DESCRIPTION OF A STUDY COURSE – SYLLABUS

Title of a course	**Signal Theory**				
Head of course	**MSc Vesna Krajčí, Lecturer**				
Study programme	**Professional undergraduate study Telematics**				
Status of a course	Obligatory				
Year of study	1.	**Semester**	II	**ECTS credits**	6
Teaching plan (L + E + S+ Pr)	2+2+0+0				

Goals of a course

Acquisition of specific competencies in the field of signal and system analysis. 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 11: Design and develop solutions for components, circuits and software for application in signal processing and telecommunications, 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. Describe basic signals, their properties, transformations and sampling.
2. Analyse systems in time and frequency range, with linearization and block view.
3. Compare different manners of filtering, sampling, modulating and multiplexing signals.
4. Explain the basics of transducers for the measurement of electrical and non-electrical values.
5. Distinguish different types of real signals.

Content of a course

IT description of a communicative system. Entropy and information content. An outline and types of signals: continuous, discreet and digital. The linear transformations system. Correlation and convolution. Characteristics of random signals and noise. Spectral density. Channel capacity. SISO and MIMo channel models. Boundaries of a safe information transfer. IT features and principles of medium coding: language, sound, image and video. Characteristics of the speech signal. Speech coding. Image coding. Procedures of compressing the image. Basics of modulation processes. Time continuous modulation and time discreet modulation. Multiplexing principles: space-division multiplexing, frequency-division multiplexing, time-division multiplexing and wavelength-division multiplexing. Orthogonal frequency division multiplex. OFDM modulation procedures.

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	Computer exercises	Threshold	Max
Outcome 1	24 %	-	10 %	**17 %**	**34 %**
Outcome 2	14 %	-	2 %	**8 %**	**16 %**
Outcome 3	-	14 %	8 %	**11 %**	**22 %**
Outcome 4	-	14 %	-	**7 %**	**14 %**
Outcome 5	-	14 %	-	**7 %**	**14 %**
Percentage of ECTS	2.28	2.52	1.2	**-**	**-**
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	30 %	4 %	**34 %**
Outcome 2	12 %	4 %	**16 %**
Outcome 3	18 %	4 %	**22 %**
Outcome 4	10 %	4 %	**14 %**
Outcome 5	10 %	4 %	**14 %**
Percentage of ECTS	4.8	1.2	**-**
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. Brodic T.: Fundamentals of Signal Theory, University of Rijeka, Rijeka, 2011.
2. Vrankić M.: Signals and Systems, Collection of Solved Problems, Graphis, Zagreb, 2007.
3. Vrhovski Z., Purković D.: Signals and Systems, Collection of Solved Problems, College of Technical Studies in Bjelovar, Bjelovar, 2012.
4. Sučić, V.: Signals and Systems, Lectures and Exercises, Faculty of Engineering, Rijeka, 2009.

Additional literature
1. Peruško U., Glavinić V.: Digitalni sustavi, Školska knjiga, Zagreb, 2005. 2. Čupić M.: Digitalna elektronika i digitalna logika, Zbirka riješenih zadataka, Kigen, Zagreb, 2006. 3. Perić, N.: Automatsko upravljanje, Predavanja, Fakultet elektrotehnike i računarstva, Zagreb, 2005.