# SYLLABUS

**1. Course title:**

Digital Signal Processing

**2. Code:**

TK004

**3. Cycle of study:**

1

**4. ECTS credits:**

6

**5. Type of course:**

(•) Mandatory ( ) Elective

**6. Prerequisites:**

**7. Class restrictions:**

(max. 150 characters)

**8. Duration / semester:**

1 5

**9. Weekly contact hours:**

9.1. Lectures: 3

9.2. Seminars: 1

9.3. Laboratory/Practice classes: 1

**10. Faculty:**

Faculty of Electrical Engineering

**11. Department/study program:**

Electrical Engineering and Computer Science

**12. Lecturer:**

Ph.D. Nermin Suljanovic, full prof.

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

nermin.suljanovic@untz.ba

**14. Web site:**

(max. 50 characters)

**15. Course aims:**

Introduce basic principles of digital signal processing to students.

**16. Learning outcomes:**

Deterministic signal analysis in time and frequency domains.
Determination of time-discrete LTI system response to arbitrary sequences.
Determination of LTI system properties form impulse response.
Time-continuous signal processing using DSP platforms.
Determination of signal spectrum using discrete Fourior transforms.
FIR filter design.
IIR filter design.

**17. Course content:**

Advantages of digital signal processing. Discrete-time systems and z-transform. Discrete Fourier Transform (DFT) and properties. Fast Fourier Transform (FFT). Discrete convolution. Digital filtering. Finite Impulse Response (FIR) filter. Windowing. Infinite impulse response (IIR) filters. Digital filter design. FPGA platforms for signal processing. VHDL implementation of basic DSP operations.

**18. Learning methods:**

Lecturing with projected presentations and necessary derivations on blackboard, with active student participation. Seminars include problem solving and use cases. Laboratory is based on numerical simulations and practical uses cases.

**19. Assessment methods:**

Test and homeworks during semester and final exam.

**20. Assessment components:**

Midterm test and homeworks are 60% of the final grade. The final written test is 40%.

**21. Required reading list:**

- J.G.Proakis, D.G. Manolakis, Digital Signal Processing, Principles, New Jersey, 1996.
- A. V. Oppenheim, R. W. Schafer, Discrete-Time Signal processing, Prentice-Hall, 1989.
- J. McAllister, G. Lightbody, Y. Yi, FPGA-based Implementation of Signal Processing Systems, Wiley, 2008.

**22. Web sources:**

(max. 687 characters)

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

2016/17

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

04.04.2016