NAME OF THE COURSE	Fundamentals of Electrical Engneering					
Code	PMT056	Year of study	2. (undergraduate)			
Course teacher	Ph. D. sc. Vedran Boras	Credits (ECTS)	6,0			
Associate teachers	-	Type of instruction (number of hours)	L	S	E	F
			30	15	15	
Status of the course	compulsory	Percentage of application of e-learning	30%			

COURSE DESCRIPTION	
Course objectives	Enabling students to: - acquisition of basic theoretical knowledge in the field of Electrical Engineering, - understanding and application of basic principles and laws of electrical engineering, - solving simple problems in electrical engineering, - the permanent adoption and deepening of knowledge in the field of electrical engineering.
Course enrolment requirements and entry competences required for the course	There are no requirements for course enrolment.
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Students will be able to after successfully mastering the subject: 1. define the basic phenomena, physical quantities and laws of electrical engineering, 2. apply the basic laws of electrical engineering, 3. calculate the required quantities of simple problems in the field of electrostatics, 4. apply individual methods for solving electrical networks of direct and alternating current, 5. calculate quantities of simple magnetic circuits.
Course content broken down in detail by weekly class schedule (syllabus)	Week 1: Lecture (2 hours): Introductory lecture. Introducing students to the rules, literature and teaching assignments. Introducing students with the content of the course. Lecture: Theories of the atom. Electricity and structure of substances and Coulomb's law. Exercises: The tasks from the application of Coulomb law. Seminar: Distribution of seminar papers to students. Week 2: Lecture: Electrostatic - electric field. Electric potential and voltage. The work in an electric field and Gauss's law. Exercises: Calculation of the electrostatic field. Seminar: Distribution of seminar papers to students. Week 3: Lecture: Dielectrics in the electrostatic field. Polarization of dielectrics. The electric field at the boundary of two dielectrics. Exercises: Calculation of the electric field on the boundary of two dielectrics. Seminar: Monitoring progress of work on the seminars. Week 4:

	Lecture: Capacitance and capacitors. Connections of capacitors, energy of the charged capacitors. Exercises: Calculation of equivalent capacity and charges for the different connections of the capacitors. Seminar: Monitoring progress of work on the seminars. Week 5: Lecture: A conductor in the electrostatic field. Electrostatic induction. The concept of electric current. Active and passive circuit elements. Ideal and real sources of electric current. The density of electric current and Ohm's law. Exercises: Calculation of equivalent capacity and charges for the different connections of capacitors. Seminar: Monitoring progress of work on the seminars. Week 6: Lecture: Electric resistance and conductivity. Joule's law. Connections of electric resistances. Kirchhoff laws. Analysis of linear DC networks. Exercises: 1. Colloquium Seminar: Monitoring progress of work on the seminars. Week 7: Lecture: Magnetostatics - About magnetism. The magnetic field. Basic laws of the magnetic field. The force in the magnetic field. Definition of amperes. Exercises: Solving simple DC networks. Seminar: Monitoring progress of work on the seminars. Week 8: Lecture: Magnetic properties of materials. Conditions on the border of two magnetic materials. Exercises: Solving complex linear DC networks. Seminar: Monitoring progress of work on the seminars. Week 9: Lecture: Electromagnetic induction. Self-induction. Mutual induction. The energy of the magnetic field. Exercises: 2nd Colloquium Seminar: Monitoring progress of work on the seminars. Week 10: Lecture: Alternating currents - Characteristic values and basic rules of periodic functions. AC current and voltage with sine wave shape. The elements and parameters in AC circuits. Exercises: Examples for the application of complex calculation in analysis of AC circuits. Seminar: Monitoring progress of work on the seminars. Week 11: Lecture: Representation of AC quantities. The characteristic values of AC quantities. Mathematical operations with AC quantities. Exercises: Solving AC networks using the complex calculation. Seminar: Monitoring progress of work on the seminars. Week 12:

<table>
<tr><td></td><td colspan="6">Lecture: Application of symbolic methods in calculation of linear AC networks. Ideal elements in AC networks.
Exercises: Specific examples of symbolic methods in the solving linear AC networks.
Seminar: Monitoring progress of work on the seminars.
Week 13:
Lecture: Voltage and current resonance. Three-phase AC circuits.
Exercise: 3rd Colloquium
Seminar: Review and presentation of the seminar papers.
Week 14:
Lecture: Electric power in AC circuits. Transient phenomena in simple electric circuits.
Exercises: Additional and repeatedly term for one of the Colloquium 1-2.
Seminar: Review and presentation of the seminar papers.
Week 15:
Lecture: Electrolytic dissociation. Electrolysis. Faraday's laws of electrolysis. Voltage polarization. The primary and secondary chemical sources of electrical energy.
Exercises: Additional and repeatedly term for third Colloquium
Seminar: Review and presentation of the seminar papers.</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
☒ seminars and workshops
☒ exercises
☒ on line in entirety
☒ partial e-learning
☒ field work</td><td colspan="3">☒ independent assignments
☒ multimedia
☒ laboratory
☒ work with mentor
☐ (other)</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">Regular attendance and active participation in lectures. Independent preparation and presentation of a seminar paper, which should be processed one area of basic electrotechnics. Self-learning and studying, accessing colloquia and / or written and oral examination.</td></tr>
<tr><td rowspan="5">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>2</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Exercises attendance</td><td>1</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td>1</td><td>Independent learning</td><td>2</td></tr>
<tr><td>Tests</td><td></td><td>Oral exam</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">Three colloquia during semester or written and oral exam in the examination period. Previously, the student should to complete and pass preliminary exam on seminar. Students who pass all three colloquiums (achieve more than 50% points from each tests) released a written and oral exam. Other students should to access written and oral exam. Depending on the achieved percentage of the oral and written part of the exam is determined by the final score: 50 - 62% - sufficient (2) 63-75% - good (3) 76-87% - very good (4) 88-100% - excellent (5)</td></tr>
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	Title	Number of copies in the library	Availability via other media
Required literature (available in the library and via other media)	1. Kuzmanović B.: Osnove elektrotehnike I i II, Element Zagreb, 2005.		
	2. Šehović E, Tolić M., Felja I.: Osnove elektrotehnike zbirka primjera I. dio, Školska knjiga, Zagreb, 1984.		
	3. Maletić A.: Osnove elektrotehnike, Sveučilište u Splitu, 1993.		
	4. Essert M., Valter Z.: Osnove elektrotehnike, Zagreb, 1990.		
	5. Pinter V.: Osnove elektrotehnike I i II, Tehnička knjiga Zagreb, 1994.		
Optional literature (at the time of submission of study programme proposal)	1.Robbins & Miller: Circuit analysis theory and practice, 2 nd edition, 2.Wilfried Weißgerber: Elektrotechnik für Ingenieure – Formelsammlung, © Vieweg+Teubner |GWV Fachverlage GmbH, Wiesbaden 2009. 3.Wing O.: Classical circuit theory, 2008 Springer Science+Business Media, LLC		
Quality assurance methods that ensure the acquisition of exit competences	- Taking attendance at lectures; - The annual analysis of the success of the examination; - Student survey in order to evaluate teachers; - Feedback from students who have already graduated from the relevance of the course content, - Self-evaluation.		
Other (as the proposer wishes to add)			