SYLLABUS PREDMETA

General information

Course title:	Fundamentals of Electrical Engineering II
ISVU[1] course code:	116164
Studies in which the course is taught:	Study of mechanical engineering
Course Instructor:	Filip Žugčić mag.ing.el
Course Assistant:	Dr.sc. Anamarija Kirin
ECTS credits:	5.0
Semester of the course execution:	II
Academic year:	2022./2023.
Exam prerequisites:	-
Lectures are given in a foreign language:	-
Aims:	The objective of the course is to acquaint students with variable and alternating sizes, the basics of magnetism, transient phenomena in R, L, C circuits, and the analysis of the AC circuit.

Course

Course structure	Number of contact hours per week:	Number of contact hours per semester:	Student's requirements by type of teaching:
Lectures:	2	30	attendence 50%
Tutorials:	2	20	attendance 80%
Practical (lab) sessions:	1	10	attendance 100%
Seminars:			
Field work:			
Other:			
TOTAL:	+	60	

Monitoring of students' work, knowledge evaluation and learning outcomes

Formation of the grade during the implementation of teaching: (Define from minimum 5 to maximum 10 learning outcomes)	LEARNING OUTCOMES (upon completion of the course the student should be able to:)	FACTORS AFFECTING THE GRADE (e.g. term paper, practical work, presentation, …)	MAXIMUM NUMBER OF POINTS PER FACTOR
	I1: Define the characteristic magnitudes of the alternating currents and voltages (current, peak, mean and effective values), their vector representation and the basics of magnetism		
	I2: Explain the laws of the general relation between current and voltage on resistance, capacity, inductance and inductance		
	I3: Solve complex networks with a symbolic complex account for the sine wave of voltages and currents in the network		
	I4: Formulate transient phenomena in the R-L-C circuit (oscillation, damping), and phenomena		

---

[1] ISVU – Information System of Higher Education Institutions in Croatia

	and effects of resonance in electrical network	
	I5: Normalize the characteristic quantities in a three-phase system (phase and line voltage and current, operating, reactive and apparent power)	
	I6: Explain the basic principles of transformers, synchronous and asynchronous machines and transmission of electricity in the transmission and distribution system	
Alternative formation of the grade (I 1 – I 10)	**or alternative formation of the grade: I 1 – I 6** Written exam 70% final grade-I1. I2, I3, I4, I5, I6 Oral exam 30% of final grade	TOTAL: 100 points
Students' competencies	Students will gain general and expert knowledge of variable and alternating sizes, the behavior of resistors, capacitors, and coils in alternating circuits, and learn methods to solve AC electrical circuits	

Prerequisites for course approval (lecturer's signature):	Attendance at classes and laboratory exercises
Prerequisites for taking exams:	Teacher's signature
Grading scale:	(According to the Regulations on student assessment of Karlovac University of Applied Sciences, Article 9, Paragraph 5) 90-100 - excellent (5) (A) 80 to 89.9 - very good (4) (B) 65 to 79.9 - good (3) (C) 60 to 64.9 - sufficient (2) (D) 50 to 59.9 - sufficient (2) (E) 0 to 49.9 – fail (1) (F) Students are graded during class, what forms 70% of final exam. Students who achieve 50% (35 points) and more are allowed to take the final exam. The score on final exam makes 30% of the final grade.

ECTS structure

ECTS credits allocated to the course reflect the total burden to the student during adoption of the course content. Total contact hours, relative gravity of the content, effort required for exam preparation, as well as, every other possible burden are taken in account:

Attendance (active participation)	Term paper	Composition	Presentation	Continuous assessment and evaluation	Practical work
0.5					
Independent work	**Project**	**Written exam**	**Oral exam**	**Other**	
		3	1.5		

	SYLLABUS PREDMETA

Review of topics/units per week associated with learning outcomes

Week	Lectures topics/units and learning outcomes:	Tutorials topics/units and learning outcomes:
1.	Physical basis of magnetism I1	An overview of the basic concepts of magnetism in concrete examples I1
2.	Voltage and current ratios at R, L and C I2	Troubleshoot transient occurrences of R-L-C circuits I2
3.	R-L-C circuit - transient, oscillation and damping I4	Analysis of transient occurrences of R, L and C circuits I4
4.	Alternating Currents - Mean and Effective Value I1	Variable size analysis I1
5.	Sine currents - vector representation I1	Sine magnitude analysis using vector representation I1
6.	Impedance I4	Solving simple networks with resistors, capacitors and coils I4
7.	AC power - power triangle, reactive power compensation I5	Analysis of power in AC networks I5
8.	Complex Account I3	Solving electrical circuits with complex account I3
9.	Inductive Networks I3	Solving coil problems I3
10.	Ideal transformer I6	Analysis of ideal transformer on replacement scheme I6
11.	Transformer with iron core - vector diagram I6	Analysis of transformers with iron core with replacement scheme and vector diagram I6
12.	Three Phase Current - Phase and Line Values I5	Three Phase Systems Task Solving I5
13.	Three-phase Current power I5	Power analysis in three-phase systems I5
14.	Synchronous and asynchronous motors I6	Analysis of synchronous and asynchronous machines by alternate circuit and torque characteristic I6
15.	Transmission and distribution of electricity I6	Analysis of voltage levels in the transmission and distribution system in the Republic of Croatia I6

References

REFERENCES (compulsory/additional):
B. Kuzmanović: Osnove elektrotehnike II, ISBN:953-197-662-7, Element, 2005
Felja i dr.: Zbirka zadataka osnova elektrotehnike II, ISBN: 978-953-0-30645-5, Školska knjiga
N. Marinović: Opća elektrotehnika i elektronika II, ISBN: 978-953-0-30620-2, Školska knjiga

Exams for the academic year: ____2022____./__2023_____.

Exam dates:	According to the schedule of exams for academic year : 2022./2023.

Contact information

1. Course Instructor/Lecturer:	
e-mail:	fzugcic@vuka.hr
Office hours / Consultations:	According to the deal
2. Course Instructor/Lecturer:	
e-mail:	akirin@vuka.hr
Office hours / Consultations:	According to the deal