

Digital Systems for Telecommunications

Emiliano Sisinni

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Office hours: **Room 23 @ DII, Wednesday 3:30 PM – 5:30 PM**



Timetable

	lunedì	martedì	mercoledì	giovedì	venerdì
08:00-09:00			DATA-DRIVEN SYSTEM MODELLING <u>Federico Alessandro Ramponi</u> Aula B0.5	MEASUREMENTS AND INSTRUMENTATION FOR TELECOMMUNICATIONS <u>Umberto Minori</u> Aula B1.9	
09:00-10:00	HEALTH INFORMATION SYSTEMS DID <u>Michèle Melchiorri</u> Aula B1.4	DIGITAL MODULATION AND CHANNEL CODING <u>Pierangelo Migliorati</u> Aula B2.9	DATA-DRIVEN SYSTEM MODELLING <u>Federico Alessandro Ramponi</u> Aula B0.5	MEASUREMENTS AND INSTRUMENTATION FOR TELECOMMUNICATIONS <u>Umberto Minori</u> Aula B1.9	
10:00-11:00	HEALTH INFORMATION SYSTEMS DID <u>Michèle Melchiorri</u> Aula B1.4	DIGITAL MODULATION AND CHANNEL CODING <u>Pierangelo Migliorati</u> Aula B2.9	DIGITAL MODULATION AND CHANNEL CODING <u>Pierangelo Migliorati</u> Aula B1.9	MEASUREMENTS AND INSTRUMENTATION FOR TELECOMMUNICATIONS <u>Umberto Minori</u> Aula B1.9	AMMINISTRAZIONE DI SISTEMA E SE <u>Andrea Mauro</u> MLAB.1
11:00-12:00	HEALTH INFORMATION SYSTEMS DID <u>Michèle Melchiorri</u> Aula B1.4	DIGITAL MODULATION AND CHANNEL CODING <u>Pierangelo Migliorati</u> Aula B2.9	DIGITAL MODULATION AND CHANNEL CODING <u>Pierangelo Migliorati</u> Aula B1.9	INFORMATION THEORY <u>Marco Dalai</u> Aula B2.7	AMMINISTRAZIONE DI SISTEMA E SE <u>Andrea Mauro</u> MLAB.1
12:00-13:00	DATA-DRIVEN SYSTEM MODELLING <u>Federico Alessandro Ramponi</u> Aula B0.5			INFORMATION THEORY <u>Marco Dalai</u> Aula B2.7	AMMINISTRAZIONE DI SISTEMA E SE <u>Andrea Mauro</u> MLAB.1
13:00-14:00	DATA-DRIVEN SYSTEM MODELLING <u>Federico Alessandro Ramponi</u> Aula B0.5	DIGITAL SYSTEMS FOR TELECOMMUNICATIONS DID <u>Emiliano Sisinni</u> Aula N.6	INFORMATION THEORY <u>Marco Dalai</u> Aula B1.9	SISTEMI INFORMATIVI EVOLUTI E SE <u>Devis Bianchini</u> MLAB.2	SISTEMI INFORMATIVI EVOLUTI DID <u>Devis Bianchini</u> Aula B1.9
14:00-15:00	DATA-DRIVEN SYSTEM MODELLING <u>Federico Alessandro Ramponi</u> Aula B0.5	DIGITAL SYSTEMS FOR TELECOMMUNICATIONS DID <u>Emiliano Sisinni</u> Aula N.6	INFORMATION THEORY <u>Marco Dalai</u> Aula B1.9	SISTEMI INFORMATIVI EVOLUTI E SE <u>Devis Bianchini</u> MLAB.2	SISTEMI INFORMATIVI EVOLUTI DID <u>Devis Bianchini</u> Aula B1.9
15:00-16:00	PROCESSING AND COMMUNICATIONS LABORATORY <u>Nicola Adami</u> MLAB.1	TELECOMMUNICATIONS DID <u>Emiliano Sisinni</u> Aula N.6	INFORMATION THEORY <u>Marco Dalai</u> Aula B1.9	SISTEMI INFORMATIVI EVOLUTI E SE <u>Devis Bianchini</u> MLAB.2	DIGITAL SYSTEMS FOR TELECOMMUNICATIONS E SE <u>Emiliano Sisinni</u> ELE2
16:00-17:00	PROCESSING AND COMMUNICATIONS LABORATORY <u>Nicola Adami</u> MLAB.1	QUANTUM TECHNOLOGIES <u>Maurizio Antoni</u> Aula B2.7	SISTEMI INFORMATIVI EVOLUTI DID <u>Devis Bianchini</u> Aula B2.4	AMMINISTRAZIONE DI SISTEMA DID <u>Andrea Mauro</u> Aula B0.5	DIGITAL SYSTEMS FOR TELECOMMUNICATIONS E SE <u>Emiliano Sisinni</u> ELE2
17:00-18:00	PROCESSING AND COMMUNICATIONS LABORATORY <u>Nicola Adami</u> MLAB.1	QUANTUM TECHNOLOGIES <u>Maurizio Antoni</u> Aula B2.7	SISTEMI INFORMATIVI EVOLUTI DID <u>Devis Bianchini</u> Aula B2.4		DIGITAL SYSTEMS FOR TELECOMMUNICATIONS E SE <u>Emiliano Sisinni</u> ELE2
18:00-19:00		QUANTUM TECHNOLOGIES <u>Maurizio Antoni</u> Aula B2.7	SISTEMI INFORMATIVI EVOLUTI DID <u>Devis Bianchini</u> Aula B2.4		ELE2

