

**Telecommunications Networks**

Code: 102699  
ECTS Credits: 6

Degree	Type	Year	Semester
2500898 Telecommunication Systems Engineering	OB	3	2

**Contact**

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**Use of Languages**

Principal working language: spanish (spa)  
Some groups entirely in English: No  
Some groups entirely in Catalan: No  
Some groups entirely in Spanish: Yes

**Prerequisites**

Fonaments de xarxes

**Objectives and Contextualisation**

Once ended the course the student would have to able being of:

- Explore the requests that different apps and communities sue at communication neetwork: Quality of the Service
- Describe a taxonomy of the networks of communication: oriented at the connection and networks no oriented at the connection, circuits and packages switching, ...
- Describe how come it is necessary and how does the interconnection of ntworks
- Analyse the different techniques for a reliable communication.
- Explain the problematic of the congestion of the network: Assignment of resources vs. Control of the congestion
- Compound volumes and intensities of traffic.
- Describe and compare the different methods of management of cues
- Assess the features and services of different meshes.
- Provide a general vision of the organisation and operation of a cellular network.
- Express the conclusions of his work at an appropriate technical language

**Competences**

- Apply the necessary legislation in the exercise of the telecommunications engineers profession and use the compulsory specifications, regulations and standards.
- Communication
- Design and dimension multiuser communication systems using the principles of communication theory under the restrictions imposed by the specifications and the need to provide a quality service.
- Develop ethics and professionalism.
- Develop personal attitude.
- Develop personal work habits.
- Develop thinking habits.
- Direct the activities object of the projects in the field of telecommunication.

- Draft, develop and sign projects in the field of telecommunications engineering that, depending on the speciality, are aimed at the conception, development or exploitation of telecommunication and electronic networks, services and applications.
- Learn new methods and technologies, building on basic technological knowledge, to be able to adapt to new situations.
- Perform measurements, calculations, estimations, valuations, analyses, studies, reports, task-scheduling and other similar work in the field of telecommunication systems.
- Resolve problems with initiative and creativity. Make decisions. Communicate and transmit knowledge, skills and abilities, in awareness of the ethical and professional responsibilities involved in a telecommunications engineers work.
- Work in a team.

## Learning Outcomes

1. Adapt to multidisciplinary environments.
2. Apply the techniques in networks, services, processes and telecom applications in both fixed and mobile environments, personal, local or long distance with different band widths, including telephony, radio, television and data are based from the point of view transmission systems.
3. Assume and respect the role of the different members of a team, as well as the different levels of dependency in the team.
4. Carry out management activities for the design and dimensioning of telecommunications networks considering classical and new generation methods.
5. Communicate efficiently, orally and in writing, knowledge, results and skills, both professionally and to non-expert audiences.
6. Construct, operate and manage networks, services, processes and telecom applications, understood these as systems of recruitment, transportation, representation, processing, storage, management and presentation of multimedia information, from the point of view of the transmission systems.
7. Critically evaluate the work done.
8. Develop critical thinking and reasoning.
9. Develop curiosity and creativity.
10. Develop independent learning strategies.
11. Develop scientific thinking.
12. Develop the capacity for analysis and synthesis.
13. Differentiate and classify the main algorithms dimensioning, traffic control and congestion.
14. Differentiate and understand the significance of measurements and assessments of telecommunications networks to Formenta and ensure their optimal design.
15. Discuss and apply cryptography systems aimed at improving the safety of a telecommunication network.
16. Distinguish the different nature of the problems of dimensioning and routing for each of the different types of networks and make decisions and initiatives to improve the operation and provision of telecommunications networks.
17. Efficiently use ICT for the communication and transmission of ideas and results.
18. Evaluate the advantages and disadvantages of different conceptual and technological options for different telecommunication applications.
19. Manage available time and resources.
20. Manage networks, services, processes and telecom applications according to the laws and regulations both domestically and internationally.
21. Respect diversity in ideas, people and situations.
22. Use communication and computer applications (office automation, databases, advanced calculation, project management, display, etc.) to support the development and exploitation of telecommunication and electronic networks, services and applications.
23. Work autonomously.
24. Work cooperatively.

## Content

1. Fundamentals of Communication networks: Requests, performance, architecture, protocols and standards
2. Taxonomy of networks of telecom: voice, TV and data
3. Design of networks: Multiplexing, circuits and packages switching, traffic, access and core networks.
4. Interconnection of networks
5. Transport: Protocols Extreme-extremes and reliable communications
6. Assignment of Resources, modelled of tails, disciplines of tails and quality of the service. Control and treatment of the congestion
7. internal and external Routing.
8. Cellular networks

## Methodology

Activities directed:

- Classes of theory: exposition of theoretic contents.
- Practical classes: resolution of questions and problems related with the theory.
- Practices of laboratory: development of a hyphen of work related with the matter. Utilisation of tools of simulation.

Freelance activities:

- Personal study of the matter of the subject. Preparation of diagrams of blocs, digests and response at questions.
- Problem solving: complement of the individual study and work prior to the practical classes.

Staffed activities:

- Tutoring: individual or at groups reduced to resolve doubts, advise at the development of the subject or attend other specific questions

## Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Classes magistrals	30	1.2	11, 12
Classes pràctiques	10	0.4	11, 12, 8
Pràctiques de laborator	15	0.6	5, 11, 12, 9, 8, 23
Resolució de problemes	15	0.6	1, 3, 7, 5, 12, 9, 19, 24
Type: Supervised			
Tutories	6	0.24	7, 11, 10, 12, 9, 8, 17, 19, 23
Type: Autonomous			
Estudi	51	2.04	12, 8, 19

## Assessment

- 50% the validation of knowledge validation. The minimum grade required by this part is 5 out of 10. To carry out the validation of knowledge, two partial tests will be done during the course (a partial test to evaluate part I of the subject and another partial test to evaluate the part II of the subject) and a final exam (which will be evaluated by both parties). If the student takes more than 4 in one of the two parts in the partial tests, it will not have to be evaluated again of this part to the final exam (the note for this part will be the one of the partial one) . The validation note will be finally the average of the notes obtained in both parts. In order to be able to do the average, the student must have obtained more than 4 the theoretical exam of each part (either partial or in the corresponding part of the final).
- 25% of the grade of work done for class activities. No minimum mark is required for this part.
- 25% the qualification of questionnaires. The average minimum grade required by this part is 7 out of 10. If the average mark of this part is reached at 7 in the mean part is 0.

The practices are mandatory. It will be necessary to do the previous work, attend and answer the questions that

Irregularities by student parts, copy and plagiarism

Without prejudice to other disciplinary measures that are deemed appropriate

## Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Participació a classe	25%	17.5	0.7	1, 2, 3, 7, 18, 5, 6, 11, 12, 9, 8, 13, 14, 15, 16, 4, 17, 19, 20, 21, 24, 22
Quizzes	25%	2.5	0.1	2, 18, 5, 6, 11, 10, 12, 8, 13, 14, 15, 16, 19, 20, 23, 22
Validació de coneixements	50%	3	0.12	2, 5, 6, 11, 10, 12, 8, 13, 14, 15, 16, 19, 20, 23

## Bibliography

- Nader F. Mir. Second Edition. PrenticeHall. 2014
- Computer and Communications Networks.W. Stallings. 10th Edition Pearson Education. 2014
- Data and Computers CommunicationsKurose & Ross: Computer Networking: A Top-Down Approach. Prentice Hall. 2014
- Peterson & Davie: Computer Networks: A Systems Approach. Prentice Hall. 2014
- A. Tanenbaum, D. Wetherall. 5th Edition Prentice Hall. 2011