Faculty of Science

BIOR93, Biology: Applied Bioinformatics, 7.5 credits

Biologi: Tillämpad bioinformatik, 7,5 högskolepoäng

Second Cycle / Avancerad nivå

Details of approval

The syllabus was approved by Study programmes board, Faculty of Science on 2022-06-03 to be valid from 2022-06-03, spring semester 2023.

General Information

The course is an elective second-cycle course for a degree of Bachelor or Master in Biology or Molecular Biology.

Language of instruction: English

Main field of studies	*Depth of study relative to the degree requirements*
Biology	A1N, Second cycle, has only first-cycle course/s as entry requirements
Molecular Biology	A1N, Second cycle, has only first-cycle course/s as entry requirements

Learning outcomes

The aim of the course is that the students acquire a general understanding of several major bioinformatics concepts and tools commonly used in biology and molecular biology and obtain training in designing and executing bioinformatics procedures aimed at answering scientific questions within various fields of biology.

Knowledge and understanding

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

- account for basic concepts and methodological approaches in bioinformatics, including data collection and formatting, data analysis, and data visualization and interpretation of results
- account for applications and methods of common bioinformatics analysis, including sequence (DNA, RNA, or protein) alignment, gene expression analysis, and phylogenetic analysis

- describe the most common nucleotide and amino acid databases available online

Competence and skills

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

- download, compile, and organize data from online sources of relevance in biology and molecular biology
- work with different types of sequence and phylogenetic data formats
- perform various statistical and data analyses on sequence and phylogenetic data
- design and execute a workflow of retrieving, analyzing, and visualizing data

Judgement and approach

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

- discuss the value of various approaches to solve bioinformatics problems
- critically evaluate results obtained from bioinformatic analyses

Course content

The course gives an overview of the most commonly used applied bioinformatics methods within the fields of biology and molecular biology. Areas covered include sequence databases, pairwise and multiple sequence alignment, homology searches in sequence databases and subcellular localization prediction. Several downstream analyses are performed and their utility in applied ecology, evolutionary biology and molecular biology research will be discussed with guest lecturers. The primary focus will be on how bioinformatics methods are applied, but an overview of the underlying algorithms and statistics is included.

Course design

Teaching consists of lectures, group discussions and computer exercises with written assignments. Active participation in group discussions and computer exercises and associated elements is compulsory.

Assessment

The assessment is based on the written performance of students during assignments and in an written exam at the end of the course.

Students who do not pass an assessment will be offered another opportunity for assessment soon thereafter.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

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

Grades

Marking scale: Fail, Pass, Pass with distinction.

For a grade of Pass on the whole course, the student must have passed the written examination and assignments, as well as compulsory components.

Grading for assignments and compulsory components is Fail, Pass, whereas for written examination it is Fail, Pass, Pass with distinction.

The final grade is determined by the result on the written examination. A strong effort on the compulsory components and assignments can raise the course grade, if the grade stands between two grades.

Entry requirements

To be admitted to the course, students must have 90 credits in science studies, including knowledge equivalent to BIOA10 Cell and microbiology, 15 credits and BIOA11 Genetics and evolution. English 6/English B.

Further information

The course is offered at the Department of Biology, Lund University.

Subcourses in BIOR93, Biology: Applied Bioinformatics

Applies from V23

2301 Written exam, 5,0 hp
Grading scale: Fail, Pass, Pass with distinction
2302 Assignments and compulsory components, 2,5 hp
Grading scale: Fail, Pass