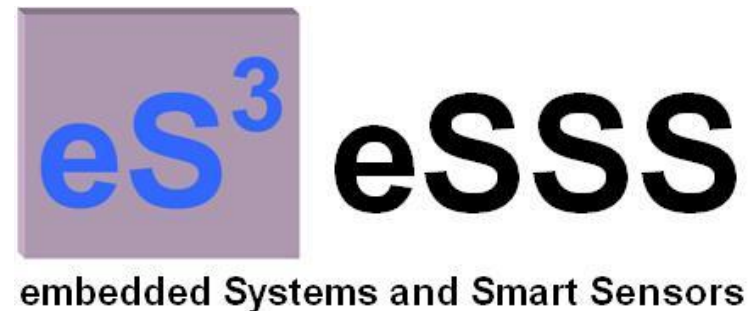
- Room N6: theoretical lesson
- ELE2: lab sessions (<http://auledide.unibs.it>)
- For any issue: send me an email
- Slides available on the e-learning web site (<https://elearning.unibs.it/course/view.php?id=29800> or short name 2022.CTMLM.DS4TLC)

embedded Systems and Smart Sensor research group



Reti Logiche e Principi di Elettronica Digitale
Complementi di elettronica digitale e uP

Sistemi e strumenti per l'automazione e PLC
Sistemi distribuiti e PLC



Digital Systems for Telecommunications & Progetto di Sistemi Elettronici per l'IoT
& Componenti e Sistemi Elettronici

Goals & Objectives

DIGITAL SYSTEMS FOR TELECOMMUNICATIONS

- This laboratory course takes a Software-Defined Radio (SDR) implementation approach to learn about modern analog and digital communication systems.
- SDR uses general purpose radio hardware that can be programmed in software to implement different communication standards.
- We will begin by discussing the basic principles of wireless radio frequency transmissions and leverage this knowledge to build analog (and digital) communication systems.
- Knowledge of these techniques and systems will provide a platform that can be used in the class project for further exploration of wireless networking topics.

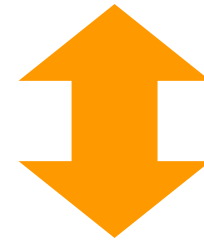


Goals and Objectives

In the classroom lectures, you will learn more about the hardware architecture aspects etc...



In the laboratory sessions (**ELE2**), you will learn more about the real-world hardware by means of hands-on sessions on ADALM-Pluto SDR.



What this course is not...

Despite the lab part will use SDR as a reference example of “Digital Systems for Signal Processing”, we are **NOT** covering the following topics in this course:

- Programming languages
- Channel models
- Networking protocols
- Communication systems or any baseband communication systems
- Antenna design



Grading

- Course grading is based on testing the knowledge of course topics (**accounting for 70% of the final grade**)
- and a creative lab project reporting and discussion (**accounting for 30% of the final grade**).
- Generally, both activities are carried out in the same oral interview.
- If needed, a written test could be delivered for testing only the knowledge of course topics; in this case, the test is positively passed if at least 60% of the overall test mark is obtained).



Textbooks

- *“Software-Defined Radio for Engineers”, by Travis F. Collins, Robin Getz, Di Pu, and Alexander M. Wyglinski, 2018, ISBN-13: 978-1-63081-457-1.*
 - <https://www.analog.com/en/education/education-library/software-defined-radio-for-engineers.html>
- *“Software Defined Radio Using MATLAB & Simulink and the RTL-SDR”, by Robert W Stewart, Kenneth W Barlee, Dale S W Atkinson, 2015, ISBN-13: 978-0992978723.*
 - <https://www.desktopsdr.com/>

