SYLLABUS

1. Course title:

Power System Analysis

2. Code:

EEMS109

3. Cycle of study:

1

4. ECTS credits:

6

5. Type of course:

(•) Mandatory ( ) Elective

6. Prerequisites:

[EEMS002] Theory of Electrical Circuits

7. Class restrictions:

8. Duration / semester:

1 7

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. Mirza Kušljugić, full prof.

13. Lecturer's e-mail:

mirza.kusljugic@untz.ba

14. Web site:

15. Course aims:

Objective of the course is introduction of matrix based techniques and methods in modeling (using static models), solutions (simulations) and analyses of stationary and short circuits states in electric power system (EPS). Procedure of analysis of physical processes in real time systems based on the results of simulations are covered in detail. Selected case studies are used to illustrate the application of presented techniques and methods when analyzing real EES.

16. Learning outcomes:

Learning outcomes are: understanding of physical processes in complex EPS in stationary state by taking into account the complex interaction between system components; to know matrix models of modeling EPS static models and simulation methods of the system response in stationary state and short-circuit state; ability to identify the need for voltage regulation, waste reduction and active power flow management, and knowledge of reactive and active power management techniques as well as understanding the application of presented methods and procedures in real EPS.

17. Course content:

Modeling of EPS components (generation, transmission, transformers and loads) in analysis of stationary states and short-circuit state. Matrix based model of calculation of stationary states (based on node voltages and load flow methods) and solution methods based on numerical procedures (Gauss-Seidel i Newton-Raphson). Calculations, allocation and measures for reduction of waste of active power and energy. Economic dispatching. Voltage and reactive power flow control. Active power flow control. Modeling of EPS components in short circuits states analysis using static models. Matrix method of calculation of short circuits states. Case study analyses: study of new production capacities connection to EPS with conventional and renewable energy sources.

18. Learning methods:

The following learning methods are used: lectures using multimedia tools, illustrations of using the presented methods in simple test systems, preparation and presentation of group seminar papers with students active participation and discussion, design of simple simulation programs in the Matlab environment, analysis of case studies on real EPS.

19. Assessment methods:

Written and oral exams are organized. Written exam is combination of theoretical questions and solutions of numerical problems, which were practiced during lectures and practice hours. Concluding exam is composed of the discussion regarding material passed on the written exam.

20. Assessment components:

Attendance 10%, written part of the exam - theory 50% , written part of the exam - assignments 30%, seminar work 10%.

21. Required reading list:

M. Hajro, M. Kušljugić: “Eksploatacija i upravljanje elektroenergetskim sistemom“,
N. Rajaković: '' Analiza elektroenergetskih sistema I'', ''Analiza elektroenergetskih sistema II''
J.J. Grainger, W.D. Stevenson, Jr.: ''Power System Analysis''

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