SYLLABUS

1. Course title:

Electromechanical Energy Conversion

2. Code:

ESKE003

3. Cycle of study:

1

4. ECTS credits:

6

5. Type of course:

(•) Mandatory ( ) Elective

6. Prerequisites:

[ESKE001] Fundamentals of Electrical Engineering I, [ESKE002] Fundamentals of Electrical Engineering II

7. Class restrictions:

8. Duration / semester:

1 4

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. Vlado Madžarević, full professor

13. Lecturer's e-mail:

vlado.madzarevic@untz.ba

14. Web site:

15. Course aims:

The main goal of this module is to give students basic knowledge of electromechanical energy conversion, both theoretically and practically through laboratory / computational problem solving.

16. Learning outcomes:

Understanding the principles of electromechanical energy conversion. Interpretation of work rotating energy converters through electromagnetic fields and Poynting vector
Understanding the principles of basic types of electromechanical power converter
The application of numerical calculations of the electromagnetic field in the electro-mechanical transducer
Understanding the operation of asynchronous, synchronous and DC electromechanical converters

17. Course content:

Electromechanical energy conversion. Interpretation of the work rotating energy converters via electromagnetic fields and Poynting vectors. Stator and rotor field. The working principle of the basic types electromechanical power inverters. Electromagnetic systems with one excitation. Electromagnetic systems with coupled windings. Electromotive force. Equation of electromagnetic forces and of electromagnetic torque. Magnetic fields in electrical machines: one-way, alternating, rotating and single-phase field. Magnetic excitation forces of concentrated and distributed windings. The higher spatial harmonics magnetic excitation force. Magnetic field and reactance wastage. The main reactance. Weather harmonics MPS. Typical sizes: losses, the degree of utilization, the concept of nominal power. The numerical calculations of electromagnetic fields in electromagnetic converters. Poynting theorem in differential and integral form. Poynting vector N. Examples of energy flow. Electromagnetic energy absorbed in the material. Poynting theorem in the material. Justification of work electromechanical energy convectors through Poynting vector.

18. Learning methods:

Lectures with the use of multimedia resources
Calculation (auditory) exercise
The experimental (laboratory) exercises

19. Assessment methods:

Examination is performed in writing, orally and combined (written + oral).

20. Assessment components:

Rating exam is based on the total number of points a 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 I 25
Test II 25
Final exam 50

21. Required reading list:

M. Petrovic: "Electromechanical converters", Belgrade, 2001.
Š. Masic: "Electrical machines", University of Sarajevo - Faculty of Electrical Engineering in Sarajevo, Sarajevo 2005th

22. Web sources:

23. Applicable starting from the academic year:

2016/2017

24. Adopted in the Faculty/Academy session:

2016/2017