SYLLABUS

1. Course title:

Numerical Methods in Design

2. Code:

EEMS301

3. Cycle of study:

1

4. ECTS credits:

6

5. Type of course:

(•) Mandatory ( ) Elective

6. Prerequisites:

[ESKE202] Power Systems

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:

Ph.D. Amir Nuhanović, full prof.

13. Lecturer's e-mail:

amir.nuhanovic@untz.ba

14. Web site:

15. Course aims:

The goal of this course is to introduce students to numerical methods that are commonly used during power systems design: numerical methods for solving algebraic, differential and partial differential equations.

16. Learning outcomes:

After accepting of subject matter students are qualified for: model and solve partial differential equations for simpler domains by writing programs or using the appropriate software; using different numerical methods, methods of linear and nonlinear programming solve the practical problems common in the design of power networks.

17. Course content:

Numerical solutions of partial differential equations in electrical engineering. Semidiscrete and discrete methods. The method of finite differences, finite volumes methods. The accuracy and stability of the methods. Finite element method: finite element approximation, the integral form of equations and discretization. The method of moments: the integral equation. Examples of solving electromagnetic fields in the elements and systems in electronics, communications and energy devices. Computer-aided design. The basic elements of CAD systems: computer and software support. Modeling in CAD. Numerical methods of linear and nonlinear programming, stochastic and optimization methods in solving of various problems in the design of power networks. Power system components and network modeling: matrix methods, linear transformations. Numerical techniques in the simulation of steady-state and dynamic processes. Examples of the application.

18. Learning methods:

Lectures, oral and laboratory exercises: The lectures cover theoretical basics with simpler examples when needed, on oral part students work on numerical exercises, and in laboratory exercises, students solve problems using the appropriate software tool.

19. Assessment methods:

At the half of the semester written examination of the knowledge that covers up the half of subject matter is organized, enabling the student to achieve a maximum of 40 points. The attendance at the course is evaluated from 0 to 5 points, with 5 points being awarded if the student is present at all lectures and exercises, and each absence is penalized with one point. Laboratory exercises makes maximum of 15 points. The final exam makes maximum of 40 points and consists of a written and/or oral exam of the second part of the subject matter.

20. Assessment components:

The examination mark is based on the total number of points the student has obtained by fulfilling the preconditions and passing the final exam. Students can achieve a maximum of 100 points (5 + 40 + 15 + 40)

21. Required reading list:

S. Rao, Engineering Optimization, Theory and Practice, 2009.
K.Hameyer, R.Melmans, Numerical Modelling and Design of Electrical Machines and Devices (Advances in Electrical and Electronic Engineering), WIT Press, 1999.

22. Web sources:

23. Applicable starting from the academic year:

2016/2017

24. Adopted in the Faculty/Academy session:

04.04.2016