



UNIVERSIDADE FEDERAL DO CEARÁ

FEDERAL UNIVERSITY OF CEARÁ OFFICE OF THE VICE PROVOST FOR UNDERGRADUATION (PROGRAD) COORDINATION FOR PROJECT AND CURRICULUM DEVELOPMENT CURRICULUM DEVELOPMENT DIVISION

1. Academic unit offering the curricular component (Faculty, Center, Institute, Campus):

Center of Technology

2. Department offering the curricular component (when applicable):

Teleinformatics Engineering Department

3. Undergraduate course(s) offering the curricular component

Code of the Course	Name of the Course	Course Degree ¹	Curriculum (Year/Semester)	Nature of the Component ²	Semester of Offer ³	Habilitation ⁴
91	Telecommunications Engineering	Bachelor	2015.1	Optional	-	-

4. Name of the curricular component:

Laboratory of Mobile Communications

5. Code of the curricular component (filled by PROGRAD):

TI0072

6. Prerequisites	No ()	Yes (x)	
		Code	Name of the curricular component / activity
		TI0063	Mobile Communications I

7. Corequisite	No (x)	Yes ()	
		Code	Name of the curricular component / activity

8. Equivalences	No (x)	Yes ()	
		Code	Name of the curricular component / activity

9. Day period of the curricular component (more than one option can be selected):

Morning Afternoon Night

¹ Fill with *Bachelor (Engineer), Licenciante, or Technologist.*

² Fill with *Mandatory, Optional, or Elective.*

³ Fill when mandatory.

⁴ When elective, fill with the habilitation or emphasis to which the curricular component is linked.

10. Regime of the curricular component:

(x) Semester

() Yearly

() Modular

11. Justificatory for the creation/regulamentation of this curricular component

Mobile communications systems, such as mobile telephony and wireless networks in general, represent an important means of communication, with great economic and social impact, making it necessary to understand the technical details of its operation.

12. Objectives fo the curricular component:

The course aims to train students in the practical aspects of designing and operating mobile telephony networks and wireless networks in general by introducing them to the use of automated planning and performance monitoring tools.

13. Syllabus:

Introduction to Mobile Telephony and Wireless Communications Systems. Network Planning Aspects. Performance Measures. Modeling and Simulation Practices. Measurement and Analysis Practices.

14. Program:

1. **Introduction to Mobile Telephony Systems and Wireless Communications:** History. Key components of a mobile phone system. Propagation and Interference. Multiple Access Techniques. Main Mobile Telephone Standards. Main Standards of Wireless Communications Networks.
2. **Network Planning Aspects:** Coverage-oriented planning. Capacity-oriented planning. Satisfaction of quality of service levels. Planning tools for cellular telephone networks. Planning tools for wireless local area networks.
3. **Performance Measures:** Link performance metrics. System performance metrics. Specific performance indicators in Cellular Telephony. Specific Performance Indicators in Wireless Networks. Performance Monitoring Tools.
4. **Modeling and Simulation Practices:** Modeling and simulation tools for wireless communication systems. Radio resource management techniques. Performance and capacity analysis.
5. **Measurement Practices and Analysis:** Measurement campaigns in indoor and outdoor environments. Adjustment of measured values according to specific models. Application to wireless local area networks and cellular systems. Analysis of coverage and performance.

15. Workload description

Number of Weeks:	Number of Credits:	Total Workload in Hours:	Theory Workload in Hours:	Practice Workload in Hours:
16	02	32	-	32

16. Basic bibliography:

- 1- Lecture notes.
- 2- Laboratory activities script.
- 3- Technical manuals of the considered software tools.

17. Complementary bibliography:

- 1- Simulation and Software Radio for Mobile Communications; H. Harada, R. Prasad; Artech House, 2002; ISBN-10: 1580530443; ISBN-13: 978-1580530446
- 2- Indoor Radio Planning: A Practical Guide for GSM, DCS, UMTS and HSPA (Hardcover); Morten Tolstrup (Author); Wiley, 2008; ISBN-10: 0470057696; ISBN-13: 978-0470057698
- 3- RF Measurements for Cellular Phones and Wireless Data Systems (Hardcover); Allen W. Scott, Wiley-IEEE, 2008, ISBN-10: 0470129484, ISBN-13: 978-0470129487
- 4- Optimizing and Testing WLANs: Proven Techniques for Maximum Performance; Tom Alexander; Newness 2007, ISBN-10: 0750679867 ISBN-13: 978-0750679862
- 5- Principles of Communication Systems Simulation with Wireless Applications; W. H. Tranter, K. S. Shanmugan, T. S. Rappaport, K. L. Kosbar; Prentice Hall 2004, ISBN-10: 0134947908, ISBN-13: 978-0134947907
- 6- Radio Network Planning and Optimisation for UMTS; J. Laiho, A. Wacker, T. Novosad; Wiley 2006, ISBN-10: 0470015756, ISBN-13: 978-0470015759