



COURSE SYLLABUS

General information

Course title:	Fundamentals of electrical engineering I
ISVU course code:	38908
Course instructor:	Filip Žugčić mag. ing. el.
Course assistant:	dr. sc. Anamarija Kirin
Study programme and specialization in which the course is taught:	Study of mechatronics
ECTS credits:	5
Semester of the course execution:	I.
Exam prerequisites:	-
Course objectives:	The objective of the course is to introduce students to the basics of electrostatics, basic methods of calculating the electrical DC networks

Course structure

Teaching mode	Number of contact hours per semester:	Student's requirements per teaching mode
Lectures:	30	attendance 70%
Exercises (auditory, linguistics):	20	attendance 70%
Exercises (laboratory, practical):	10	attendance 100%
Field work:		
Other:		
TOTAL:	60	

Monitoring of students' work and knowledge evaluation during the course

OUTCOMES		Colloquium 1	Colloquium 2	Verbal test	Total	Pass	Time frame for the recognition of the outcome
Outcome 1	Define the basic physical quantities of electricity (charge, electric field, energy, electric potential, capacity)			10%	10%	5%	Until the end of the academic year
Outcome 2	Apply the basic laws of electrostatics (Coulomb's law, Gauss's law)	20%			20%	10%	Until the end of the academic year
Outcome 3	Analyze capacitance as an element of a circuit	20%			20%	10%	Until the end of the academic year
Outcome 4	Describe the basic electrical quantities of a simple circuit (charge movement in a conductor, electrical resistance, sources)			10%	10%	5%	Until the end of the academic year



COURSE SYLLABUS

	of electrical energy)						
Outcome 5	Explain and apply the basic laws of electrical engineering (Ohm's law, Kirchoff's laws)		20%		20%	10%	Until the end of the academic year
Outcome 6	Solve electrical network problems using Thevenin/Norton's theorem, the method of contour currents and node voltages		20%		20%	10%	Until the end of the academic year
Total % grade points		40	40	20	100	50	
Share in ECTS		2	2	1	5		

Knowledge evaluation on exams

Exam prerequisites					
OUTCOMES		Written exam	Oral exam	Total	Pass
Outcome 1	Define the basic physical quantities of electricity		10%	10%	5%
Outcome 2	Apply the basic laws of electrostatics	20%		20%	10%
Outcome 3	Analyze capacitance as an element of a circuit	20%		20%	10%
Outcome 4	Describe the basic electrical quantities of a simple circuit		10%	10%	5%
Outcome 5	Explain and apply the basic laws of electrical engineering	20%		20%	10%
Outcome 6	Solve electrical network problems	20%		20%	10%
Total % of grade points		80	20	100	50
Share in ECTS		4	1	5	

Review of units per week with associated learning outcomes

Week	Lecture course content and learning outcomes:	Outcome	Exercises course content and learning outcomes:	Outcome
1.	Physical basics of electricity	01	Overview of basic concepts of electricity with concrete examples	01
2.	Electric field	01	Analysis of electric field problems using examples	01
3.	Coulomb's law	02	Application of Coulomb's law	02
4.	Gauss's law	02	Solving tasks using Gauss's law	02
5.	Potential and voltage	01, 03	Solving potential and voltage problems	01, 03
6.	Capacitors	01, 03	Solving networks with capacitors and examples of capacitor design	01, 03
7.	Electricity	03	Analysis of the problem of generation of current and passage of current through the conductor	03



COURSE SYLLABUS

8.	Ohm's law	04	Application of Ohm's law for a simple electric circuit	04
9.	Kirchoff's laws	04	Application of Kirchoff's laws on electrical networks	04
10.	Basic electrical measurements	05	Carrying out the procedure of measuring voltage, current and power with measuring instruments	05
11.	Analysis of electrical networks	04	Solving tasks using learned methods for solving simple electrical networks	04
12.	Method of contour currents	06	Solving electrical networks using the method of contour currents	06
13.	Thevenin's and Norton's theorem	06	Solving electrical networks using Thevenin's and Norton's theorem	06
14.	Node voltage method	06	Solving electrical networks using the nodal voltage method	06
15.	The optimal procedure for solving complex electrical networks	06	Solving complex electrical networks using several different methods	06

References (compulsory / additional)

B.Kuzmanović: Osnove elektrotehnike I, ISBN:953-197-128-5, Element,
B.Kuzmanović: Zbirka zadataka i pitanja iz Osnove elektrotehnike I, ISBN:953-197-664-3, Element,
2010