

Mobile Communication Networks

– 2020/2021 –

Teaching Staff

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Objectives

Knowledge of the fundamental principles of the operation of mobile communication networks, focusing on: the key technological aspects; wireless local area networks; the 2nd, 3rd, 4th, and 5th generation mobile networks; and the main services provided by mobile communication networks.

Bibliography

- *Wireless Communication Networks and Systems*, Cory Beard, William Stallings, 1st edition, Pearson Education Limited, 2015, ISBN: 978-1292108711;
- *Mobile Communications*, Jochen Schiller, 2nd Edition, Addison-Wesley, 2003, ISBN: 0-321-12381-6;
- *Computer networking: a top-down approach*, Pearson, James Kurose, Keith Ross, Pearson, 2016; ISBN: 978-0133594140.

Program

- Technological principles:
 - Characteristics of signal propagation over the wireless medium and related transmission techniques.

- Coding and modulation schemes.
- Multiple access techniques (TDMA, FDMA, CDMA, OFDMA, SDMA) and duplexing.
- Cellular concept and of radio resource allocation.
- Medium access control (Aloha, Slotted Aloha, CSMA, CSMA / CA).
- Mobility management;
- Principles of secure mobile communications.
- Systems:
 - Architecture and operation principles of 2nd, 3rd, 4th, and 5th generation cellular networks (GSM/GPRS, UMTS/HSPA, LTE/EPC, and 5G);
 - Wireless LANs (IEEE 802.11 access networks).
- Services:
 - Architecture and operation principles of services provided by mobile communication networks, namely, voice, data, and location-based services.

Evaluation

- 1 project (groups of 2 persons) consisting of a synthesis/revision of the state of the art on the subject to be specified (P): 5 points;
- 3 tests during the semester ($T1 + T2 + T3$): 5 + 5 + 5 points;
 - 1st test: Tuesday, 10/11, 10h00, room FC4 126
 - 2nd test: Tuesday, 15/12, 10h00, room FC2 009
 - 3rd test: After 15th of January (date to be specified)
- Final grade $P + T1 + T2 + T3$;
- If Final grade < 9.5 , you can attend an exam (R : 15 points) in *Época de recurso*. In that case the final grade will be $P + R$;
- Classification improvement: Exam (M : 15 points) in *Época de recurso*. Final grade $P + M$.