Course Unit Descriptor

Study Programme: Physics		
Course Unit Title: The Essential Physics of Medical Imaging		
Course Unit Code: F18HI		
Name of Lecturer(s): Associate Professor Jovana Nikolov		
Type and Level of Studies: Bachelor Academic Degree		
Course Status (compulsory/elective): Elective		
Semester (winter/summer): Summer		
Language of instruction: English		
Mode of course unit delivery (face-to-face/distance learning): Face-to-face		
Number of ECTS Allocated: 6		
Prerequisites: -		
Course Aims: This module aims to introduce the physics, mathematics, instrumentation and clinical applications of all common medical imaging modalities including X-ray radiography, computed tomography (CT), ultrasound imaging, positron emission tomography (PET), and magnetic resonance imaging (MRI).		
Learning Outcomes: The overall competence is acquiring knowledge and students' ability for individual and team scientific research work in the field of applying physical concepts to the commonly used and emerging medical imaging modalities. The specific competences are, for example: • develop basic knowledge of the medical imaging modalities including X-ray/CT, nuclear medicine, ultrasound and magnetic resonance imaging • develop an understanding of general issues in medical imaging that span the common modalities • develop a competence in the fundamental analytical and computational tools used in medical imaging.		
Syllabus: *Theory:* Introduction to medical imaging. Image quality: spatial resolution, convolution. Image contrast, noise. SNR, CNR, ROC. X-ray imaging. Computed Tomography imaging. Nuclear Medicine: clinical applications, basic principles. Nuclear Medicine imaging: SPECT, PET. MRI: basic physics and imaging technique. Ultrasound: physical principles and imaging modalities. *Practice:* Practical classes are held in the adequate clinics of Medical Faculty, University of Novi Sad wherein students may be introduced to the practical application of medical imaging modalities in medicine.		
Required Reading: 1. Paul Suetens, Fundamentals of Medical Imaging, Cambridge University Press, 2009. 2. Nadine Barrie Smith, Andrew Webb, Introduction to Medical Imaging Physics: Engineering and Clinical Applications Cambridge University Press, 2011. 3. Anthony B. Wolbarst, Patrizio Capasso, Andrew R. Wyant: Medical Imaging: Essentials for Physicians, John Wiley & Sons, Inc., Hoboken, New Jersey, 2013.		
Weekly Contact Hours:	**Lectures:** 3	**Practical work:** 2

Teaching Methods: Lectures, seminars and practical work.			
Knowledge Assessment (maximum of 100 points):			
Pre-exam obligations	points	**Final exam**	points
Active class participation	-	written exam	50
Practical work	10	oral exam	20
Preliminary exam(s)	-	…….	
Seminar(s)	20		
The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.			