



Faculty of Science

## **BIOR94, Biology: Molecular Biotechnology and Methods, 15 credits**

*Biologi: Molekylär bioteknik och metodik, 15 högskolepoäng*  
Second Cycle / Avancerad nivå

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### **Details of approval**

The syllabus was approved by The Education Board of Faculty of Science on 2024-05-28. The syllabus comes into effect 2024-05-28 and is valid from the spring semester 2025.

### **General information**

The course is an optional second-cycle course for a degree of Bachelor or Master of Science in Biology and Molecular Biology. The course is a compulsory second-cycle course for a degree of Master of Science in Molecular Biology, with a specialization in Molecular Genetics and Biotechnology, and in Molecular Biology, with a specialization in Microbiology and biotechnology.

*Language of instruction:* English

<i>Main field of study</i>	<i>Specialisation</i>
Molecular Biology	A1F, Second cycle, has second-cycle course/s as entry requirements
Biology	A1F, Second cycle, has second-cycle course/s as entry requirements

### **Learning outcomes**

The overall aim of the course is that the student acquires in-depth knowledge in the field of molecular biotechnology. The course focuses on both theoretical and practical aspects of molecular biotechnology and its use in society. The course includes advanced molecular biology techniques to manipulate and understand biological systems at the molecular level as well as application of these techniques to create new biotechnological products and treatments.

### **Knowledge and understanding**

On completion of the course the student shall be able to:

- in detail describe the most central methods in molecular biology processes and molecular biotechnology
- describe how recombinant DNA technology in different organisms can be used for biotechnological applications
- account for biotechnological applications within medicine, agriculture and industry

### **Competence and skills**

On completion of the course the student shall be able to:

- independently apply methods in molecular biology
- plan and evaluate experiments addressing questions in molecular biology
- carry out information searches in literature databases
- present and in an initiated way discuss achieved results, orally and in writing
- master basic practical laboratory skills within molecular biology research

### **Judgement and approach**

On completion of the course the student shall be able to:

- evaluate, assess and critically compare results from studies in biotechnology and molecular biology
- reason about the choice of strategy to solve various biotechnological problems
- reflect on ones own knowledge in relation to continued studies and work within the area of molecular biology

### **Course content**

Molecular biotechnology is an interdisciplinary field that focuses on the use of molecular methods and techniques to study and manipulate biological systems at the molecular level. With the help of biotechnology, new products and processes can be developed to meet various societal problems. The theoretical part of the course deals with the underlying theory of molecular biological methods. The methods that will be covered in the course include various genetic engineering methods, molecular analysis methods for detection and characterization of DNA and other macromolecules, separation and quantification of biomolecules and methods for changing genetic material. The course also covers methodology regarding DNA sequencing and transcriptome analysis, mass spectrometry and metabolomics. The latter part of the course focuses on how molecular biology is used in applied biotechnology, including protein production, drug development and genetically modified organisms.

In the laboratory part, some of these methods are practiced. The laboratories will also be evaluated with the help of the method theory that has been covered earlier during the course. To some extent, the students will be trained in independently planning and setting up experiments. Information will be provided about the regulations that apply to experimental work at universities, companies, and authorities. During the course, a literature study is carried out where the student practices searching for information in literature databases and analyzing, evaluating, and presenting scientific information regarding molecular methods and molecular biotechnology applications.

## **Course design**

The teaching consists of lectures, laboratory sessions, demonstrations and group work. Participation in laboratory sessions, demonstrations and group work, and associated elements is compulsory.

## **Assessment**

Examination takes place as a written examination at the end of the course as well as through laboratory sessions, demonstrations and group work during the course.

For students who have not passed the regular examination, an additional examination in close connection to this is offered.

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.

## **Grades**

Grading scale includes the grades: Fail, Pass, Pass with distinction

To pass the entire course, approved written examination and approved laboratory sessions, demonstrations and group work, are required.

The final grade is decided by the result of the written examination.

The grading scale for laboratory sessions, demonstrations and group work is Fail, Pass, whereas written examination is graded according to the scale Fail, Pass, Pass with Distinction.

## **Entry requirements**

For admission to the course, 135 credits of scientific studies including knowledge corresponding to 45 credits of molecular biology including cell biology, genetics and microbiology, 30 credits chemistry including biochemistry, and a 15 credits elective second cycle course in molecular biology. English 6/English B.

## **Further information**

The course may not be included in a degree together with BIOR79 Methods in Molecular Biology 15 credits.

The course is given by The Department of Biology, Lund University.