## Testi del Syllabus

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<tr>
<td><strong>Insegnamento:</strong></td>
<td>1006831 - 5G WIRELESS NETWORKS</td>
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<td><strong>Corso di studio:</strong></td>
<td>5052 - COMMUNICATION ENGINEERING - INGEGNERIA DELLE TELECOMUNICAZIONI</td>
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<td><strong>Tipo Attività:</strong></td>
<td>D - A scelta dello studente</td>
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<td><strong>Periodo:</strong></td>
<td>Secondo Semestre</td>
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<td><strong>Sede:</strong></td>
<td>PARMA</td>
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### Testi in italiano

#### Lingua insegnamento

- English

#### Contenuti

- 5G Wireless Networks
- Vertical Industries
- Technology Roadmapping
- Architectural paradigms
- Novel Networking Techniques
- Physical Layer Advances

#### Testi di riferimento

- 5G Heterogeneous Networks: Self-organizing and Optimization, Authors: Bo Rong, Xuesong Qiu, Michel Kadoch, Songlin Sun, Wenjing Li, ISBN: 9783319393711

#### Obiettivi formativi

This course will cover the most promising technologies investigated in the context of 5G wireless communications which are planned to be standardized and deployed by 2020. We will start with the main applications that have motivated a new generation of networks and explain various improvements that have been suggested in all communication layers. The attendees will be able to understand the limitations of current networks as well as the requirements of the next generation, motivated by the vertical industries. Furthermore, they will be able to study new architectural paradigms, as well as proposed evolutions in the networking and physical layer of communications.

#### Prerequisiti

- Digital Communications Theory
- Wireless Communications
- Basics of Networking Theory
- Basics of Information Theory

#### Metodi didattici

- Lectures and exercises (approximately with a ratio 80%-20%).
Modalità di verifica dell'apprendimento

Written exams which include both theoretical and critical system design questions based on the taught material.

Programma esteso

Every class = 2 hours

Introduction to 5G. Traffic Projections. Key performance indicators and targets.
Wireless spectrum & Current Architecture.
5G Vertical Industries & Requirements / e-Health, Factories of the future
5G Vertical Industries & Requirements/ Energy, Automotive
Architectural paradigms/ Cloud RAN - Virtualization
Architectural paradigms/ From Macro to Pico-cells. HetNets, Self-Organized Networks.
Architectural paradigms/ Integration with Satellite, Optical.
Architectural paradigms/ Backhauling, Fronthauling.
Networking / Software Defined Networking, Network Function Virtualization
Networking / Information Centric Networking, Caching.
Physical Layer/ Precoding, Beamforming - Theory
Physical Layer/ Precoding, Beamforming - Exercises
Physical Layer/ Massive MIMO - Theory
Physical Layer/ Massive MIMO - Exercises
Physical Layer/ mmWave Frequencies, Hybrid Analog Digital - Theory
Physical Layer/ mmWave Frequencies, Hybrid Analog Digital - Exercises
Physical Layer/ Cooperation and Coordination in Cellular Systems - Theory
Physical Layer/ Cooperation and Coordination in Cellular Systems - Exercises
Physical Layer/ Cognitive Radio - Theory 1
Physical Layer/ Cognitive Radio - Theory 2
Physical Layer/ Cognitive Radio - Exercises
Physical Layer/ Energy efficiency
Physical Layer/ IoT
Revisit Architecture Topics – Q&A
Revisit Networking Topics – Q&A
Revisit PHY layer Topics – Q&A

Testi in inglese

Lingua insegnamento

English

Contenuti

5G Wireless Networks
Vertical Industries
Technology Roadmapping
Architectural paradigms
Novel Networking Techniques
Physical Layer Advances

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| Physical Layer/ Cognitive Radio – Theory  
| Physical Layer/ Cognitive Radio – Exercises  
| Physical Layer/ Energy efficiency  
| Physical Layer/ IoT  
| Revisit Architecture Topics – Q&A  
| Revisit Networking Topics – Q&A  
| Revisit PHY layer Topics – Q&A  
