



DISCIPLINE ACADEMIC SHEET
ACADEMIC YEAR 2025 – 2026

1. PROGRAMME DATA

1.1. Higher Education Institution	UNIVERSITY OF CRAIOVA
1.2. Faculty	Automation, Computers and Electronics
1.3. Department	Computers and Information Technology
1.4. Field of Study	Computers and Information Technology
1.5. Study level	L(License / Undergraduate)
1.6. Organizational form	IF
1.7. Study Program (name/code) /Qualification	Computers / L2060101010

2. DISCIPLINE DATA

2.1 Discipline Name				Decision and Estimation in Information Processing			
2.2 Course Activities Holder				Prof. dr. ing. Dorin ȘENDRESCU			
2.3. Practical Activities Holder				Asist. drd. ing. Bujgoi Gheorghe			
2.4. Study Year	3	2.5. Semester	1	2.6. Evaluation type	E	2.7. Discipline regime	DFA

3. ESTIMATED TOTAL TIME (hours per semester of teaching activities)

3.1. Number of hours per week	3	in which: 3.2 course	2	3.3. sem./lab./pr.	1
3.4. Total hours of curriculum	42	in which: 3.5 course	28	3.6. sem./lab./pr.	14
3.7. Time distribution - hours/week					hours
Study after manual, course support, bibliography and notes					-
Additional documentation in library, on specialized electronic platforms and field					10
Training seminars / labs, homework, portfolios and essays					13
Tutorial					-
Examinations					5
Other activities.....					5
Total hours per individual activities					33
3.8. Total hours per semester					75
3.9. Number of credits					3

4. PRECONDITIONS (where appropriate)

4.1. of curriculum	The student must possess specialized knowledge acquired in the following disciplines: Mathematical Analysis, Special Mathematics, Fundamentals of Electrotechnics, Electronic Devices, Analysis and Synthesis of Digital Circuits, Computer Programming and Programming Languages, Information Transmission and Coding.
4.2. of competence	Not necessary.

5. CONDITIONS (where appropriate)

5.1. of the course	The course is taught using the video projector. The board is used for some explanations and answers to questions from the audience. Course support in electronic format and access to up-to-date documentation are provided. The teaching process has the following structure: ▪ 80% theoretical presentation, based on the course support (slides) ▪ 20% interactive activity (discussions with the students)
5.2. of seminar/ laboratory/project	The laboratory uses a computer network. The information transmission and estimation procedures at user level, presented in the course, are modeled and simulated.

6. COURSE OBJECTIVES – expected learning outcomes that are supported by completing and passing the course

Knowledge	The student/graduate describes, identifies and summarizes elementary concepts and methods for signal acquisition, analysis and processing, implemented in systems with general-purpose processors or signal processors, and the way they are applied to concrete problems.
Skills (Abilities)	The student/graduate uses specific methods and tools for characterizing signals in the time domain and in the frequency domain, performs the acquisition, analysis and digital processing of analog signals. The student/graduate designs, measures, evaluates the performances of, diagnoses and debugs functional blocks of small/medium complexity for signal analysis and digital processing, using dedicated simulation environments (Matlab, Python, etc.). The student/graduate designs functional blocks of small/medium complexity for signal analysis and digital processing and implements them on signal processors, microcontrollers or dedicated processors.
Responsibility and autonomy	The student/graduate shows a spirit of initiative and action for updating professional, economic and organizational culture knowledge.

7. CONTENT

7.1. Course	The method of implementation	Teaching methods	Allocated time (hours)
1. 1. Random signals. Fundamental notions 1.1 Definition of random signals 1.2 Distribution functions and probability densities of continuous-time random signals 1.3 Temporal mean		The course is taught using the video projector. - 80% theoretical presentation, based on the course support (slides). - 20% interactive activity	6

values and statistical mean values of random signals. Fundamental notions. 1.4 Correlation and covariance functions 1.5 The autocorrelation function of a sum of independent signals 1.6 The Wiener-Khinchin theorem 1.7 The transfer of stochastic signals through linear systems 1.8 Passing white noise through an ideal low-pass filter 1.9 Passing white noise through an ideal band-pass filter			
2. 2. Reception of discrete signals 2.1 The ideal channel 2.2 Types of binary signals used in baseband. 2.3 Intersymbol interference. The signal equalizer. 2.4 Detection of binary signals using the correlation receiver 2.5 Detection of binary signals using the coherence function 2.6 The signal-to-noise ratio. Examples.			6
3. 3. Transmission systems with signal detection 3.1 The model of a transmission system with signal detection 3.2 Observing random signals at discrete time moments 3.3 The Bayes criterion 3.4 Detection of a signal			6

