2. Entry requirements:
Three to five ECTS gained in basic microscopy and techniques of preparing biological preparates for microscopy in previously completed studies.

3. Objectives of the course and intended learning outcomes:
(competences)
Educational aims: The aim of the subject is to build of the student's knowledge of microscopic techniques and image analysis. The students will be given a theoretical and practical presentation of various microscopic techniques, their usefulness, advantages and possible deficiencies. Techniques of preparing biological preparates will be shown in practical cases.
Intended learning outcomes: Students will obtain knowledge of the physical bases of microscopic techniques. In addition students will become familiar with basic skills, image processing and analysis and they will also be acquainted with basic interpretations of the micrography of biological samples.

4. Syllabus outline:
Recognition of and building on basic light microscopy techniques (e.g., transmission microscopy, microscopy in a dark field, phase-contrast microscopy, interference contrast-DIC microscopy and fluorescent microscopy) including presentation of their advantages and physical background. Presentation of procedures of taking microscopic pictures, their analysis and 3D-reconstruction.
Presentation of the principles, advantages and techniques of transmission electronic microscopy (TEM) in cases of viruses, bacteria and eucaryontic cells. Acquaintance with basic procedures of preparing biological preparates with negative contrast, chemical fixation and freezing. Examples of analysis of micrographs of eucaryontic cells.
Familiarity with techniques of scanning electron microscopy (SEM), procedures of preparing biological samples for this type of microscopy and analysis of SEM micrographs.
Use of techniques of focused ionic beam -FIB/SEM on biological samples.
Presentation of correlative microscopy (light/electronic /AFM).
Principle of operation, background and examples of high resolution transmission electron microscopy (HRTEM), atomic force microscopy (AFM) and spectroscopic methods (EDXS, EELS) of biological samples.
5. Literature (in the case of books and monographs, study sources are only selected chapters from them):

- Izbrani članki iz revij:
  - »New« Microscopy and microanalysis online journal; Wiley and Sons
  - Journal of Microscopy, Blackwell publishing

6. Teaching methods:
Lectures, consultations, seminars, practical laboratory work, project work.

7. Assessment methods:
Seminar task on chosen microscopic technique (40%), project task (60%).

8. References:

Štrus Jasna

Kostanjšek Rok
1. KOSTANJŠEK, Rok, LAPANJE, Aleš, RUPNIK, Maja, ŠTRUS, Jasna,
