

SYLLABUS

1. Program Data

1.1. Institution of Higher Education	Babeş-Bolyai University
1.2. Faculty	Faculty of Mathematics and Computer Science
1.3. Department	Department of Computer Science
1.4. Field of Study	Computers and Information Technology
1.5. Course of Study	Bachelor
1.6. Study Programme	Information Engineering

2. Discipline Data

2.1. Discipline Name	Transmisiuni de date Data Transmissions						
2.2. Course Coordinator	Assoc. Prof. PhD. Eng. Cristian P. CHIONCEL						
2.3.1. Seminary Coordinator							
2.3.2. Laboratory Coordinator	Assoc. Prof. PhD. Eng. Cristian P. CHIONCEL						
2.3.3. Project Coordinator							
2.4. Year of Study	IV	2.5. Semester	8	2.6. Evaluation Time	E	2.7. Discipline Regime	Mandatory DS
2.8 Code of the discipline	MLE7032						

3. Estimated Total Time (hours per semester of teaching activities)

3.1. Number of Hours per Week	5	from which: 3.2. Course	3	3.3. laboratory & seminar	1 S 1 LP
3.4. Total Hours from the Curriculum Plan	70	from which: 3.5. Course	42	3.6. laboratory & project	28
Time Fund Distribution - hours					22
Study of Handbook, Course Materials, Bibliography & Notes					11
Additional Documentation in Library, on Special E-learning Platforms & in the Field					11
Preparation of seminars/laboratories/ projects, topics, reports, portfolios & essays					7
Mentoring					4
Examination					-
Other Activities					
3.7. Total Time of Individual Study	55				
3.8. Total Hours per Semester	125				
3.9. Number of Credits	5				

4. Pre-condition (where is the case)

4.1. of Curriculum	• Basic knowledge in mathematics, physics, manipulation of mathematical expressions
4.2. of Competences	• Basic knowledge of computer use and modeling and simulation languages

5. Condition (where is the case)

5.1. of Course Progress	•
5.2.1. of Seminary Progress	•
5.2.2. of Laboratory Progress	• knowledge of the laboratory work
5.2.3. of Project Progress	•

6. Acquired Specific Competences

Professional Competences	<ul style="list-style-type: none"> Operating with the basics of Mathematical, Engineering and Computer Science (PC 1). Designing hardware, software and communication components (PC 2)
Transversal Competences	<ul style="list-style-type: none"> Honorable, responsible, ethical behavior, in the spirit of the law, to ensure the professional reputation (TC 1). Demonstrating initiative and pro-active behavior for updating professional, economical and organizational culture knowledge (TC 3)

7. Discipline Objectives (coming out from the Checklist of Acquired Specific Competences)

7.1. General Objective of Discipline	<ul style="list-style-type: none"> Familiarization with the operating principles of digital processing and digital signal transmission techniques
7.2. Specific Objectives	<ul style="list-style-type: none"> Use the most appropriate methods in the field of digital signal transmission

8. Content

8.1. Course	Teaching methods	Observation	
1-2. INTRODUCTION - general problems of defining the notions of communications; telecommunications classification, telephone network, useful signals in telecommunications, relative levels (dB, Np) and absolute.	Exposure, problematization, conversation, explanations		
3-4. TELEPHONE NETWORK - telephone signal, data transmission, transmission chain.			
5-6. TRANSMISSION STRUCTURES - 4-wire, 2-wire transmission. Transmission line.			
7. FREQUENCY MULTIPLEXING - principles of multiplexing and frequency multiplexing, frequency multiplexing techniques.			
8. FREQUENCY MULTIPLEX ORGANIZATION - primary group, their transmission (basic primary group A, B, reunion of primary groups), formation of a primary group B by premodulation, obtaining a primary group B by pre-grouping			
9. MULTIPLEXATION AND DEMULTIPLEXATION OVER TIME. Sampling - Pulse Amplitude Modulation (AIM). The principle of time multiplexing.			
10. PRINCIPLE OF PULSE CODE MODULATED TRANSMISSIONS (PCM). The principle of modulation of pulses in code; structure of BMI transmission systems; synchronization in PCM transmission systems.			
11. PULSE CODE MODULATION (PCM). PCM signal frequency band. BMI time multiplexing transmission technique;			
12. METHODS OF MULTIPLEXING OVER TIME. Definition, digital transmission, DAC; hierarchy of time multiplexing - multi-level multiplexing.			
13. PULSE CODE MODULATION (PCM). Quantization error, signal transmission with PCM - control.			
14. PULSE CODE MODULATION (PCM). Uneven quantization, noise signal ratio; example.			
Bibliography 1. Naforniță M, Munteanu C., <i>Comunicații de date</i> , Ed. "Gh Asachi", Iași, 2006 2. Tanenbaum A., <i>Rețele de calculatoare</i> , Ed. „Agora”, Tg. Mureș, 1997 3. Oteștean M., Alexa Șt., <i>Tehnica telecomunicațiilor</i> , Ed. "Politehnica" Timișoara, 2000 4. https://electronicaplicata.wordpress.com/2018/06/14/teoria-transmisiunii-informatiei-sem-ii/			
8.2.1. Seminary		Teaching methods	Observation
1. The connection between Nb and dB		-	2 hours
2. Block diagram of the frequency multiplex, grouping of the upper levels.		2 hours	
3. Analysis of the operating scheme for different types of modulators, representation of the evolution in time and spectrum		4 hours	
4. Expression in literary form of the stability conditions for a system with terminal repeaters and without intermediate repeaters		2 hours	
5. Pre-group translations in G.P. basic B with 3 groups and four ways		2 hours	
6. Quantization of an unknown voltage according to the compression law A, on 8 bits.		2 hours	
8.2.2. Laboratory	Teaching methods	Observation	
1. Health and safety in laboratory.	Explanation	2 hours	
2. Amplitude modulation	Laboratory experiment, discussion, and debate	2 hours	
3. Frequency modulation		2 hours	
4. Phase modulation		2 hours	
5. Pulse modulation		2 hours	
6. Digital transmission. ENCODE		2 hours	
7. Evaluation, debt remaining hours.		2 hours	
Bibliography 1. Oteștean M., Alexa Șt., <i>Tehnica telecomunicațiilor</i> , Ed. "Politehnica" Timișoara, 2000			
8.2.3. Project -	Teaching methods	Observation	

9. Corroborating Discipline's Contents with the Expectation of the Epistemic Community Representatives, the Professional Associations and the Employers' Representatives from the Programme Corresponding Field

- They have been established with the main employers by previous discussions at the study programme substantiation.

10. Evaluation

Type of activity	10.1. Evaluation criteria	10.2. Evaluation methods	10.3. Weight from the final grade
10.4. Course	Debates participation	Number of interventions	10 %
	Acquired knowledge level	Exam (on paper)	60 %
10.5.1. Seminary	Activity / implication	Active participation in seminars	5 %
	Gained competence level	Current written works: homework	5 %
10.5.2. Laboratory	Activity / implication	Number of interventions	10 %
	Gained competence level in practice	Practical test	10 %
10.6. Performance Minimum Standard			
<ul style="list-style-type: none"> • Completion of Applicative Activities (laboratory work accomplishment and project approval by the minimum grade of 5). • Completion of each exams subject by the minimum grade of 5. 			

Completion Date

May 2022

Course Coordinator's Signature

Assoc. Prof. PhD. Eng. Cristian Paul **CHIONCEL**

Laboratory & Seminar Coordinator's Signature

Assoc. Prof. PhD. Eng. Cristian Paul **CHIONCEL**

Department Endorsement Date

24.05.2022

Chief of Department Signature

Prof. dr. Laura **DIOȘAN**