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]	Network Planning/DF						
2.1b Name of discipline in Romanian	Planificarea rețelei						
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	2	**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					1.93
		Study using a manual, course materials, bibliography and lecture notes					1.5
		Preparation of seminars/ laboratories, homework, assignments, portfolios, and essays					1.5
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					27
		Study using a manual, course materials, bibliography and lecture notes					21
		Preparation of seminars/ laboratories, homework, assignments, portfolios, and essays					21
3.5 Total hrs./week[9]	8.93						
3.5* Total hrs./semester	125						
3.6 No. of credits	5						

4. Prerequisites(where applicable)

4.1 Curriculum	• Radio Networks Design
4.2 Learning outcomes	•

5. Conditions(where applicable)

5.1 of the course	Room equipped with blackboard, video projector, computers, Internet •
5.2 to conduct practical activities	Room equipped with blackboard, video projector, computers, Internet

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6. Learning outcomes acquired 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 planning a modern radio communications network.
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A brief preparation of the student related to other aspects of planning a modern radio communications network - economic, legal.
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8. Content

8.1 Course	Number of hours	Of which online	Teaching methods
1 Link budget for mobile radio	2	0	PPT presentation, video projector, blackboard, interactive discussions, partially online, virtual campus
2 GSM case - 1	2	0	
3 GSM case - 2	2	0	
4 UMTS case - 1	2	2	
5 UMTS case - 2	2	2	
6 LTE case - 1	2	2	
7 LTE case - 2	2	2	
8 Indoor propagation	2	0	
9 Radio channels and fading	2	0	
10 Geodata bases	2	0	
11 Geospatial data for network planning	2	0	
12 Interference and inter-system compability - 1	2	0	
13 Interference and inter-system compability - 2	2	0	
14 Propagation models calibration	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 Project activity - start	2	0	
3 Radio link budget	2	0	
4 Project activity	2	2	
5 GSM link budget	2	0	
6 Project activity	2	2	
7 UMTS link budget	2	0	
8 Project activity	2	2	. A dialogue is held with the participants
9 LTE link budget	2	0	
10 Project activity	2	2	
11 Channels and fading - 1	2	0	
12 Project activity	2	2	
13 Channels and fading - 2	2	0	
14 Project presentation	2	0	

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	60%
9.5 Applied activities	**S:**		
	L: Ability to develop a power budget for the studied models	Homeworkst	20%

	P: Ability to develop a project	Oral project presentation	
	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]

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]** 07.10.2025	**Dean** **(signature)**