



*Course syllabus*

# Mikroskopi, Bio-imaging Microscopy, Bio-Imaging

**EXTP60, 7,5 credits, A (Second Cycle)**

**Valid for:** 2023/24

**Faculty:** Faculty of Engineering, LTH

**Decided by:** PLED W

**Date of Decision:** 2023-03-27

## General Information

**Elective for:** BME4

**Language of instruction:** The course will be given in English on demand

## Aim

## Learning outcomes

*Knowledge and understanding*

For a passing grade the student must

- be able to carry out investigations in which biological structures and functions are visualized using methods based on fluorescence microscopy.
- understand the major limitations and opportunities in various methods based on light and fluorescence microscopy.

*Competences and skills*

For a passing grade the student must

- be able to apply basic methodology in histology, histochemistry, immunocytochemistry and in situ hybridization.
- be able to apply basic methodology in the microscopic analysis of living cells.
- be able to produce digital images of microscopic preparations.

### *Judgement and approach*

For a passing grade the student must

- be able to plan an investigation in which biological structures or functions are visualized by microscopy.
- be able to value possibilities and limitations of various types of "advanced" research microscopes and imaging methods that are not based on optical microscopes.

## Contents

A theoretical introduction to microscopy, with emphasis on fluorescence microscopy. Theoretical principles of confocal microscopy and the use of deconvolution in microscopy. Overview of different types of advanced research microscopes, as well as imaging methods that are not based on optical microscopes. Preparation and optimization of both fixed and live samples for microscopy. Microscopic visualization of cellular structures and physiological functions with fluorescent markers. Theoretical introduction to digital visualization, with an emphasis on fluorescence-based methods and digital imaging. Practical project - including, preparation, documentation and analysis of microscopy specimens - with oral and written presentation.

## Examination details

**Grading scale:** UV - (U,G,VG) - (Fail, Pass, Pass with Distinction)

**Assessment:** To pass the course, students must pass a written test, hand in a satisfactory project report, including oral presentation of the project, as well as participation in the compulsory course activities. The final grade is determined by weighing the results of the written test and the project reports.

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.

## Admission

### **Admission requirements:**

- KOKA20 General and Organic Chemistry
- EXTA70 Biology of the Cell or TEK295 Biology of the Cell
- EXTG50 Human Physiology or TEK015 Human Physiology

**The number of participants is limited to:** No

**The course overlaps following course/s:** BIOS08

## Contact and other information

**Course coordinator:** David O'Carroll , david.ocarroll@biol.lu.se

**Course homepage:** <https://www.biologi.lu.se/utbildning/grund-och-avancerad-utbildning/kurser/kurser-avancerad-niva/biologiska-kurser-pa-avancerad-niva-for-teknologer>

**Further information:** The course is given together with BIOS08.