SYLLABUS

1. Course title:

Digital Control Systems and Signal Processing II

2. Code:

AR401

3. Cycle of study:

1

4. ECTS credits:

6

5. Type of course:

◉ Mandatory   ○ Elective

6. Prerequisites:

[AR301] Digital Control Systems and Signal Processing I

7. Class restrictions:

8. Duration / semester:

1   8

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:

Phd. Zenan Šehić, full professor

13. Lecturer's e-mail:

zenan.sehic@untz.ba

14. Web site:

15. Course aims:

The aim of the course is to familiarize students with signal analysis and modern methods of signal analysis. Introduce students to the types of signals, signal analysis in time and frequency domain. Spectral analysis. Understanding the basics of sampling, modulation and discretization. Introducing students to the fundamentals of filtering, and their realizations. Analog and digital (IIR and FIR).

16. Learning outcomes:

Learning outcomes are that students overcome the signal analysis and modern methods of signal analysis.

17. Course content:

Types of signals. Record signal with basic functions. The signal vector space. Frequency and time of transformation and deterministic aperiodic and periodic signal. Random functions and their record. Time averaging and sampled. Ergodizem. Spectral representation of the signal. Using the discrete convolution and correlation. Modulation. Sampling. Discrete Fourier transformation. Transformation Z. Digital filters:

Basics of filtering. Types of filters: analog, digital and SC filters. The ideal power filter. Lowpass, highpass, Reintroductioa sealed, spillable Reintroductioa and others. Ideal impulse response filter. Approximation lowpass ideal frequency characteristics due to the sub parameters. Butterworth, Cebis, elliptic and Bessel-Thomson approximation. A frequency mapping. Sensitivity analysis. The realization of active filters. Cascade connection of members of the first and second order.

Modeling with the differential equation. Recursive and nonrecursive systems. Systems with finite (FIR) and infinite impulse response (IIR). Convolution. Sinusoidal steady state

18. Learning methods:

Planned activities: concrete experience, observation and reflection, creation of abstract concepts and active experimentation. Preferred learning styles are: visual style, auditory, verbal, kinesthetic, logical-mathematical, social and independent. The most important learning methods are:
- Lectures with the use of multimedia resources, active learning techniques and with student's active participation and discussion;
- Auditive exercises;
- Preparation and presentation of group and individual seminar papers

19. Assessment methods:

The exam is conducted orally and in writing. The written exam is a combination of theoretical issues and computational examples done on lectures and laboratory exercises. The final exam is oral exam consisting of theoretical issues.

20. Assessment components:

Student's obligations	Points
Attendance at lectures	5
Attendance at exercises	5
Seminar	10
Mini tests	30 (2x15)
Total preexam obligations	50
Final exam up to	50

21. Required reading list:

K.Ogata: "Discrete time control", Prentice-Hall, 1990

K.Astrom, B. Wittenmark: "Computer Controlled Systems", Prentice-Hall, 1997

22. Web sources:

23. Applicable starting from the academic year:

2016/2017

24. Adopted in the Faculty/Academy session:

04.04.2016