COURSE GUIDE

Dean, Prof. Daniela TĂRNICERIU

.....

1. Program info

1.1 Higher education institution	"Gheorghe Asachi" Technical University of Iaşi
1.2 Faculty / Department	Electronics, Telecommunications and Information Technology
1.3 Department	Telecommunications and Information Technologies
1.4 Field	Electronic Engineering, Telecommunications and Information Technology
1.5 Study level	Bachelor's Degree Studies
1.6 Study program / Qualification	Telecommunications Systems and Technologies

2. Course info

2.1 Course name:	**Digital Communications**					Code: ETTI_EDIS404T	
2.2 Course organizer (lecturer)	Conf. Ciprian-Romeo COMȘA						
2.3 Teaching assistants	Şef lucr. dr.ing. Felix DIACONU						
2.4 Year of study	4	2.5 Semester	7	2.6 Assessment	E	2.7 Type of subject	DIS

3. Estimated total time (hours per semester for teaching activities)

3.1 Number of hours per week	5	3.2 lecture	3	3.3 seminar/laboratory/project	2
3.4 Total number of hours in curricula	70	3.5 lecture	42	3.6 seminar/laboratory/project	28
Time distribution					hours
Textbook, course support, references and course notes study					8
Library, electronic platforms and on site documentation					3
Seminar/laboratory preparation, homework, reports, portfolios and essays					5
Tutoring					7
Assessment					3
Other activities					1

3.7 Total individual study hours	26
3.9 Total hours per semester	96
3.10 Number of credit points	4

4. Prerequisites (where applicable)

4.1 curricula type	Mathematical analysis, Algebra, Signals, circuits, and systems, Communications' basics, Communication Systems
4.2 competence type	-

5. Infrastructure (where applicable)

5.1. for lectures	Laptop, video projector, white/black board Students will switch off their mobile phones
5.2. for laboratories and seminaries	Computer network, Matlab/Communication tools, internet Students will switch off their mobile phones

6. Specific competences

Professional competences	Know and use adequately specific terminology Understand specific architecture of digital communication systems Understand specific interaction phenomena of transmission, demodulation, diversity, equalization, synchronization Learn main digital receiver structures and their domain of validity Develop skills to analyze and evaluate performance of a digital communication receiver in various noise conditions Learn main parameters of digital communication systems Learn resource management techniques for digital communication systems Learn computer aided design principles for digital communications

Transversal competences	Use efficiently information sources and computer assisted techniques for communication and professional skills' enhancing Prove interest in professional skills' enhancing by critical thinking Prove interest for long life learning Learn to work in international environment

7. Course targets (as resulting from **6. Specific competences** table)

7.1 Course main target	Detailed knowledge of digital communication systems and receiver structures
7.2 Course specific targets	Prove acquiring enough knowledge to understand course subjects Critically understand, explain and evaluate the theoretical, methodological, and practical subjects, specific for digital communications Correctly use of digital propagation models Identify specific parameters of main digital communications' technologies

8. Contents

8. 1 Lectures	**Teaching methods**	**Notes**
Probability, random variables and random processes Digital receiving techniques Advanced Digital Modulation Techniques Fading Diversity Equalization Synchronization	Combination of: -lecture -slide presentation -explanation -debate -case study -corroboration with other courses' content, with previously presented subjects or with practical aspects of the presented subject	

References:

1. K. Wesołowski, "*Introduction to Digital Communications*", Wiley, 2008
2. U. Madhow, "*Fundamentals of Digital Communication*", Cambridge Press, 2008
3. Couch II L.W., *"Digital and Analog Communication Systems"*, Prentice Hall, 2013.
4. B. Sklar, „Digital Communications", Pearson Ed, 2013.
5. Proakis J. G., Salehi M., *"Communication Systems Engineering"*, Prentice Hall, 2011.

8. 2 Seminar	**Teaching methods**	**Notes**
1. Spectral Density Power. Autocorrelation. 2. Random variables. Random processes 3. Digital Modulations 4. Probability Error for Digital Communication Systems in Noise 5. Pseudorandom sequences 6. Trellis Codded Modulation. Viterbi Algorithm 7. Home work / Final Test	Problem solving and solution anaysis Exercises Discussions	

8. 3 Laboratory	**Teaching methods**	**Notes**
1. Random variables. 2. Random processes 3. Receiver structures – Match filter 4. Digital Communication Systems in Noise 5. Synchronization 6. Spread Spectrum Systems 7. Home work / Project / Final colloquium	Analysis of Matlab based solutions Exercises Discussions	

References:

1. K. Wesołowski, "*Introduction to Digital Communications*", Wiley, 2008
2. U. Madhow, "*Fundamentals of Digital Communication*", Cambridge Press, 2008
3. Couch II L.W., *"Digital and Analog Communication Systems"*, Prentice Hall, 2013.
4. B. Sklar, „Digital Communications", Pearson Ed, 2013.
5. Proakis J. G., Salehi M., *"Communication Systems Engineering"*, Prentice Hall, 2011.

References:

. K. Wesołowski, "*Introduction to Digital Communications*", Wiley, 2008

9. Course contents corroboration with the expectations of the epistemic community representatives, professional associations and relevant employers in the field of the program

Course content and teaching/assessment techniques derive from continuous interaction with colleagues from other Romanian and foreign universities in the frame of Erasmus/Socrates exchange program. Also, industry representatives offered significant input. Course objectives are in good agreement with the general curriculum, offering basic knowledge and creating skills needed for engineers in electronics, telecommunications, and information technology. Course syllabus is adapted to the requirements for the specialization of Telecommunication technologies and systems, as it is implemented in universities from Romania and abroad. The course uses specific knowledge from previously studied courses, like Mathematics, Signals, circuits, and systems, or Digital communications. The course is adequately placed in the curriculum structure.

10. Assessment

<table>
<tr><th>Activity type</th><th>10.1 Assessment criteria</th><th>10.2 Assessment methods</th><th colspan="2">10.3 Percentage of final grade</th></tr>
<tr><td></td><td></td><td></td><td colspan="2"></td></tr>
<tr><td rowspan="2">10.4 Lectures</td><td rowspan="2">Acquired theoretical subjects (quantity, correctness, accuracy)</td><td>Testing during semester: weeks 5, 10</td><td colspan="2">10%</td></tr>
<tr><td>Final test: thesis with theoretical subjects and simple exercises</td><td colspan="2">60% (minimum 5)</td></tr>
<tr><td rowspan="2">10.5 Laboratory / Seminar</td><td rowspan="2">Reports' quality, homework content and quality of its oral presentation; final test</td><td>Problem solving activity - report, Homework, Final Test</td><td>10%</td><td rowspan="2">30% (minimum 5)</td></tr>
<tr><td>Experimental reports, final colloquium</td><td>20%</td></tr>
<tr><td colspan="5">10.6 Minimum performance standard</td></tr>
<tr><td colspan="5">• Adequately know and understand specific theory aspects
• Solve specific problems</td></tr>
</table>

Completion date:
12.09.2019

Course organizer signature,
Conf. dr. ing. Ciprian-Romeo COMȘA

Teaching assistant signature,
Șef lucr. dr. ing. Felix Diaconu

Department approval date,

16. SEP. 2019

Department director signature,
Prof. dr. ing. Luminița Scripcariu