Title of module	Advanced Practical in the Focal Point Programme: "Molecular Medicine" VZ: 185881 **" Electron microscopy of biological specimens"**

Credit points	7.5 (of 15)	***Available in semester(s)***	2
Hours per week	9	***Compact course***	☒

Lecturer(s)	A. Unger and teaching assistants
Teaching methods	A five-week all-day practical lab course with a compulsory seminar presentation. **Please note:** A second Advanced Practical will have to be performed in the same semester to earn the full complement of 15 credits
Evaluation of learning progress	Active participation, feedback during independently performed experiments, project discussions with the supervisor
Mode of examination	Assessment of experimental skills during the practical (50%), a written project report (40%), and a seminar presentation of experimental results (10%).
Learning objectives	In this course we will acquire basic aspects of the organisation of animal cells with different electron microscopical techniques.We elaborate the theoretical EM background and provide a full program for the preparation of specimens and analysis. This includes tissue preparation, fixation, dehydration and embedding into resins. The participants can learn how to cut ultrathin sections with glas- and diamond knifs and counter-staining with different heavy metal salts. Candidates will independently work with a Zeis EM 910 including digital camera system. After completion of the course students will have aquired basic skills in the preparation of electron microscopical speciments, analysis with the EM and interpretation of self-made pictures and plates.
Soft skills	Participans should elucidate and present the obtained results on a poster.

Contents of module

Topic:
"Electron microscopy of animal specimens"

Content:

1)Cytoskeletal structures of animal cells
2)Demonstration of actin filaments by negative stain
3)Titin stains in negative contrast
4)The extracellular matrix: Kollagen
5)DNA-preparation for EM
6)Localisation of structural proteins by various Immuno-EM techniques

Methods:

1)Tissue dissection, fixation, resin embedding
2)Ultramicrotomy (40-80nm sectioning)
3)Counter- &, Immunostainings (Nano-Gold)
4)Negative staining
5)"Freeze fracture" techniques (if possible)
6)to some extent: native preparation of proteins
(Chromatography, SDS-PAGE, Blotting)

Note:
The course can qualify students for further independent diploma/master/phD works in our EM facility of the RUB.