

## SYLLABUS

**1. Course title:**

Protective and Control Systems

**2. Code:**

ESKE401

**3. Cycle of study:**

1

**4. ECTS credits:**

6

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

[ESKE202] Power Systems, [ESKE203] Electrical Machines II, [ESKE301] Electrical Substations

**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:**

Electrical Engineering

**11. Department/study program:**

Electrical Engineering and Computer Science

**12. Lecturer:**

Ph.D. Mario Pejdanović, assistant prof.

**13. Lecturer's e-mail:**

mario.pejdanovic@untz.ba

**14. Web site:**

www.fet.ba

**15. Course aims:**

The core objective of this course is to provide students with theoretical and practical knowledge of both protective and control systems through laboratory and problem solving.

**16. Learning outcomes:**

Students will be able to understand, analyze, recognize, select and calculate the various protection and control systems used in power equipment after lectures and passed exams.

**17. Course content:**

Protective Relays: Purpose, characteristics, protection type, hardware and software relay relays  
Motor protection: Short circuit protection, overload protection, non-asymmetric protection and reverse phase sequence, overfill protection, overload protection, thermal motor protection, earthing motor protection, substructure protection, CBFP function  
Generator protection: Short circuit protection, differential generator protection, earth leakage protection, overcurrent protection  
Transformer protection: Short circuit protection, overpass protection, non-asymmetric protection, earth fault protection, Bucholz transformer protection, CBFP function, differential transformer protection  
Bus protection: overvoltage protection, undervoltage protection, earthing protection  
Protection of electrical networks: overcurrent protection, remote protection  
Numeric protection: motor, transformer, bus, power supply, test mode of numeric protective relays. Numerical block protection

**18. Learning methods:**

Theoretical knowledge is provided to students through lectures and auditorial exercises. Practical knowledge includes independent work of students through homework, auditorial exercises and laboratory exercises, and a tour of complex industrial power plant facilities.

**19. Assessment methods:**

Examination is held in written and/or orally. Written exam is a combination of theoretical questions and computational examples. It is organized in two parts. The final exam contains only theoretical questions.

**20. Assessment components:**

Students earn points through attendance at lectures, audit and laboratory exercises, and through two partial examinations, of which the first part-exam is in mid-semester and the second one at the end of the semester, and through the final exam.

**21. Required reading list:**

F. Božuta: Automatski zaštitni uređaji elektro-energetskih postrojenja, Univerzitet u Sarajevu 1980  
F. Božuta: Automatic protection devices for electro-energetic plants, University of Sarajevo 1980

**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