Physics in Medicine: Fundamentals of Medical Imaging (A) - physics773

Degree - M.Sc. in Physics (PO von 2014)

Module	**Elective Advanced Lectures: Applied Physics**
Module No.	physics70b

Course	**Physics in Medicine: Fundamentals of Medical Imaging (A)**
Course No.	physics773

Category	**Type**	**Language**	**Teaching hours**	**CP**	**Semester**
Elective	Lecture with exercises	English	3+1	6	ST

Requirements for Participation:

Preparation: Lectures Experimental Physics I-III (physik111-physik311) respectively

Form of Testing and Examination: Requirements for the examination (written or oral): successful work with the exercises

Length of Course: 1 semester

Aims of the Course: Understanding of the principles of physics of modern imaging techniques in medicine

Contents of the Course:

Introduction to physical imaging methods and medical imaging; Physical fundamentals of transmission computer tomography (Röntgen-CT), positron emission computer tomography (PET), magnetic resonance imaging (MRI) and functional MRI

detectors, instrumentation, data acquisition, tracer, image reconstruction, BOLD effect; applications: analysis of structure and function.

Neuromagnetic (MEG) and Neuroelectrical (EEG) Imaging; Basics of neuroelectromagnetic activity, source models

instrumentation, detectors, SQUIDs; signal analysis, source imaging, inverse problems, applications

Recommended Literature:

K. Lehnertz: Scriptum zur Vorlesung

S. Webb; The Physics of Medical Imaging (Adam Hilger, Bristol 1988)

O. Dössel; Bildgebende Verfahren in der Medizin (Springer, Heidelberg 2000)

W. Buckel; Supraleitung (Wiley-VCH Weinheim 6. Aufl. 2004)

E. Niedermeyer/F. H. Lopes da Silva; Electroencephalography (Urban & Schwarzenberg, 1982)