

SYLLABUS

1. Course title:

Modeling and Simulation

2. Code:

EEMS104

3. Cycle of study:

1

4. ECTS credits:

6

5. Type of course: Mandatory Elective**6. Prerequisites:**

[FIZ1] Physics I

7. Class restrictions:**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. Amir Tokić, full professor

13. Lecturer's e-mail:

amir.tokic@untz.ba

14. Web site:

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15. Course aims:

"The main objective of this course is to provide basic knowledge and skills of methods, techniques and software tools for simulation continuous, discrete and stochastic systems using appropriate analytical and numerical procedures or computer-based simulation package."

16. Learning outcomes:

At the end of the course, students will get the knowledge and skills to: analyze, model and simulate different types of continual dynamical systems, learn how to describe dynamic systems and 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 the simulation system. Analytical techniques to solve equations of state space: S - domain, Cayley-Hamilton theorem. The solid and very rigid dynamic systems. Applied numerical methods: Euler's method, Heuneov method, trapezoidal method, Runge-Kutta methods, Introduction to multistep methods. Modeling and Simulation discrete system. Modeling and simulation of stochastic systems: Techniques of generating and testing random numbers. Generation of random variables. The concept of stochastic simulation of discrete systems: queues. The analysis of input / output data. Linear regression. Population models. Software packages for simulation different types of dynamic 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. Turčinodžić: "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.