# SYLLABUS

**1. Course title:**

Medical Image Processing and Analysis

**2. Code:**

BMI203

**3. Cycle of study:**

1

**4. ECTS credits:**

6

**5. Type of course:**

◯ Mandatory ◉ Elective

**6. Prerequisites:**

[RI101] Introduction to Programming

**7. Class restrictions:**

Students of the Faculty of Electrical Engineering, study program "Electrical Engineering and Computer Science", that

**8. Duration / semester:**

1 7

**9. Weekly contact hours:**

9.1. Lectures: 3

9.2. Seminars: 0

9.3. Laboratory/Practice classes: 1

**10. Faculty:**

Faculty of Electrical Engineering

**11. Department/study program:**

Electrical Engineering and Computer Science

**12. Lecturer:**

PhD. Amira Šerifović-Trbalić, assistane prof.

**13. Lecturer's e-mail:**

amira.serifovic@untz.ba

**14. Web site:**

www.fet.ba

**15. Course aims:**

The aim of the course is to familiarize students with different medical image modalities and to present the knowledge needed to understand, develop and apply algorithms and software to medical image data as well as extract useful quantitative information from medical image data. Students should acquire theoretical and practical skills in the field of medical image processing and analysis as well as for image processing and analysis in general.

**16. Learning outcomes:**

At the end of the semester, successful students, who fulfilled their obligations during the semester, should acquire theoretical and practical skills in the field of medical image processing and analysis, as well as for image processing and analysis in general.

**17. Course content:**

Introduction to medical image processing and analysis. Medical image acquisition and imaging modalities: X-ray, CT (Computed Tomography), MRI (Magnetic Resonance Imaging), ultrasound, nuclear medicine and microscopy. Medical image storage, archiving and formats. Medical image processing, enhancement, filtering: basic image processing algorithms, thresholding, contrast enhancement, SNR characteristics, filtering, histogram modeling. Medical image visualization: shape analysis and modeling, surface and volume rendering, animation and interaction. Medical image segmentation. Medical image registration. Medical image search and retrieval. Applications of medical imaging.

**18. Learning methods:**

Lectures - a PowerPoint presentation is used, and plates and chalk are used for further explanations.
Laboratory exercises - compulsory student attendance and active participation in classes. The laboratory exercises use the Matlab software package to test the solutions of assignments. The assignments are given on the foregoing laboratory exercises.

**19. Assessment methods:**

The final grade is formed on the basis of continual knowledge testing, which is performed during the semester in the form of tests and final exams. The first test is held in the 8th week of the semester and covers the course material processed in the first 7 weeks of the semester. The second test is held in the 12th week of the semester and covers the course material from the 8th to the 11th weeks of the semester. All students are writing the test at the same time and can achieve up to 30 points per each exam. The final exams cover the entire course material, focusing on subjects not covered by the tests. At the final exam, the student can earn a maximum of 30 points. Points gained on all forms of knowledge testing are recognized as a cumulative exam and the student must have at least 54 cumulative points to pass the exam.

**20. Assessment components:**

The final grade is based on the total number of points the student has obtained by fulfilling the prerequisites and passing the final exam. A student can earn up to maximum 100 points. Student assessment is based on the following criteria:
1. attendance and activity at the lectures and exercises (presence at the lectures 5 points and presence at the laboratory exercises 5 points)
2. points achieved on tests (60 points)
3. final exam scores (30 points)

**21. Required reading list:**

G. Dougherty: “Digital image processing for Medical Applications“, Cambridge University Press, 2009
J.L.Semmlow: “Biosignal and Medical Image Processing, MATLABBased Applications“, 2008
P. Suetens: “Fundamentals of Medical Imaging“, Cambridge University Press, 2009

**22. Web sources:**

(max. 687 characters)

**23. Applicable starting from the academic year:**

2016/2017

**24. Adopted in the Faculty/Academy session:**

04.04.2016.