SYLLABUS

1. Course title:

Systems Simulation

2. Code:

EEMS201

3. Cycle of study:

1

4. ECTS credits:

6

5. Type of course:

(•) Mandatory ( ) Elective

6. Prerequisites:

[EEMS105] Systems Modeling

7. Class restrictions:

8. Duration / semester:

1 6

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. Amir Tokić, full professor

13. Lecturer's e-mail:

amir.tokic@untz.ba

14. Web site:

15. Course aims:

The main objective of this course is to give the students the basic knowledge and skills in methods, techniques and software tools for simulation of continuous, discrete and stochastic systems using the appropriate analytical or numerical methods and computer based simulation packages.

16. Learning outcomes:

At the end of the course, students will get the knowledge and skills to: analyze and perform simulation of continual, discrete and stochastic systems, perform the analytical solving techniques of state space equation, use single-step and multi-step numerical methods for system simulation, use of software packages for simulation of different types of dynamical systems.

17. Course content:

Introduction to systems simulation. Analytical techniques for solving the state space equation: S-domain, Cayley-Hamilton's theorem. Stiff and very stiff dynamic systems. Applied numerical methods: Euler's methods, Heune's method, trapezoidal method, Runge-Kutta's methods, Introduction to multistep methods. Modeling and simulation of discrete systems. Modeling and simulation of stochastic systems: Techiques for generating and testing the random numbers. Generation of random variables. The concept of simulation of discrete stochastic systems: waiting queues. Analysis of input/output data. Linear regression. Population models. Software packages for simulation of different types of dynamical systems.

18. Learning methods:

Lectures and exercises - the classic learning approach using the board and table is applied.
Laboratory exercises - mandatory attendance of students and active participation in class. Exercises are performed in a computer center using the appropriate software packages.

19. Assessment methods:

The exam is written and oral. The written exam is a combination of theoretical issues and computational examples done on lectures and exercises. The final exam is oral exam consisting of discussion of theoretical issues.

20. Assessment components:

Rating exam is based on the total number of points that student earned by completing pre-exam and a final exam. The student can achieve a maximum of 100 points according to the following scale:
Test 1 - 45
Test 1 - 45
Total Prerequisites: 90
Final exam: 10

21. Required reading list:

A. Tokić: "Modelovanje i simulacija kontinualnih sistema", PrintCom, Tuzla, 2010.
F. E. Cellier: "Continuous System Simulation", Springer-Verlag, New York, 2006.
F. Turčinhodžič: "Metodologija simulacije: diskretni stohastički sistemi", ETF Sarajevo, 1999.

22. Web sources:

23. Applicable starting from the academic year:

2016/2017

24. Adopted in the Faculty/Academy session:

04.04.2016.