SYLLABUS

1. Course title:

Fundamentals of Electrical Engineering I

2. Code:

ESKE001

3. Cycle of study:

1

4. ECTS credits:

7

5. Type of course:

(●) Mandatory ( ) Elective

6. Prerequisites:

(max. 110 characters)

7. Class restrictions:

(max. 150 characters)

8. Duration / semester:

1 1

9. Weekly contact hours:

9.1. Lectures: 3

9.2. Seminars: 2

9.3. Laboratory/Practice classes: 1

10. Faculty:

Faculty of Electrical Engineering

11. Department/study program:

Electrical Engineering and Computer Science

12. Lecturer:

PhD. Izudin Kapetanovic, full professor

13. Lecturer's e-mail:

izudin.kapetanovic@untz.ba

14. Web site:

www.oe.fe.untz.ba, www.fet.ba

15. Course aims:

The course gives understanding of electrical engineering concepts, laws and principles regarding electrostatics and DC electrical circuits. After finishing this course students will be able to analyze DC electrical circuits and understand underlying physical phenomena. The aim of the course is to overcome the integrated process of theoretical and practical basics through research and laboratory work and mathematical methods for analisys of complex problems.

16. Learning outcomes:

1. define and understand the fundamental concepts related to electric fields
2. understand and apply electrostatic field laws
3. apply superposition method for electric filed calculation
4. undesrtand relationship between electric potential and field
5.understand and apply Kirchhoff's Laws to DC circuit analysis.
4. analyze DC circuits by following circuit analysis methods and theorems: nodal analysis, star-delta transformation, transformation between real source models, Millman's, Thévenin's and Norton's theorems, superposition principle.
5. analyze DC electrical circuits with capacitors
6. use basic laboratory measurement equipment including the power supplies, ammeters, voltmeters, ohmmeters, digital multimeters, function generators, and oscilloscopes as well as to conduct experiments, to measure basic quantities in electric circuits, and to interpret data.

17. Course content:

Electrostatics
Structure of matter. Electric charge, Coulumbo law and electric field vector. Electric potential and voltage, field and potential relationship. Flux of electric field vector. Gauss Law. Conductor in electric field. Electrostatic induction. Capacitance, capacitors. Dielectrics in electric field. Dielectric polarization and polarization vector. Maxwell's postulate. The electric field at the boundary of two dielectrics. Dielectric characteristics. Electrostatic field energy and forces. The movement of charged particles in a vacuum under the influence of electrostatic field.
DC currents
The overview of development and current trends in electrical engineering and computer science. Fundamentals of electricity, capacitance. Electric current and electrical phenomena. Concepts, elements and topology of electric circuits. Ohm's Law. Kirchhoff s laws. Elementary DC circuits.. Complex DC circuits (bridge circuit, star-delta transformation, circuits with multiple sources). Methods for analisys of complex electrical circuits (Superposition, Thevenin s, Norton s, reciprocity and Millman s theorem). Circuits with capacitors. The capacitor's charging and discharging process. Stationary and transient states in electrical circuits with capacitors.

18. Learning methods:

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

19. Assessment methods:

Two midterm written exams (calculations) in VII and XV week
Final exam: written and oral (theoretical issues and solve practical problems)

20. Assessment components:

Continuous Assessment
Homeworks 5 %,
Electrostatic (I midterm exam) 20 %
DC Electric circuits (II midterme exam) 20 %
Class participation 5 %
Exam
Test 1(theory)-Electrostatic 10 %
Test 2 (theory)- DC Electric circuits 10 %
Final Exam (oral or written) 30 %
Maximam: 100 %

21. Required reading list:

E. Hot, "Osnovi elektrotehnike", knjiga prva, Svjetlost Sarajevo, 1996.
B. Milatović, "Osnovi elektrotehnike I", Svjetlost Sarajevo, 1983.
B. Popović, "Osnove elektrotehnike I", Građevinska knjiga Beograd, 1990.
H. Božilović, Ž. Spasojević, G. Božilović, "Zbirka zadataka iz osnova elektrotehnike-Elektrostatika, stalne jednosmjerne struje", Naučna knjiga Beograd, 1989.
I. Kapetanović, N. Sarajlić, T. Konjić, "Osnovi elektrotehnike-zbirka zadataka, knjiga 1,2", Fakultet elektrotehnike Univerziteta u Tuzli, Tuzla 2000.
I. Kapetanović, V. Madžarević, N. Sarajlić, T. Zuber, "Osnovi elektrotehnike-prvi dio: Elektrostatika i linearna električna kola jednosmjerne struje sa teorijom, laboratorijskim vježbama i zadacima, drugo dopunjeno izdanje", Fakultet elektrotehnike i mašinstva Univerziteta u Tuzli, Tuzla 1995.

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