SYLLABUS

1. Information about the program

1.1 Higher education institution	Universitatea Politehnica Timișoara
1.2 Faculty[1] / Department[2]	Electronics Telecommunications and Information Technologies/ Communications
1.3 Field of study (name/code[3])	Electronics Telecommunications and Information Technologies Engineering / 20.20.10
1.4 Study cycle	Master
1.5 Study program (name/code/qualification)	Communications Networks Engineering / 20.20.10 / 2153

2. Information about discipline

2.1a Name of discipline/The educational classe[4]	Wideband Communication Networks / DF						
2.1b Name of discipline in Romanian							
2.2 Coordinator (holder) of course activities	s.l.dr.ing. Teodor PETRITA						
2.3 Coordinator (holder) of applied activities[5]	s.l.dr.ing. Teodor PETRITA						
2.4 Year of study[6]	2	**2.5** Semester	3	**2.6** Type of evaluation	E	**2.7** Regime of discipline[7]	DOP

3. Total estimated time (direct activities (fully assisted), partially assisted activities and unassisted activities[8])

3.1 Number of hours fully assisted/week	4 ,of which:	course	2	seminar/laboratory/project			2
3.1* Total number of hours fully assisted/sem.	56 ,of which:	course	28	seminar/laboratory/project			28
3.2 Number of on-line hours fully assisted/sem	,of which:	course		seminar/laboratory/project			
3.3 Number of hours partially assisted/week	,of which:	project, research		training		hours designing M.A. dissertation	
3.3* Number of hours partially assisted/ semester	,of which:	project of research		training		hours designing M.A. dissertation	
3.4 Number of hours of unassisted activities/ week	4,92 ,of which:	Additional documentation in the library, on specialized electronic platforms, and on the field					0,92
		Study using a manual, course materials, bibliography and lecture notes					2
		Preparation of seminars/ laboratories, homework, assignments, portfolios, and essays					2
3.4* Total number of hours of unasssited asctivities/ semester	69 ,of which:	Additional documentation in the library, on specialized electronic platforms, and on the field					13
		Study using a manual, course materials, bibliography and lecture notes					28
		Preparation of seminars/ laboratories, homework, assignments, portfolios, and essays					28
3.5 Total hrs./week[9]	8,92						
3.5* Total hrs./semester	125						
3.6 No. of credits	5						

4. Prerequisites (where applicable)

4.1 Curriculum	•
4.2 Learning outcomes	•

5. Conditions (where applicable)

5.1 of the course	•
5.2 to conduct practical activities	•

6. Learning outcomes acquired through this discipline

Knowledge	C2. The student/graduate understands the principles of electronic circuits and architectures • C6. The student/graduate understands algorithms and structures for data processing • C10. The student/graduate understands the concepts of traffic, bandwidth and QoS • C11. The student/graduate knows communication technologies and protocols. • C3. The student/graduate understands the structure and style of academic and technical texts •
Skills	• A2. The student/graduate develops schemes and integrates hardware/software components • A5. The student/graduate integrates interdisciplinary methods and perspectives • A10. The student/graduate evaluates network needs and optimizes resources • A11. The student/graduate selects and applies communication methods appropriate to the context • A12. The student/graduate configures and optimizes ICT resources" • A2. The student/graduate communicates results in a professional, clear, coherent and correct manner in the form of reports, documentation and scientific papers •
Responsibility and autonomy	• RA1 The student/graduate independently manages a research process and critically evaluates the results • RA9 The student/graduate coordinates and supports collaboration between different fields • RA11 The student/graduate takes responsibility for the correct and efficient transmission of information • RA12 The student/graduate is responsible for the stability and performance of managed systems • RA1. The student/graduate respects and promotes standards of ethics and professional integrity in all stages of research •

7. Objectives of the discipline (based on the grid of learning outcomes acquired)

- Introduction to baseband signals, multiplexing techniques and analog and digital modulation techniques used in broadband networks. Understanding and applying the concepts of traffic, bandwidth and QoS for the main digital communication systems with parameters and application areas
- Integrating interdisciplinary methods and perspectives with network needs assessment and resource optimization

8. Content

8.1 Course	Number of hours	Of which online	Teaching methods
1. Introduction. Applications. Antennas. Propagation and channel shaping. Receiver structure	6		Presentation, direct interaction with the student, practical examples, comparative analyses, resources on the Virtual Campus platform
2. Modulation and demodulation of signals	3		
3. Mixed receivers for broadband communications	4		
4. Broadband analog and digital transceivers and digital receivers	6		
5. Digital spread spectrum coding for broadband access	3		
6. Broadband pulsed interference in narrowband receivers	3		
7. Location and tracking. Estimated time of arrival. Approximate position. Analysis of location positioning accuracy	3		

	Bibliography[10] 1. Xuemin Shen ed. “Ultra-wideband wireless communications and networks”, John Wiley & Sons Ltd 2006 2. Jeffrey Reed ed: “An Introduction to Ultra Wideband Communications Systems”, Prentice Hall, 2005. 3. W. Pam Siriwongpairat, K. J. Ray Liu, "Ultra-Wideband Communications Systems : Multiband OFDM Approach" Wiley-IEEE Press

8.2 Applied activities[11]	Number of hours	Of which online	Teaching methods
Simulating single-carrier modulation types	4		
Simulating OFDM modulation types	4		
The generalized multipath propagation model	4		
IEEE 802.15.4.a channel model	4		
Spread spectrum codes used in broadband transmissions	2		
Receivers used in broadband transmissions	8		
Indoor location with UWB	2		

	Bibliography[12] 1. Xuemin Shen ed. “Ultra-wideband wireless communications and networks”, John Wiley & Sons Ltd 2006 2. Jeffrey Reed ed: “An Introduction to Ultra Wideband Communications Systems”, Prentice Hall, 2005. 3. W. Pam Siriwongpairat, K. J. Ray Liu, "Ultra-Wideband Communications Systems : Multiband OFDM Approach" Wiley-IEEE Press 4. Campus virtual 5. Teodor PETRITA , Radiocomunicaţii : receptoare definite software Editura Orizonturi Universitare, Timișoara, 2019 ISBN 978-973-638-643-5

9. Evaluation

Type of activity	**9.1** Evaluation criteria[13]	**9.2** Evaluation methods	**9.3** Share of the final grade
9.4 Course	Knowledge acquired regarding the topics covered	Written exam with topics from the content covered. Topics related to the topics covered in the course with upload on Virtual Campus	50%
9.5 Applied activities	**S:**		
	L: Checking the degree of understanding of the principles presented and experienced		50%
	P:		
	Pr:		
	Tc-R[14]:		

9.6 Minimum performance standard (minimum amount of knowledge necessary to pass the discipline and the way in which this knowledge is verified[15]

- For the exam, the development of a paper corresponding to an elementary understanding of the theoretical aspects of the course and the ability to solve simple numerical applications similar to those exemplified in the course
- For the applied activities, the minimum objectives are: participation in all applied activities, achieving the minimum objectives imposed on each paper, namely the ability to understand the principles of coding and modulation systems and the ability to implement these principles in minimal applications

Date of completion	Course coordinator (signature)	Coordinator of applied activities (signature)
23.09.2025		

Head of Department (signature)	Date of approval in the Faculty Council [16]	Dean (signature)
	07.10.2025	