Course syllabus for

# Advanced diagnostic pathology, 7.5 credits

Avancerad patologisk diagnostik, 7.5 hp
This course syllabus is valid from autumn 2025.
Please note that the course syllabus is available in the following versions:
Autumn2024 , Autumn2025

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| Course code | 3BL011 |
| Course name | Advanced diagnostic pathology |
| Credits | 7.5 credits |
| Form of Education | Higher Education, study regulation 2007 |
| Main field of study | Biomedical Laboratory Science |
| Level | AV - Second cycle |
| Grading scale | Pass with distinction, Pass, Fail |
| Department | Department of Laboratory Medicine |
| Decided by | Education committee LABMED |
| Decision date | 2024-03-21 |
| Revised by | Education committee LABMED |
| Last revision | 2024-10-07 |
| Course syllabus valid from | Autumn 2025 |

## Specific entry requirements

Completed biomedical laboratory science education with a specialty in Biomedical Laboratory Science of about 180 credits or a Bachelor's degree in biomedical laboratory science. In addition, proficiency in Swedish and English equivalent to Swedish B/Swedish 3 and English A/English 6.

## Objectives

The general aim of the course is that the students should develop advanced knowledge in and understanding of the modern pathology laboratory including pathology and artificial intelligence and biomarkers for diagnostics and molecular pathology. The aim is in addition to give an insight into how the methods are used in clinical diagnostics and other fields relevant for biomedical scientists.

**On completion of the course, the student should be able to:**

**Knowledge and understanding**

- Compare and explain the choice of advanced diagnostic methods and biomarkers in the modern pathology laboratory
- Theorise and reflect on the concept of precision medicine and how it is used in diagnostics

- Theorise and reflect on how machine learning and artificial intelligence can be used in current and future diagnosis and care applications.

**Skills and abilities**

- Independently search, analyse, and evaluate the choice of advanced methods in pathological diagnostics for profession-relevant human diseases
- Apply different applications for machine learning for advanced image analysis, present results, and formulate conclusions based on the results
- Problematise over ethical issues around digital pathology

**Values and perspectives**

- Apply a scientific and reflecting attitude.

- Reflect on patient-ethical, integrity, and computer security-related and socioeconomic issues associated with these methods in clinical activities.

- Relate and reflect on the UN´s global sustainable development goal and the advanced pathology of today.

# Content

The course content is based on and is a specialisation of previous knowledge in pathology and molecular diagnostics in candidate and the master's educations for biomedical scientist. The students acquire advanced knowledge in:

- Inflammation and relation to diseases

- Tumour pathology

- Diagnostic methods in pathology

- Machine learning and artificial intelligence

- Precision medicine

# Teaching methods

The teaching and learning will be based on student-centered and student-engaged teaching and learning.

The students start by taking part in teacher-prepared material in the form of video presentations, scientific articles, video demonstrations, and assigned questions related to the material. Thereafter, the students meet digitally together with teachers and talk and discuss their different answers to the questions.

Digital seminars where scientific articles are discussed based on methods, results, and ethical and equal condition perspectives.

Digital demonstrations of various digital images that the students may apply thereafter on given data and be presented as written assignments.

# Examination

The course is examined individually in writing. A Pass grade requires active participation in the teacher-supervised activities and passed final written examination that is graded Fail/Pass/Pass with distinction.

The teacher-supervised activities and the project presentations are compulsory. The examiner decides if, and how, absence from compulsory parts can be compensated. Study results cannot be reported until the student has participated in compulsory course elements or compensated for any absence in accordance with instructions from the examiner. Absence from a compulsory educational component may mean that the student cannot take the opportunity until the next time the course is given.

Students who do not pass a regular examination are entitled to re-examination on five more occasions. If the student has carried out six failed examinations/tests, no additional examination or new course admission is approved.

Each occasion the student participates in the same test counts as an examination. Submission of a blank exam is considered an examination occasion. In case a student is registered for an examination but does not attend, this is not regarded as an examination.

In the event of special circumstances, or if a student with a disability is in need of certain adjustments, the examiner may decide to depart from the syllabus' regulations on examination form, number of examination opportunities, possibility of completion or exemption from compulsory educational elements, etc. Content and intended learning outcomes as well as the level of expected skills, knowledge and abilities must not be altered, removed or lowered.

# Transitional provisions

For a course that has been discontinued, undergone major changes, or where the reading list has been significantly changed, an additional exam (other than the regular exam) of the previous content or literature should be conducted for a period of one year from the date the change took place.

# Other directives

The course is given in Swedish where certain parts, and course material is given in English. Course evaluation is carried out according to the guidelines that are established by the Committee for higher education

# Literature and other teaching aids