of known amplitude 3.5 Detection of a signal of known shape			
4. 4. Optimal reception of discretely modulated signals 4.1 Estimating the signal shape. Optimal filtering of continuous signals 4.2 Optimal Wiener filtering 4.3 Kalman-Bucy optimal filters 4.4 Maximizing the signal-to-noise ratio. Examples.			6
5. 5. Transmission systems with parameter estimation 5.1 The model of a transmission system with parameter estimation 5.2 Estimation based on the minimum mean square error 5.3 Estimation based on the maximum a posteriori probability density 5.4 Estimating an unknown deterministic parameter 5.5 Estimating the transfer characteristics of a channel			4
Bibliography:			
1. . Feher K. - Comunicatii digitale avansate, vol. I, Ed. Tehnica Bucuresti 1993 2. Feher K. - Comunicatii digitale avansate, vol. II, Ed. Tehnica Bucuresti 1994 3. Held G. - Data Compression. Techniques and Applications. Hardware and software, Ed. John Wiley & Sons 1985 4. Held G. - Comunicații de date, Editura Teora, București, 1998. 5. Iancu E. - Teoria transmisiei datelor, Editura Universitaria, Craiova, 2004. 6. Proakis J. - Communication Systems Engineering, Prentice Hall International Editions, 1994. 7. Spataru Al. - Fondements de la théorie de la transmission de l'information, Presses Polytechniques Romandes, 1987			
2.			

7.2. Seminar/laboratory/project	The method of implementation	Teaching methods	Allocated time (hours)
1. 1. Polar modulation.			2

	Simulation of the modulator, demodulator, transmission channel.			
2.	2. Quadrature modulation. Simulation of the modulator, demodulator, transmission channel.			2
3.	3. Extracting the useful signal from the disturbed signal. Design of FIR digital filters (computer simulation)			2
4.	4. Comparative analysis of the performances of modulations using harmonic carrier signals. Calculation of the signal-to-noise ratio.			4
5.	5. Detection of binary signals using the correlation receiver (computer simulation). Experimental determination of the statistical performances.			2
6.	6. Detection of a signal of known amplitude (computer simulation)			2
Bibliography:				
1. . Held G. - Comunicații de date, Editura Teora, București, 1998. 2. Iancu E. - Transmisii de date, îndrumar de laborator, Reprografia Universității din Craiova, 1995. 3. Tugal D. - Data Transmission. Analysis, Design, Application consideration , McGraw-Hill Book Company, 1982				
2.				

8. Correlating the content of the discipline with the expectations of representatives from the epistemic community, professional associations and representative employers in the field related to the program

The course content was discussed with the representatives of: ▪ SC IPA SA Craiova ▪ SC ELPRECO SA Craiova ▪ SC ELPREST SA Craiova

9. EVALUATION

Activity Type	9.1. Evaluation criteria	9.2. Evaluation methods	9.3. Final mark weight
9.4. Course	- Understanding the theoretical fundamentals of information transmission. - The ability to make connections between the taught notions. - The capacity for analysis and synthesis in a concrete situation.	Partial written exam. Final written exam	40% 40%
9.5. Seminar/laboratory/project	- Interpretation of the results; - The solutions of the applications are presented and discussed within the group	Ongoing assessment and final test	20%
9.6. Minimum standard of performance			
▪ Obtaining at least 50% of the score of the ongoing assessments, laboratory tests and final exam. ▪ The final grade is calculated by rounding the final score to a whole grade.			

Date of Completion	Signature of the Course Activities Holder,	Signature of the Practical Activities Holder,
23.08.2025	Prof. dr. ing. Dorin ȘENDRESCU	Asist. drd. ing. Bujgoi Gheorghe

Date of Approval in the Department	Signature of the Department Director,
25.08.2025	Ș.l.dr.ing. Nicolae ENESCU

Date of Approval in the Faculty	Signature of the Dean,
	Prof.dr.ing. Dorin ȘENDRESCU