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[133]	Curriculum (Year/ Semester)	Nature of the Component[134]	Semester of Offer[135]	Habilitation[136]
91	Telecommunications Engineering	Bachelor	2015.1	Optional	-	-

4. Name of the curricular component:
Communication Networks

5. Code of the curricular component (filled by PROGRAD)**:**
TI0131

6. Prerequisites	No ( )	Yes (x)	
		Code	Name of the curricular component / activity
		TI0120	Communication Principles

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

8. Equivalences	No ( )	Yes (x)	
		Code	Name of the curricular component / activity
		TI0062	Communication Networks

9. Day period of the curricular component (more than one option can be selected)**:**
(x) Morning (x) Afternoon (x) Night

133 **Fill with *Bachelor (Engineer), Licenciate,* or *Technologist.***
134 **Fill with *Mandatory, Optional,* or *Elective.***
135 **Fill when mandatory.**
136 **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

Today's communications systems are increasingly integrated in a way that allows the provision of services of various kinds in a transparent way to the user. Such integration forms the communications networks, essential subject in the formation of an engineer in the area of telecommunications.

12. Objectives fo the curricular component:

Several aspects of communication networks are addressed, focusing on their basic elements and the main types of networks for voice and data transmission. It also aims to present the fundamental concepts of queuing and traffic theory, which are essential for understanding and optimizing the functioning of communication networks.

13. Syllabus:

Introduction and Layered Network Models; Telephone Networks; ISDN networks; Voice over IP (VoIP); Queueing Theory; Traffic Theory.

14. Program:

1. **Introduction and layered network models:** network components, network types, OSI model. Overview, mechanisms and functionalities of layers: physical, link, network and transport.
2. **Telephony networks:** Basic concepts: telephone equipment, selector systems or couplers, switching center, telephone network structure, numbering plan; Signaling: of the subscriber, intercentral, via associated channel, of the subscriber line, between registers, along long-distance routes, via common channel; Signaling networks; PCM systems; Public and private telephony networks.
3. **Integrated Services Digital Network (ISDN):** concepts; interfaces; network elements; protocol architecture; frame relay, interconnection, ISDN standards.
4. **Voice over IP (VoIP):** introduction; application scenarios; technical aspects and voice quality; VoIP services and components; addressing; signaling protocols; transport protocols; control.
5. **Queueing theory:** notation and structure of queuing systems; discrete and continuous Markov chains; birth and death processes; systems in equilibrium; M / M / 1, M / M / 1, M / M / 1, M / M / 1, M / M / M / M / ∞ / M, M / M / m / K / M.
6. **Traffic theory:** Traffic generated by finite sources; traffic measurements, Erlang distribution, stochastic models; arrival time of orders; scheduling; quality of service and fairness metrics.

15. Workload description

Number of Weeks:	Number of Credits:	Total Workload in Hours:	Theory Workload in Hours:	Practice Workload in Hours:
16	04	64	64	-

16. Basic bibliography:

1- Lecture notes.

2- Andrew S. Tanembaum, Redes de Computadores, 5th edition, Pearson, 2011.
3- Paul Jean E. Jeszensky. Sistemas Telefônicos. Manole, 2004.
4- Leonard Kleinrock. Queueing Systems, Volume 1: Theory. Wiley Interscience, 1975.

17. Complementary bibliography:

1- John C. Bellamy, Digital Telephony, 3rd edition, John Wiley & Sons, 2000.
2- Roger L. Freeman, Fundamentals of Telecommunications, 2nd edition, Wiley, 2013.
3- Roger L. Freeman, Telecommunication System Bacheloring, 4th edition, Wiley-Interscience, 2004.
4- Giovanni Giambene, Queuing Theory and Telecommunications – Networks and Applications, Springer, 2010.
5- William J. Stewart, Probability, Markov Chains, Queues, and Simulation – The Mathematical Basis of Performance Modeling, Princeton University Press, 2009.