Course guide
300264 - 5GPLAN - 5G Mobile Network Planning

Last modified: 11/05/2026

Unit in charge: Castelldefels School of Telecommunications and Aerospace Engineering
Teaching unit: 739 - TSC - Department of Signal Theory and Communications.

Degree: MASTER'S DEGREE IN APPLIED TELECOMMUNICATIONS AND ENGINEERING MANAGEMENT (MASTEAM) (Syllabus 2015). (Optional subject).
MASTER'S DEGREE IN ADVANCED TELECOMMUNICATION TECHNOLOGIES (Syllabus 2019). (Optional subject).
ERASMUS MUNDUS MASTER IN COMMUNICATIONS ENGINEERING AND DATA SCIENCE (CODAS 1) (Syllabus 2024). (Optional subject).
ERASMUS MUNDUS MASTER IN COMMUNICATIONS ENGINEERING AND DATA SCIENCE (CODAS 2) (Syllabus 2024). (Compulsory subject).

Academic year: 2026 **ECTS Credits:** 3.0 **Languages:** English

LECTURER

Coordinating lecturer: Joan Olmos Bonafé

Others: Sílvia Ruiz Boqué

PRIOR SKILLS

Radio Communication. Digital Communication System.

REQUIREMENTS

Next Generation WiCom and IoT

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Generical:
05 COO. (ENG) Coordinar las tareas de un equipo multidisciplinar para completar las tareas de un proyecto tecnológico o de innovación basado en las TIC.

Transversal:
02 SCS. SUSTAINABILITY AND SOCIAL COMMITMENT. Being aware of and understanding the complexity of social and economic phenomena that characterize the welfare society. Having the ability to relate welfare to globalization and sustainability. Being able to make a balanced use of techniques, technology, the economy and sustainability.
05 TEQ. TEAMWORK. Being able to work as a team player, either as a member or as a leader. Contributing to projects pragmatically and responsibly, by reaching commitments in accordance to the resources that are available.
03 TLG. THIRD LANGUAGE. Learning a third language, preferably English, to a degree of oral and written fluency that fits in with the future needs of the graduates of each course.

Basic:
CB6. Possess and understand knowledge that provides a basis or opportunity to be original in the development and/or application of ideas, often in a research context.
CB7. Students will be able to apply the acquired knowledge and their ability to solve problems in new or little explored environments in broader (or multidisciplinary) contexts related to their study area.
CB9. Students will be able to communicate their conclusions and the knowledge and ultimate reasons that support them to specialized and non-specialized audiences in a clear and unambiguous manner.

TEACHING METHODOLOGY

Project Based Learning and Problem Solving

LEARNING OBJECTIVES OF THE SUBJECT

At the end of the course the student should be able to:

Understand the latest results, trends, activities and applications in future wireless networks.
Design and plan a realistic network or application.
Include Green Network aspects (spectrum and energy efficiency) in the design of a wireless network.
Define SON algorithms to optimize a wireless network.
Design realistic and multidisciplinary projects working in teams.

STUDY LOAD

Type	Hours	Percentage
Hours small group	27,0	36.00
Self study	48,0	64.00

Total learning time: 75 h

CONTENTS

Unit 1: Cellular Network Planning

Description:
o mobile system planning: coverage and capacity optimization
o main steps in 2G, 3G, 4G planning
o Green networks: spectrum and energy efficiency
o Self-Organizing Networks (SON)
o Radio Resource Management and interference coordination.
o 5G planning

Related activities:
Problem solving related with these topics. Additional readings

Full-or-part-time: 10h
Theory classes: 6h
Self study : 4h

Unit 2: Project on 5G planning

Description:
Students working in teams do a real design or platform related with new technologies and experimenting with RRH, NFV, C-RAN, RANaaS, and load balancing.

Related activities:
Laboratory activities oriented to do the project.

Full-or-part-time: 65h
Laboratory classes: 21h
Self study : 44h

GRADING SYSTEM

Any academic fraud, plagiarism or use or possession of unauthorised means in an assessment activity leads to a mark of zero (0) for the affected test or assignment. Furthermore, in accordance with the University's regulations, if disciplinary proceedings are initiated the subject is recorded as "Pending Assessment" until a decision is reached. These incidents are managed in accordance with the **Action Framework for Academic Integrity in Assessment at the UPC**.

Students have to deliver one or more reports regarding its progress on the project. Project will be evaluated according to technical solution (50%), quality of reports (20%), discussion (20%) and quality of the team (10%).

BIBLIOGRAPHY

Basic:
- Holma, Harri; Toskala, Antti. LTE for UMTS : evolution to LTE-Advanced. 2nd ed. Chichester, UK: John Wiley, cop. 2011. ISBN 9780470660003.

RESOURCES

Audiovisual material:
- Nom recurs. Resource