SYLLABUS

1. Information about the program

1.1 Higher education institution	Universitatea Politehnica Timișoara
1.2 Faculty[1] / Department[2]	Electronică, Telecomunicații și Tehnologii Informaționale/Communications
1.3 Field of study (name/code[3])	Electronică, Telecomunicații și Tehnologii Informaționale / 20.20.10
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]	Mobile communication network/DF						
2.1b Name of discipline in Romanian	Comunicații fără fir						
2.2 Coordinator (holder) of course activities	Ass. Prof. Dr. Eng. Valentin Nita						
2.3 Coordinator (holder) of applied activities[5]	Ass. Prof. Dr. Eng. Valentin Nita						
2.4 Year of study[6]	1	**2.5** Semester	2	**2.6** Type of evaluation	E	**2.7** Regime of discipline[7]	DOB

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	6.71 ,of which:	Additional documentation in the library, on specialized electronic platforms, and on the field					2
		Study using a manual, course materials, bibliography and lecture notes					2
		Preparation of seminars/ laboratories, homework, assignments, portfolios, and essays					2.71
3.4* Total number of hours of unasssited asctivities/ semester	94 ,of which:	Additional documentation in the library, on specialized electronic platforms, and on the field					28
		Study using a manual, course materials, bibliography and lecture notes					28
		Preparation of seminars/ laboratories, homework, assignments, portfolios, and essays					38
3.5 Total hrs./week[9]	10.71						
3.5* Total hrs./semester	150						
3.6 No. of credits	5						

4. Prerequisites (where applicable)

4.1 Curriculum	•
4.2 Learning outcomes	

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5. Conditions (where applicable)

5.1 of the course	• Classroom equipped with video projector, internet access, and multimedia resources
5.2 to conduct practical activities	• Laboratories equipped with high-performance computers

6. **Learning outcomes** acquired through this discipline

Knowledge	• C1.Studentul/Absolventul cunoaște metode, tehnici și paradigme de cercetare • C8.Studentul/Absolventul cunoaște terminologia și convențiile comunicării tehnice • C10.Studentul/Absolventul înțelege conceptele de trafic, lățime de bandă și QoS • C12.Studentul/Absolventul înțelege principiile scalabilității și alocării resurselor
Skills	• A3.Studentul/Absolventul utilizează instrumente colaborative și contribuie la proiecte • A10.Studentul/Absolventul evaluează nevoile rețelei și optimizează resursele • A11.Studentul/Absolventul selectează și aplică metode de comunicare potrivite contextului • A12.Studentul/Absolventul configurează și optimizează resursele TIC
Responsibility and autonomy	• RA4 Studentul/Absolventul asigură corectitudinea și relevanța concluziilor extrase • RA7 Studentul/Absolventul asigură calitatea și respectarea normelor academice • RA10 Studentul/Absolventul propune soluții pentru eficientizarea traficului și gestionează resursele • RA11 Studentul/Absolventul se responsabilizează pentru transmiterea corectă și eficientă a informației

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

- The discipline aims to prepare the students pursuing the master's program with modern communication techniques in common communication networks as well as applications.
- This discipline also trains the student in the ability to understand the limits and possibilities of overcoming the limits of existing wireless communication technologies.

8. **Content**

8.1 Course	Number of hours	Of which online	Teaching methods
General applications of mobile communication networks.	2		The course is conducted using a video projector, internet access, and multimedia resources. It integrates MOOC and OER materials. Interaction with participants is encouraged through discussions, and course assignments are provided.
1G to 5G networks	4		
Multiple access techniques.	4		
WiFi and Bluetooth communication	4		
Industry 4.0 and wireless communications.	4		
5G and 6G networks study cases for 2030	2		
Threats and Vulnerabilities in Wireless Communications. From IoT communication networks to 5G-6G.	2		
Security and Encryption Protocols in IoT communication networks (ex. NB-IOT, ZigBee, LoRaWAN, etc.)	2		
Security and Encryption Protocols in 5G and 6G networks.	2		
Integration of Edge Computing with the Internet of Things (IoT)	2		

	Bibliography[10] Signal Processing using Programming Languages: A Comprehensive Handbook with Scilab, Simulink, Python, V.A. Nita, R.E. Craciunescu, R. A. Badea, MATLAB, Octave, 95 Pagini, Matrix ROM, București 2023 ISBN: 978-606-25-0805-0 From GSM to LTE-Advanced Pro and 5G, Martin Sauter, Wiley 2017 WI-FI, BLUETOOTH, ZIGBEE AND WIMAX, H. LABIOD, H. AFIFI, C. DE SANTIS, Springer, 2007

8.2 Applied activities[11]	Number of hours	Of which online	Teaching methods
Design thinking techniques to identify problems in society that need wireless communications	6		
IoT .	4		
Laboratory for developing practical solutions integrating wireless communication systems	14		
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	Bibliography[12] Signal Processing using Programming Languages: A Comprehensive Handbook with Scilab, Simulink, Python, V.A. Nita, R.E. Craciunescu, R. A. Badea, MATLAB, Octave, 95 Pagini, Matrix ROM, București 2023 ISBN: 978-606-25-0805-0 Building Wireless Sensor Networks, Robert Faludi, O'Reilly, 2011 NB-IoT Use Cases and Devices, Kersten Heins, Springer, 2022.

9. Evaluation

Type of activity	**9.1** Evaluation criteria[13]	**9.2** Evaluation methods	**9.3** Share of the final grade
9.4 Course	Coverage of the entire course content.	Written exam and oral presentation	50%
9.5 Applied activities	**S:**		
	L:		
	P: Ability to develop traffic models for the considered networks based on the theoretical knowledge acquired.	Written exam and oral presentation	25%
	Pr: Ability to select wireless communication network and use it in a real case problem.	Practical application and oral presentation.	25%
	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]			
• Minimum 50% out of the total points			

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

22.09.2025	Conf. dr. ing. Niță Valentin-Adrian	Conf. dr. ing. Niță Valentin-Adrian
Head of Department (signature)	**Date of approval in the Faculty Council** [16]	**Dean (signature)**
Conf. dr. Ing. Horia Baltă	07.10.2025	Prof. Dr. Ing. Cătălin Căleanu