University of Niš Faculty of Medicine	Study program: **INTEGRATED ACADEMIC STUDIES OF MEDICINE** *ACCREDITATION 2018*	

Course: Physics in medical diagnosis

Course head: prof. dr Tatjana Jovanović

Course status:	Elective
Semester: III	**Study year: II**
ECTS: 4	**Course code:** M-II-9.b

Course purpose:

The program of the course aims to:

- demonstrate and explain tissue interactions and radiation upon which diagnostic methods are based;
- focus on the properties of tissue which determine the image obtained by particular methods;
- demonstrate the association of imaging parameters and image quality: image resolution, signal/noise ratio, contrast;
- instruct students to prepare seminar papers related to new achievements in medicine.

Course outcome: (knowledge, skills, attitudes)

Course outcome consists in the implementation of diagnostic methods based on the principles of physics, which should facilitate learning in clinical courses and clinical practice.

Nr. of classes of active teaching: 30

Lectures: 15	**Practice: 15**

Course content

Theoretical teaching

- Methods of spectroscopy intended to determine the structure of biomolecules;
- Magnetic resonance in medicine, basis of NMR spectroscopy and imaging; parameters;
- Physical properties of lasers; interaction of laser radiation with biological structures;
- X-ray tube; production and spectrum of x-rays; interaction of x-ray photons with biological tissues;
- Physical basis of the devices for radioactive radiation in medicine; physics of the ultrasound; sonography, resolution;
- Endoscopy.

Practice

- Seminars;
- Infrared and optical spectroscopy of biological macromolecules;
- Analysis of the process of diffusion by way of PC-assisted NMR;
- Lasers in medicine;
- Classical imaging; image enhancer, xerographical procedure, resolution and contrast;
- Dosimetry and radiation protection;
- Interactions of sound waves with tissues;
- Lab practice;
- Determination of the linear coefficient of absorption of gamma rays with a G.M.-counter;
- Difraction of laser light;
- Sound and ultrasound.

Recommended literature:

1. D. Ristanović i saradnici, Biofizika, Medicinska knjiga, Beograd, 1993.
2. Udžbenici i časopisi iz medicine i medicinske dijagnostike koje studenti mogu pogledati u biblioteci Medicinskog fakulteta u Nišu
3. J. Brnjas-Kraljević: Struktura materije i medicinska dijagnostika, Medicinska knjiga 2001.
4. B. Jovanović, B. Živković, T. Jovanović, Praktikum iz biofizike, Niš, 2002.

Teaching methods:

- Interactive theoretical and practical teaching
- Consultations
- Seminar papers

Required previously passed exams:
None
Grade (max. 100 points)
Pre-exam obligations
▪ Presence and activity during lectures: 0 – 5 points ▪ Activity during practice classes: 0 – 25 points ▪ Seminar papers: 0 – 40 points
Final exam
▪ Written exam (test): 0 – 30 points