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])	Electronic Engineering, Telecommunications and Information Technologies/ Communications/M232.25.01.F1-01
1.4 Study cycle	Master
1.5 Study program (name/code/qualification)	Communication Networks Engineering/20.20.10

2. Information about discipline

2.1a Name of discipline/The educational classe[4]	Radio Networks Design/DF							
2.1b Name of discipline in Romanian	Proiectarea rețelelor radio							
2.2 Coordinator (holder) of course activities	SLSimu Călin							
2.3 Coordinator (holder) of applied activities[5]	SLSimu Călin							
2.4 Year of study[6]	1	**2.5** Semester	1	**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	4.93 ,of which:	Additional documentation in the library, on specialized electronic platforms, and on the field					2.3
		Study using a manual, course materials, bibliography and lecture notes					1.3
		Preparation of seminars/ laboratories, homework, assignments, portfolios, and essays					1.3 3
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					32. 2
		Study using a manual, course materials, bibliography and lecture notes					18. 2
		Preparation of seminars/ laboratories, homework, assignments, portfolios, and essays					18. 62
3.5 Total hrs./week[9]	7.93						
3.5* Total hrs./semester	111						
3.6 No. of credits	5						

4. Prerequisites(where applicable)

4.1 Curriculum	• Radio Communications
4.2 Learning outcomes	•

5. Conditions(where applicable)

5.1 of the course	Room equipped with blackboard, video projector, computers, Internet •

5.2to conduct practical activities	Room equipped with blackboard, video projector, computers, Internet •

6. Learning outcomesacquired through this discipline

Knowledge	C1. The student/graduate knows research methods, techniques and paradigms • C7. The student/graduate knows the principles of professional communication • C8. The student/graduate knows the terminology and conventions of technical communication • C9. The student/graduate knows ways to integrate knowledge from various fields • C10. The student/graduate understands the concepts of traffic, bandwidth and QoS •
Skills	• A1. The student/graduate applies qualitative and quantitative methodologies. • A7. The student/graduate presents ideas and results in academic/professional contexts. • A8. The student/graduate explains complex concepts to different audiences. • A9. The student/graduate applies complementary approaches in research projects. • A10. The student/graduate assesses network needs and optimizes resources. •
Responsibility and autonomy	• RA4 The student/graduate ensures the correctness and relevance of the conclusions drawn. • RA7 The student/graduate ensures the quality and compliance with academic norms. • RA10 The student/graduate proposes solutions to streamline traffic and manages resources. • RA11 The student/graduate takes responsibility for the correct and efficient transmission of information. •

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

• A training of the student related to the technical aspects of designing a modern radio communications network. • A brief preparation of the student related to other aspects of designing a modern radio communications network - economic, legal. •

8. Content

8.1 Course	Number of hours	Of which online	Teaching methods
1 Introduction to the field	2	0	PPT presentation, video projector, blackboard, interactive discussions, partially online, virtual campus
2 Preliminary knowledge	2	0	
3 The plan for a radio network - 1	2	0	
4 The plan for a radio network - 2	2	0	
5 The process of planning a radio network – 1	2	2	
6 The process of planning a radio network – 2	2	2	
7 Base station site	2	2	
8 Budget for a radio link - 1	2	2	
9 Budget for a radio link - 2	2	2	
10 Budget for a radio link - 3	2	2	
11 Models for outdoor propagation - 1	2	2	
12 Models for outdoor propagation – 2	2	2	
13 Models for outdoor propagation – 3	2	2	
14 Models for outdoor propagation - 4	2	0	

	Bibliography[10].1. Mârza Eugen, Simu Călin, “Comunicații mobile - principii și standarde”, Ed. de Vest, Timișoara, ISBN 973-36-0374-0, 2003. 2.Sofoklis A. Kyriazakos, George T. Karetsos, Practical Radio Resource Management in Wireless Systems, Artech House, Inc., United Kingdom, 2004. 3. Ajay R. Mishra, Fundamentals of Cellular Network Planning and Optimisation: 2G/2.5G/3G , Nokia Networks, John Wiley & Sons Ltd., United Kingdom, 2004. 4. Adrian Graham, Nicholas C. Kirkman, Peter M. Paul, Mobile Radio Network Design in the VHF and UHF Bands: A Practical Approach, John Wiley & Sons Ltd., United Kingdom, 2007. 5. Mârza Eugen, Alexa Florin, Simu Călin, “Radiocomunicații - fundamente”, Ed. de Vest, Timișoara, ISBN 978-973-36-0446-4, 2007. 6. Joachim Sachs, Gustav Wikstrom, Torsten Dudda et.al., 5G Radio Network Design for Ultra-Reliable Low-Latency Communication, IEEE, 2018

8.2 Applied activities[11]	Number of hours	Of which online	Teaching methods
1 Introduction	2	0.	The course is conducted with the help of a video projector, internet, multimedia resources.
2 Radio waves propagation - 1	2	0	
3 Radio waves propagation - 2	2	0	
4 Radio waves propagation - 3	2	0	
5 Free space loss model	2	0	
6 Flat terrain loss model	2	0	
7 Okumura model	2	0	
8 Hata model 9 Modified Hata model 10 Lee model - 1 11 Lee model – 2 12 COST 231 model - 1 13 COST 231 model - 2	2 2 2 2 2 2	2 2 2 2 2 2	. A dialogue is held with the participants

	Bibliography[12]1 Mârza Eugen, Simu Călin, “Comunicații mobile - principii și standarde”, Ed. de Vest, Timișoara, ISBN 973-36-0374-0, 2003 Ajay R. Mishra, Fundamentals of Cellular Network Planning and Optimisation: 2G/2.5G/3G , Nokia Networks, John Wiley & Sons Ltd., United Kingdom, 2004

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 coverage of the entire course	Written exam	66%
9.5 Applied activities	**S:**		
	L: Ability to develop a power budget for the studied models	Homeworks	33%

	P:		
	Pr:		
	Tc-R[14]:		

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

Mastering the key topics and, in general, the issues presented in the course and in the laboratory

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Date of completion	**Course coordinator (signature)**	**Coordinator of applied activities (signature)**
22.09.2025		
Head of Department (signature)	**Date of approval in the Faculty Council[16]**	**Dean (signature)**
	07.10.2025	