratory exercises, written assignments and oral presentations.

Subcourses that are part of this course can be found in an appendix at the end of this document.

Grades

Marking scale: Fail, Pass.

For a grade of Pass, students must have been awarded this grade on all components.

Entry requirements

General and courses corresponding to the following Swedish Upper Secondary School Programs: Biology B, Physics B, Chemistry B and Mathematics D.

Further information

The course is the first course of the Bachelor of Medical Science programme in Biomedicine and is conducted as part-time studies.

Subcourses in BIMA15, Biomedicine: Cell Biology

Applies from H16

- 1601 Written exam, 9,0 hp
Grading scale: Fail, Pass
- 1602 Biostatistical portfolio, 3,0 hp
Grading scale: Fail, Pass
- 1603 Course portfolio, 6,0 hp
Grading scale: Fail, Pass
- 1604 Microbial cell biology portfolio, 4,5 hp
Grading scale: Fail, Pass

Applies from H15

- 1501 Written exam, 9,0 hp
Grading scale: Fail, Pass
- 1502 Biostatistical portfolio, 3,0 hp
Grading scale: Fail, Pass
- 1503 Course portfolio, 10,5 hp
Grading scale: Fail, Pass