NAME OF THE COURSE	Applied Electrical Engineering					
Code	PMT062	Year of study	3. (undergraduate)			
Course teacher	Ph. D. Sc. Vedran Boras	Credits (ECTS)	5,0			
Associate teachers	-	Type of instruction (number of hours)	L	S	E	F
			30	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 applied electrical engineering (electrical machines, electromotor drives and electrical installation), -Understanding of the stationary and dynamic characteristics of non-regulated and regulated electromotor drives, - The permanent adoption and deepening of knowledge in the field of applied 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. Explain the working principle of the basic types of electrical machines, 2. Describe all the structural parts and the basic types of electrical machines, 3. Compare different electrical machines based on theoretical knowledge, 4. Calculate the parameters of equivalent circuits of transformers, 5. Select the type and the rated speed and rated power for defined stationary and dynamic regimes of the operating mechanism, 6. Apply the acquired knowledge in other courses as well as in future teaching practice.
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. In general about of the Electric Power System (EPS). In general about the transformation of energy. Seminar (1 hour): Distribution of seminar papers to students. Week 2: Lecture (2 hours): Introduction to electrical machines and transformers. Seminar (1 hour): Distribution of seminar papers to students. Week 3: Lecture (2 hours): Basic laws in electrical engineering - principle of electrical machines. Basic concepts and laws of electro-mechanical and electrical conversion. In general about transformers. The purpose of the transformers: power transformers, transformer construction, ideal and real single-phase two winding transformer. Seminar (1 hour): Distribution of seminar papers to students. Week 4: Lecture (3 hours): The magnetic flows in the transformer, the transformer equations, transformer equivalent circuit and phasor diagrams. Transformer in no-load and short circuit service, load losses, Kapp diagram. Three-phase transformers. Winding connections and labels. Parallel operation of transformers. Special transformers. Week 5: Lecture (3 hours): Rotating magnetic field. In general about synchronous machines.

	Synchronous machine (SM) construction, principle of SM operation. Week 6: Lecture (3 hours): Characteristics of synchronous machine, phasor diagrams, and operation performances. Week 7: Lecture (2 hours): Asynchronous (induction) machine (AM), construction, principle of AM operation. Equivalent scheme of induction machine. The first colloquium (1 hour) Week 8: Lecture (3 hours): Operation performances of asynchronous (induction) motors, single-phase induction motor. Asynchronous (induction) generator. Week 9: Lecture (3 hours): DC machine, construction, principle of DC machine operation. Operation performances of DC machines, armature reaction. AC commutator machines, special electrical machines. Week 10: Lecture (3 hours): Introduction, basic terms and definitions, problems and areas of electrical drives (ED) application. The main operation performances of the ED. Motoring and braking operation of the ED. The mechanical characteristics of various working mechanisms. The stationary states of the ED with asynchronous machine. Week 11: Lecture (3 hours): Basic types of low voltage networks and installations. Electrical schemes. Classification and characteristics of low voltage loads. Switching devices and distribution devices in low-voltage installations. Performance of installation cables, select the cable type and cross sections. Week 12: Seminar (3 hours): Colloquium presentation of the seminar papers. Week 13: Seminar (3 hours): Colloquium presentation of the seminar papers. Week 14: Seminar (3 hours): Colloquium presentation of the seminar papers. Week 15: Seminar (2 hours): Colloquium presentation of the seminar papers. The second colloquium (1 hour).
Format of instruction	☒ lectures ☒ seminars and workshops ☒ exercises ☒ *on line* in entirety ☒ partial e-learning ☒ field work ☒ independent assignments ☒ multimedia ☒ laboratory ☒ work with mentor ☒ consultations (other)
Student responsibilities	Regular attendance and active participation in lectures. Independent preparation and presentation of one seminar paper, which should be processed one area of applied electrical engineering. Self-learning and studying, accessing colloquia and / or written and oral examination.

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)*						
	Class attendance	1,5	Research		Practical training	
	Experimental work		Report		Independent learning	2
	Essay		Seminar essay	1,5	(Other)	
	Tests		Oral exam		(Other)	
	Written exam		Project		(Other)	

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<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="3">Two colloquia during semester or written and oral exam in the examination period. Previously, the student should develop and pass preliminary exam on seminar. Students who pass both colloquiums (achieve more than 50% points from each colloquium) 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>
<tr><td rowspan="10">Required literature (available in the library and via other media)</td><td>Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td>1. Predavanja – Primijenjena elektrotehnika - online</td><td></td><td></td></tr>
<tr><td>2. Pinter V., Skalicki B.: Elektrotehnika u strojarstvu, Sveuč. u Zagrebu, 1987.</td><td></td><td></td></tr>
<tr><td>3. Skalicki B., Grilec J.: Električni strojevi i pogoni, Sveučilište u Zagrebu-Fakultet strojarstva i brodogradnje, Zagreb, 2005.</td><td></td><td></td></tr>
<tr><td>4. Wolf R.: Osnove električnih strojeva, Školska knjiga Zagreb, 1995.</td><td></td><td></td></tr>
<tr><td>5. Jurković B.: Elektromotorni pogoni, ETF Zagreb, 1983.</td><td></td><td></td></tr>
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<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="3">1. KONČAR: Tehnički priručnik, KONČAR-Zagreb, 1991.
2. Keler D., Maričević M., Srb V.: Elektromonterski priručnik, Tehnička knjiga, Zagreb, 1987.
3. Guru B.S., Hiziroglu H.R.: Electric machinery and transformers, Oxford University Press, 2001.</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="3">- 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.</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="3"></td></tr>
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