NAME OF THE COURSE	Signal Processing in Natural Sciences					
Code	PMP125	Year of study	1D & 2D			
Course teacher	Doc.dr.sc. Damir Kovačić	Credits (ECTS)	5			
Associate teachers	-	Type of instruction (number of hours)	L	S	E	F
			30	0	30	0
Status of the course	Obligatory	Percentage of application of e-learning	20			

COURSE DESCRIPTION

Course objectives	To familiarize students with: • Basic concepts in signal processing that appear in natural sciences • Key signal processing methods
Course enrolment requirements and entry competences required for the course	Enrolled one of the diploma study programs
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	• To describe and classify different types of signals • To define and describe the basic concepts of signal processing theory • To include examples of the application of digital signal processing in natural sciences • To apply knowledge to solve simple signal processing problems • To define and describe the basic concepts of digital processing theory and the analysis of sound and image signals
Course content broken down in detail by weekly class schedule (syllabus)	Lecture: Introduction - definitions: signal, signal processing, information, system analysis, transformation. Lecture: Continuous and discrete signal representation Lecture: Convolution and deconvolution Lecture: Autocorrelation and signal correlation Lecture: System Realization Lecture: Linear and time-invariant systems Lecture: Fourier Transformation and Signal Spectrum (DFT, FFT) Lecture: Filters Lecture: Transformations and interpolation of signals Exercises: Practical methods of signal analysis Exercises: Spectral signal analysis Exercises: Analog and digital signal processing Exercises: Practical examples of signal processing in natural sciences 1-5 (physics, mathematics, biology, chemistry, technique)
Format of instruction	☒ lectures ☒ seminars and workshops ☒ exercises ☐ *on line* in entirety ☐ partial e-learning ☐ field work ☐ independent assignments ☐ multimedia ☒ laboratory ☐ work with mentor ☐ (other)
Student responsibilities	The student is required to attend lectures, seminars and exercises, with a maximum of 20% of excused absences. The student is required to write a term paper with the chosen topic and present it in the form of presentation to colleagues and teacher.

Screening student work *(name the proportion of ECTS credits for each*						
	Class attendance	2	Research		Practical training	
	Experimental work		Report		(Other)	

activity so that the total number of ECTS credits is equal to the ECTS value of the course)	Essay		Seminar essay	2	(Other)	
	Tests	1	Oral exam		(Other)	
	Written exam		Project		(Other)	

Grading and evaluating student work in class and at the final exam	The grade is determined based on: • Colloquium (25% grade) • Seminar paper (50% grade) • Oral presentation (25% grade)

	Title	**Number of copies in the library**	**Availability via other media**
Required literature (available in the library and via other media)	William Hartmann: Signals, Sound, and Sensation		
	B. P. Lathi (2004.), Linear Systems and Signals		

Optional literature (at the time of submission of study programme proposal)	Oppenheim, Alan, and Alan Willsky. *Signals and Systems*
Quality assurance methods that ensure the acquisition of exit competences	• Evaluation of results in accordance with the determined learning outcomes • Feedback from students via surveys • Self-evaluation of teacher • Institutional and non-institutional checks
Other (as the proposer wishes to add)	