SYLLABUS

1. Course title:

Stohastic Systems and Estimation

2. Code:

AR202

3. Cycle of study:

1

4. ECTS credits:

6

5. Type of course:

(•) Mandatory ( ) Elective

6. Prerequisites:

[AR102] Linear Dynamic Systems and Signals

7. Class restrictions:

Students of Faculty of Electrical Engineering, Study program "Electrical Engineering and Computer Science"

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. Lejla Banjanović-Mehmedović, Assoc. P

13. Lecturer's e-mail:

lejla.mehmedovic@untz.ba

14. Web site:

www.lejla-bm.com

15. Course aims:

The goal of this course is introducing to the problems of stochastic systems and estimation theory. In this sense, students become familiar with the fundamentals of stochastic systems, the system parameters estimation and the system state estimation algorithms.

16. Learning outcomes:

At the end of the semester/course, successful students will be able to analyze and solve problems in the field of parameter and state estimation of stochastic systems.

17. Course content:

The concept of probability. Theorem of total probability. Bayes' Theorem. Random variables and distribution parameters. The concept of discrete and continual random variables and their distribution. The concept of two or more random variables. Joint probability distribution of random variables. Stochastic processes. Linear discrete-time stochastic systems. Linear continuous-time stochastic systems. Fundamentals of estimation. The principles of parameter estimation. Minimum Variance estimation. Estimator least square error (MSE). Estimator maximum likelihood (ML). Estimator maximum a' posteriori probability (MAP). System parameter estimation. State estimation. Linear Kalman Filter (KF). Non-linear Kalman filter (EKF). Multiple-model estimation (MME). Examples of applications in engineering.

18. Learning methods:

Lectures, seminar/practice classes, homeworks.

19. Assessment methods:

An exam is based on the continuous assessments, which are performed throughout the semester with the midterm tests and the final exam, which includes the questions related to the entire content of the course, focusing on the areas that are not covered by the midterm test.

20. Assessment components:

The final grade is based on the total sum of points from assignments, written midterm and final exam.
Presence to lectures and practice classes: 5
Midterms tests: 45
Final exam: 50
Summary: 100

21. Required reading list:

Y. Bar Shalom, Estimation and Tracking: Principles, Techniques and Software, 1998.
I. Petrović: Primjenjene tehnike estimacije, Zagreb, 2007.
B. Kovačević, Ž. Đurović: Fundamentals of Stohastic Signals, Systems and Estimation with Worked Examples

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.