

## SYLLABUS

**1. Course title:**

Energy Conversion Systems

**2. Code:**

ESKE402

**3. Cycle of study:**

1

**4. ECTS credits:**

6

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

[ESKE303] Energy Production, [ESKE003] Electromechanical Energy Conversion

**7. Class restrictions:**

(max. 150 characters)

**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. Majda Tešanović, assistant professor

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

majda.tesanovic@untz.ba

**14. Web site:**

www.fet.ba

**15. Course aims:**

Acquiring of knowledge related to various energy technologies and energy relations in modern world. Achieving level of knowledge for use in any other electrotechnical study and for further education in the field of electrical engineering.

**16. Learning outcomes:**

1. develop an intuitive understanding of energy processes in power systems with emphasis on physical explanations using (by means of) methods of thermodynamics, fluid mechanics and electrical engineering
2. analyze and calculate the basic parameters of energy processes in thermal power plants, nuclear power plants, hydro power plants and wind power plants
3. calculate entropy changes for reversible and irreversible energy processes: calculate the loss of exergy (maximum mechanical work)
4. calculate exergy, ideal, reversible and real work of energy processes
5. describe direct energy conversions to electrical energy (thermoelectric, thermionic and photoelectric transformation, fuel cells and magnetohydrodynamics generators) and electrical energy conversions to other (useful) energy forms
6. describe environmental impact of energy utilization, conversion and consumption (environmental pollution and climatic change)

**17. Course content:**

Importance of energy, energy supply, energy constraints. Energy forms and sources, classification of energy forms. Renewable and non-renewable energy sources. Transformations of primary energy forms into more usable forms and transformation of electrical energy into other forms of energy. Energy transportation and delivery. Electrical energy: generation, transmission, distribution and usage. Electrical energy consumption. Energy systems. Energy balance. Environmental impact during generation, transformation and consumption of energy (environmental pollution and climate change). Electrothermal processes. Electro-chemical processes. Numerical calculations of thermal processes. Electrothermal analogy. Heat pumps. Sustainable development and energy. Energy storage. Energy alternatives. Energy efficiency. Fuel cells.

**18. Learning methods:**

Lectures- Involvement in lectures  
Exams- Computer aided, written, and oral exams  
Laboratory Work- Laboratory work  
Consultations- Lecturers consultations  
Other -Individual work and learning  
E-learning -Homework

**19. Assessment methods:**

Exam is written, through seminars and orally. The written exam is a combination of theoretical issues and computational examples done on lectures. Seminars include solving specific task. The final exam is oral exam consisting of essay and discussion of theoretical issues.

**20. Assessment components:**

Students activity 10 %  
Test 1(theory+computational exanples)-50 %  
Final exam- oral presentation of seminar- 40 %

**21. Required reading list:**

E.Hot, "Elektrotermicka konverzija energije",  
Z.Haznadar, "Teoretska elektrotehnika", Školska knjiga, Zagreb  
I.Kapetanovic, "Modelovanje elektrotermickih procesa", predavanja, Tuzla  
Y.A. Çengel, "Introduction to Thermodynamics and heat transfer"

**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