Program	Level of studies		Second cycle	
	Program name		Physics	
Course name	**SIMULATION AND DATA PROCESSING IN MEDICAL RADIATION PHYSICS**			
Course ID	Semester	Course status	ECTS credits	L+E
PCS9621	**I**	**ELECTIVE**	**6**	**2+2**
Lecturer	**Doc. dr. Adis Alihodžić, Prof. dr. Davorin Samek**			
Aims and intended learning outcomes	The aim of the course is to teach the students to analyze and process physical data and medical images, and to learn appropriate sofware packages use. After mastering the course students can use MATLAB / Octave software packages for statistical processing data, process simulation and image processing.			

Course content
Stochastic and deterministic events. Graphical and numerical methods in statistics. Comparative studies. Measures of morbidity and mortality. Relative risk. Mantel-Heinsel method. Standardized Mortality Rate. Tools for statistics in MATLAB and Octave. Functions and apps to describe, analyze, and model data. Descriptive statistics. Generating random numbers for Monte Carlo simulations. Regression and classification algorithms. Correlation coefficient.   Multiple regression analysis. Regression model with several independent variables. Polynomial regression. Estimation and significance of regression parameters. Logistic regression.   Medical image processing, analysis and visualization. Image segmentation, noise reduction, geometric transformation.

Student workload (hours)		Grading	
Lectures and Exercises	60	Assessment method	Points
Exam preparation	90	Midterm exams	50
Total	150	Final exam	50
		Total	100

Literature
1. Chap T. LE, Introductory Biostatistics, John Wiley & Sons, Inc., Hoboken, New Yersey, 2003   2. MathWorks, Statistics and Machine Learning Toolbox   3. MathWorks, Image Processing Toolbox

Remarks
The student must win a minimum of 55% of points on both midterm exam and final exam in order to successfully pass the exam.