DESCRIPTION OF A STUDY COURSE – SYLLABUS

Title of a course	**Basic Elements of Telematics I**				
Head of course	**MSc Vesna Krajčí, Lecturer**				
Study programme	**Professional undergraduate study Telematics**				
Status of a course	Obligatory				
Year of study	1.	**Semester**	I	**ECTS credits**	4
Teaching plan (L + E + S+ Pr)	3+2+0+0				

Goals of a course

Acquisition of specific competences in the fields of physical fundamentals of electrical engineering and telematics measurements. From general competences, developing the ability to analyze and synthesize, work independently and work in small groups (team work) and present the achieved results.

Conditions for enrolling course

No conditions

Learning outcomes on a level of a study programme which includes course

Outcome 1: Explain the basic mathematical, physical and technical principles of operation of electrotechnical, electronic and computer elements and circuits, measuring devices and electrical machines used in telematics systems.
Outcome 2: Link mathematical methods, engineering principles and computer simulations from the signal and system theory with applications in telematics systems.
Outcome 3: Conduct experiments and measurements in the laboratory and real telematics systems, and interpret the collected data and measurement results with the preparation of appropriate documentation.
Outcome 13: Design and develop solutions for components, circuits and software for application in regulation systems and production processes, with the preparation of supporting project documentation.
Outcome 15: Participate in teamwork and independently present professional content in written and spoken form in Croatian and English.

Expected learning outcomes on a level of a course

1. Analyse the physical bases of electrical engineering and electrical sources.
2. Apply rules for solving DC circuits, and resistor and capacitor connections.
3. Explain the characteristics of alternating current, transient phenomena in electrical networks, serial and voltage resonance, and various resistances in an AC circuit.
4. Describe a three-phase system with star and triangle voltage, and the calculation of the three-phase system power.
5. Explain the electricity magnetic field, electromagnetic induction, transformer operation mode, and magnetic field forces and energy.

Content of a course

Introduction into telematics. Units of measurement in telematics. Electric basics of matter. Conductors, semiconductors and insulators. Electron as a charge carrier. Electricity. Resistance. Direct current. Direct electrical circuit. Electric field and potential. Electrical circuit laws – Ohm's Law and Kirchoff's Laws. Serial and parallel circuit. Power and energy. Modern sources of charge. Magnetism. Magnetic field, magnetic induction. A conductor in a magnetic field. A scroll. Electricity as a consequence of magnetism. Alternating current – basic terminology. Alternating current frequency, maximum and effective power of charge. Inductance and capacity in the context of alternating current. Vector diagrams. A transformer. The strength of the triangle. Three-phase system and the rotating magnetic field. Phase and line charge. The triangle and star connection. The influence of electric force on a human, dangers and first aid. Electrical machines – application and operating principles. A DC generator and motor. Synchronous and asynchronous machines. Measurement procedures in electrotechnics. Measurement mistakes. Modern digital measurement instruments; oscilloscopes – a comparison between digital and analogue. Measurement resistance, charge, electricity, power. Measuring amplifiers and attenuators. Obstacles and standard measuring signals. AD converter. The significance of semiconductors and its

application. A diode, transistor, thyristor. Photoelectric elements –solar cells, lasers, LED technology. Optic cables and accompanying technology of data transfer. SM and MM technology. Some features of amplifier connectors – frequency characteristics, negative backward connection. Controllable and uncontrollable semiconductor valves. Thyristors. Electricity and charge converters. AC-AC, DC-DC, AC-DC and DC-AC converters – the importance and the way of operating. Controllable switches. Sensory analysis and the introduction into measurement converters. Measurement converters – practical examples. Basics of wireless communication.

Teaching modes	☒ lectures ☐ auditory exercises ☒ seminars and workshops ☐ distance learning ☐ field classes	☒ individual assignments ☐ multimedia and network ☐ laboratory ☐ supervisor's work ☐ other _____
Comments		

Students' obligations

Grading, evaluation and monitoring of students' work continuously during lectures and exams

Grading is based upon evaluation of course's learning outcomes' adoption. Grading is performed continuously during lectures and/or during exam, in compliance with the provisions of Regulation on the assessment of students.

Continuous check-up:

Outcomes	Pre-exam I	Pre-exam 2	Laboratory exercises	Threshold	Max
Outcome 1	14 %	-	2 %	**8 %**	**16 %**
Outcome 2	24 %	-	6 %	**15 %**	**30 %**
Outcome 3	-	14 %	12 %	**13 %**	**26 %**
Outcome 4	-	14 %	-	**7 %**	**14 %**
Outcome 5	-	14 %	-	**7 %**	**14 %**
Percentage of ECTS	1.52	1.68	0.8	**-**	**-**
Total	**38 %**	**42 %**	**20 %**	**50 %**	**100 %**

A student has passed the exam if he has acquired a percentage of credits for each learning outcome higher or equal to defined threshold.

Exam term:

Outcomes	Written exam	Oral exam	Max
Outcome 1	12 %	4 %	**16 %**
Outcome 2	26 %	4 %	**30 %**
Outcome 3	22 %	4 %	**26 %**
Outcome 4	10 %	4 %	**14 %**
Outcome 5	10 %	4 %	**14 %**
Percentage of ECTS	3.2	0.8	**-**
Total	**80 %**	**20 %**	**100 %**

A student has passed the exam if he has acquired a percentage of credits for each learning outcome higher or equal to defined threshold.

Grading:

A student has passed the exam if he has acquired at least 50% of anticipated credits of a specific learning outcome.

If a student has passed learning outcomes of all courses, the accomplished credits (percentages) of all passed learning outcomes are being added, while the final grade is defined upon following table:

Range of credits (percentages)	Numerical grade	ECTS grade
90,00 – 100,00	Excellent (5)	A
75,00 – 89,99	Very good (4)	B
60,00 – 74,99	Good (3)	C
50,00 – 59,99	Sufficient (2)	D
0,00 – 49,99	Insufficient (1)	F

Obligatory literature

1. Brodić T.: Fizikalne osnove telematike, 1. svezak, Veleučilište u Rijeci, Rijeka, 2010.
2. Brodić T.: Osnove primijenjene elektrotehnike i elektronike, Veleučilište u Rijeci, Rijeka, 2009.

Additional literature

1. Pinter V.: Osnove elektrotehnike, Knjiga I i II, Tehnička knjiga, Zagreb, 1994.
2. Šehović E., Tkalić M., Felja I.: Osnove elektrotehnike - Zbirka primjera, Školska knjiga, Zagreb, 1992.