Course Unit Descriptor

Study Programme: Physics		
Course Unit Title: Diagnostic Radiology Physics		
Course Unit Code: M18FORD		
Name of Lecturer(s): Associate Professor Jovana Nikolov		
Type and Level of Studies: Master Academic Degree		
Course Status (compulsory/elective): Compulsory		
Semester (winter/summer): Winter		
Language of instruction: English		
Mode of course unit delivery (face-to-face/distance learning): Face-to-face		
Number of ECTS Allocated: 8		
Prerequisites: Radiation and life		
Course Aims: The aim of this course is that future medical physicists gain a clear picture of the physical principles which are the basis of all diagnostic methods in radiology.		
Learning Outcomes: General Skills: Students will have an insight into the practical application of achievements of experimental physics in medicine. Specific Competencies: Students will learn about the application of experimental physics (radioisotopes and ionizing radiation) in radiological techniques used in medical diagnostics, they will also learn main characteristics of radiodiagnostic methods and optimization of the system of quality control in radiodiagnostic procedures.		
Syllabus: *Theory* Characteristics of the spectra obtained in diagnostic radiology (structure of carbon atoms, electromagnetic radiation, bremsstrahlung, X-rays, the angular distribution of diagnostic X-ray, "Heel" effect, filtration characteristics of the X-ray spectrum, the quality of the beam, STP). Generating radiodiagnostic spectra (apparatus, X-ray generators and X-ray tube, an exposure time, the influence of kVp, mAs and target material on the X-ray spectrum). The interaction of the diagnostic X-rays with tissue (The influence of the photoelectric effect and the contrast produced by Compton effect, the main characteristics of radiation: exposure, the dose, the attenuation coefficients, absorption coefficients, the dosage of the tissue). Basic concepts of imaging. X-ray detectors (Fluoroscopy, X-ray computer systems, Digital Radiography). Imaging modalities with ionizing radiation. Fundamentals of mammography. Physical principles of computed tomography (CT). Dosimetry in diagnostic radiology (doses, an equivalent dose, the effective dose, the absorbed dose in radiography and fluoroscopy, CT dosimetry, diagnostic reference levels, patient dosimetry). *Practice* Practical work - overview of radiodiagnostic procedures in clinics. Term paper.		
Required Reading: 1. “Physics for Diagnostic Radiology”, Philip Palin Dendy, Brian Heaton, CRC Press (1999) 2. “Diagnostic Radiology Physics: a handbook for teachers and students”, IAEA (2014).		
Weekly Contact Hours:	**Lectures:** 3	**Practical work:** 3

Teaching Methods: Lectures, seminars and practical work.			
Knowledge Assessment (maximum of 100 points):			
Pre-exam obligations	points	**Final exam**	points
Active class participation	5	written exam	20
Practical work	-	oral exam	50
Preliminary exam(s)	-	…….	
Seminar(s)	25		
The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.			