Molecular Imaging

Single subject course

7.5 credits

Molekylär avbildning

8FA226

Valid from: 2014 Spring semester

Determined by
The Board for First and Second Cycle Programmes at the Faculty of Health Sciences

Date determined
2013-10-30

Main field of study
Medical Biology

Course level
Second cycle

Advancement level
A1X

Entry requirements
At least three years of full-time undergraduate studies (180 credits) in a major subject area with relevance for biomedical sciences. This could include previous studies at faculties of medicine, technology/natural sciences, odontology or veterinary medicine. A major part of courses (90 credits) should be in subjects such as biochemistry, cell biology, molecular biology, genetics, gene technology, microbiology, immunology, histology, anatomy, and pathology. The lowest acceptable grade from undergraduate studies is Pass. Applicants must also have documented knowledge of English equivalent to Engelska B/Engelska 6.

Intended learning outcomes

The course aims to give the student knowledge in the vast field of molecular imaging with a focus on the molecular processes that can be monitored and studied rather than on technical aspects around imaging.

LEARNING OUTCOMES
After the course the student will be able to:

Knowledge and understanding
-Account for what kind of biological, physiological and pathophysiological processes that can be studied with molecular imaging
-Describe the contrast mechanisms in different molecular imaging modalities
-Describe methods for quantification in molecular imaging and how they relate to studied biological or physiological process
-Describe different visualization techniques in molecular imaging
-Account for how different molecular imaging techniques and other imaging techniques are combined to improve the interpretation of molecular imaging

Competence and skills
-Use image analysis and visualization software to interpret and visualize the result from a molecular imaging experiment

Judgement and approach
-Evaluate advantages and disadvantages of different molecular imaging techniques when applied in different clinical and pre-clinical situations

Course content

-Molecular imaging
-Image generation technology: Positron Emission Tomography (PET), Single Photon Emission Computed Tomography (SPECT), Magnet Resonance (MR), MR-spectroscopy, hyperpolarized MR, Electron Paramagnetic Resonance Imaging (EPR), Computed Tomography (CT), Ultrasound Imaging (US), optical methods, and electron microscopy.
-Contrasts mechanisms in molecular imaging
-Use of micro-dosing in drug design
-Image quantification, image analysis, and image visualization techniques

Teaching and working methods

General: Linköping University Master's Programme in Experimental and Medical Biosciences applies student-centered learning among which Problem Based Learning (PBL) is one pedagogical philosophy and method. To prepare the students for future employment, practical and experimental work in laboratory settings are important parts of the programme in courses as well as in individual projects.
Specific: In this course, lectures, laboratory exercises and seminars are used.

Examination

COMPULSORY ITEMS
Active participation in the compulsory parts is necessary to pass the course, and assessment of them is carried out continuously. Compulsory parts in this course are: laboratory exercises and seminars.

EXAMINATION
Individual written examination.
Oral presentation of laboratory exercises results (group assignment with individual assessment).

SCOPE OF RE-EXAMINATION
The extent of a re–examination shall be similar to the regular examination.

CHANGE OF EXAMINERS
Students who have failed the course or part of the course twice are entitled to request another examiner for the following examination occasion, unless specific reasons are present.

REGISTRATION FOR EXAMINATION
The procedure for registration should be stated prior to the commencement of each course. In other respects, regulations concerning examination and examiners are applied in accordance with Linköping University policy.

Grades

Three-grade scale, U, G, VG

Other information

The planning and implementation of a course must take its starting point in the wording of the course plan. The course evaluation included in each course must therefore take up the question how well the course agrees will the course plan. The course is carried out in such a way that both men's and women's experience and knowledge is made visible and developed. If the course is withdrawn, or is subject to major changes, examinations according to this course plan are normally offered on a total of three occasions within one year, one of them in close connection to the first examination.

Department

Institutionen för hälsa, medicin och vård