SYLLABUS

1. Course title:

Electrical Engineering and Electronics

2. Code:

3. Cycle of study:

I

4. ECTS credits:

4

5. Type of course:

Mandatory

6. Prerequisites:

Mathematics 1

7. Class restrictions:

/

8. Duration / semester(s):

1 IV

9. Weekly contact hours and student workload:

	Semester (1)	Semester (2)	(for two-semester courses)	Workload: (hours)	
9.1. Lectures	2			Classes:	34
9.2. Seminars	1			Individual work:	80
9.3. Laboratory / Practice classes	0			In total:	114

10. Faculty:

Faculty of Mecahnical Engineerig

11. Department/study program:

All study programs

12. Lecturer:

Assoc. Prof. Majda Tešanović, PhD

13. Course aims:

Enabling students to develop a physical understanding of phenomena related to electric charge at rest and in motion, their practical applications, equipping students with the skills for calculations and analysis of electric circuits, measurement of electrical quantities, understanding of basic concepts in electronics, and fostering an engineering way of thinking.

14. Learning outcomes:

Understanding phenomena related to electric and magnetic fields and their practical applications, the ability to calculate and analyze direct and alternating current electrical circuits, the ability to measure electrical quantities in circuit elements, adopting an engineering mindset based on acquired knowledge from physics and mathematics, and facilitating the understanding of other professional and specialized subjects.

15. Course content:

Electrostatics:
Electric charge. Coulomb's law and the electric field vector (E). Electric potential and voltage. Electric flux. Gauss's law. Materials in an electrostatic field. Maxwell's postulate. Electric displacement vector. Capacitance, capacitors. Energy and forces in an electrostatic field.
Direct Current (DC):
Physical interpretation of electric current flow. Electrical resistance. Current density and intensity. Joule's law. Ohm's law. Electric circuits and their elements. Resistors. Electrical generators. Kirchhoff's First and Second Laws.
Electromagnetism:
Magnetic field. Biot–Savart law. Magnetic flux. Ampère's law. Materials in a magnetic field. Electromagnetic force. Faraday's law. Self-inductance and mutual inductance. Energy and forces in a magnetic field.
Alternating Current (AC):
Basic concepts of time-periodic quantities. Average and effective values of alternating current. Graphical representation of quantities. R, L, and C elements in AC circuits. Three-phase systems.
Electronics:
P-type and N-type semiconductors. Diodes. Transistors.

16. Learning methods:

Lectures
- **Tutorials**
- **Office hours (consultations)**

17. Assessment methods:

Student knowledge and progress are assessed continuously throughout the semester using the following methods:
- **Evaluation of individual assignments**
- **Midterm examinations**
- **Multiple-choice tests**

The final assessment may be conducted in written, oral, or combined format, depending on the course requirements and academic regulations.
Midterm Examinations:
- **Midterm I: Problem-solving tasks covering the topics of Electrostatics and Direct Current Circuits**
- **Midterm II: Problem-solving tasks covering the topics of Electromagnetism, Alternating Current Circuits, and Basic Electronics**

Tests:
- **Test I: Multiple-choice questions (three answer options) related to Electrostatics and Direct Current Circuits**
- **Test II: Multiple-choice questions (three answer options) related to Electromagnetism, Alternating Current Circuits, and Basic Electronics**

Students who do not achieve a passing grade in the final examination (written and/or oral part) will be required to take make-up examinations, in accordance with the institutional examination policy.

Grade	Descriptive	Letter	For the number of points achieved
5 (five)	"does not meet the minimum criteria"	"F,FX"	<54 points
6 (six)	"meets the minimum criteria"	"E"	54-64 points
7 (seven)	"generally good, but with significant shortcomings"	"D"	65-74 points
8 (eight)	"average, with noticeable errors"	"C"	75-84 points
9 (nine)	"above average, with some errors"	"B"	85-94 points
10 (ten)	"exceptional success with no errors or with minor errors"	"A"	95-100 points

18. Assessment components:

Grading and Evaluation Criteria
Each test, midterm exam, as well as the final exam, must be completed with a minimum accuracy of 50%, which corresponds to earning 50% of the points allocated for that activity.
The grading is structured as follows:

- **Class attendance (Lectures + Tutorials): 5 points**
- **Individual assignments (5 assignments × 1 point): 5 points**
- **Midterm I: 20 points**
- **Test I: 10 points**
- **Midterm II: 20 points**
- **Test II: 10 points**

Total points earned during the semester: 70 points
Final exam: 30 points

Maximum total score: 100 points

19. Mandatory reading list:

1. **Hot E., Fundamentals of Electrical Engineering 1 and 2, Sarajevo, 1996.**
2. **Kapetanović I., Sarajlić N., Konjić T., Fundamentals of Electrical Engineering - Problem Set, Tuzla, 2000.**
3. **Kapetanović, Tešanović, Kasumović, Pejdanović, Fundamentals of Electrical Engineering, Practical Workbook 1, Tuzla, 2017.**

20. Additional reading list:

Kapetanović, Tešanović, Kasumović, Rješavanje električnih kola programskim paketom PSpice, Tuzla, 2005

21. Web sources:

www.oe.fe.untz.ba, eUniversity platforma

22. Applicable from the academic year:

2025/2026

23. Adopted in the Faculty/Academy session: