

COURSE SHEET

2019-2020



1. Information about the program

1.1 Higher Education Institution	"Gheorghe Asachi" Technical University of Iasi
1.2 Faculty	Electronics, telecommunications and Information Technology
1.3 Department	Fundamentals of Electronics
1.4 Domain	Electronics, Telecommunications and Informational technologies
1.5 Study Cycle	Licence
1.6 Study program/ Qualification	Telecommunications Systems and Technologies

2. Information about the subject

2.1 Subject Title: Signals, Circuits and Systems	Code: <i>ESIS 202</i>						
2.2 Course holder	professor Liviu Goraş						
2.3 Seminar holders	Lecturer Radu Matei Cezar						
2.4 Study year	2	2.5 Semester	3	2.6 Type of evaluation	Exam	2.7 Discipline regime	DI

3. Total estimated time (hours per semester for teaching activities)

3.1 Hours per week	7	of which: 3.2 course	4	3.3 seminar/laboratory	3
3.4 Total number of hours	98	of which: 3.5 course	56	3.6 seminar/laboratory	42
Time schedule distribution					hours
Study following the manual, course support, references and notes					28
Supplementary documentation					14
Seminar/laboratory preparation, reports etc.					28
Tutorial					6
Examinations					4
Other activities - consultations					4
3.7 Total number of individual study	84				
3.9 Total hours per semester	182				
3.10 Credit numbers	7				

4. Prerequisites (when appropriate)

4.1 of curriculum	Linear algebra, Special mathematics, Fundamental of Electrical Engineering, Material, components and passive circuits,
4.2 of competence	

5. Conditions (acolo unde este cazul)

5.1. for course presentation	Course room, white board, computer, projector
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5.2. for laboratory work	Laboratory room and electronic equipment (oscilloscopes signal generators power supplies), testing boards, computers and video projectors.
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6. Acquired specific competences

Professional competences	<ul style="list-style-type: none"> To know system and circuit elements; linear, nonlinear and time variable elements of resistive, inductive and resistive type, controlled sources, operational amplifiers To know analog and discrete signal sets/spaces encountered in computing circuit and system responses to signals, causal, periodic and finite support signals, energetic type quantities To know the principle of developing signals using elementary signals, linear systems and circuits response to signals To characterize analog systems in the time domain; convolution product To decompose analog signals in terms of elementary signals. Laplace and Fourier transforms, Fourier series To compute the steady state and transient response of analog systems in the frequency domain To characterize discrete systems in the time domain; discrete convolution To develop discrete signal in elementary signal bases; Z and discrete Fourier transforms, To compute steady state and transient response of discrete systems in the frequency domain
Transversal competences	<ul style="list-style-type: none"> To efficiently use informational sources and communications resources and professional development both in Romanian and in an international language. To work in an international context

7. Course objectives

7.1 The general course objective	- A deep understanding of theoretical, methodological and practical aspects specific to analog and discrete signal, circuits and systems (analog signals and systems, linear system analysis, discrete signals and systems analysis).
7.2 Specific objectives	<ul style="list-style-type: none"> The student is able to show that he/she has acquired enough knowledge to understand the studied notions. The student is able to critically understand, explain and interpret the theoretical, methodological and practical developments specific to analog and digital signal analysis as well as the basic principles of analog and discrete system analysis.

8. Content

8.1 Course	Teaching method	Observations hours
Physical systems modeling	Combine:	4
Principle of signal development in terms of elementary signals bases; calculation of circuits and systems response.	-course presentation	8
Steady-state and transient response of analog systems in the frequency domain.	-explanation,	4
Characterisation of analog systems in the time domain; convolution product	-debate,	4
Sets and spaces of analog and discrete often encountered in computing circuits and systems response. Causal, periodic and finite support signals, energetic type quantities.	-case studies,	2
Operational amplifier models	-Connections with other courses, with previously transmitted information and with practical applications.	4
System and circuits elements: linear, nonlinear and time variable elements of resistive, inductive and resistive type, controlled sources.		4

Bode diagrams	4
Relationship between time and frequency response.	4
Time-frequency duality formulas	4
Samplig theorem	4
Discrete signal characterization in time and frequency domain. discrete convolution.	2
Development of discrete signal in elementary signal bases; Z and discrete Fourier transforms,	4
Steady state and transient response of discrete systems	4

References		
1. L. Goraş, Semnale, circuite şi sisteme, Editura “Gh. Asachi” Iaşi 1993 (in Romanian).		
2. V.Grigoraş, D. Tarniceriu, Prelucrarea numerică a semnalelor - Partea I - Semnale şi sisteme discrete, Iaşi, Editura "Gh. Asachi", 1995 (ISBN 973-9178-28-6) (in Romanian)		
3. Ad. Mateescu, s.a., Probleme de analiză şi sinteza circuitelor electrice, Editura Tehnică, Bucureşti 1978 (in Romanian).		
4. Ch. Byrne, Signal Processing – A Mathematical Approach, A.K. Peters, 2005		
5. J. Bentsman, Introduction to Signal Processing, Instrumentation and Control, World Scientific 2016		
8. 2 Seminar / laboratory	Teaching method	Observations
1. Complex and real Fourier series;	Use of electronic equipment (oscilloscopes signal generators power supplies), testing boards, computers and video projectors. Exercises and problems Discussions	
2. First and second order circuits response to harmonic and periodic signals.		
3. Transient response of first and second order circuits Laplace transform		
4. Basic circuits with ideal operational amplifiers		
5. Circuits based on the use of nonideal operational amplifiers		
6. Fourier transform, Bode diagrams;		
7. Sampling theorem		
8. Discrete signals and systems		
References Laboratory notes and presentations.		

9. Connection of the course with employers expectations

The course objectives are in full agreement with the curricula offering information and forming skills useful to future specialists in the domain of Electronics, telecommunications and Information Technology. The content is harmonized with other courses taught at this Faculty and is similar to other courses taught at prestigious universities abroad. The course uses concepts taught at Linear algebra, Special mathematics, Fundamental of Electrical Engineering, Material, components and passive circuits, etc.

10. Rating

Type of activity	10.1 Rating criteria	10.2 Rating methods	10.3 Weight in the final mark
10.4 Course	-Knowledge correctness and completeness -Logical coherence -Degree of specialty language usage	Written test which has two parts. The first one includes 6 problems and 4 theoretical subjects. The second thesis consists of 3 problems to aiming to check the understanding level of the concepts used. Evaluation conversation Oral questioning	80%
	Criteria that envisage attitude regarding learning and		

	understanding		
10.5 Seminar/laboratory	-Capacity of operationg with the learned concepts -Quality of problem solutions	Semestrial test	10%
	-Quality of the work done., - Criteria that envisage attitude regarding learning and understanding	Laboratory tests	10%
10.6 Minimum standard of performance			
Knowledge of fundamental theory and practical elements in solvind simple problems.			

Date: 04.09.2019

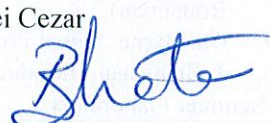
Course holder signature :

prof. dr. ing. Liviu Goras



Seminar / laboratory holders signature:

s. l. dr. ing. Radu Matei Cezar



Date:

13.09.2019

Director of Department signature:

Prof.dr.ing. Victor Grigoras

