



Programme of Course "DIGITAL COMMUNICATIONS"

<ul style="list-style-type: none"> • Code: I0331 • Type of course unit: Compulsory (Laurea Magistrale in Ingegneria delle Telecomunicazioni curriculum Comune) • Level of course unit: Postgraduate Degrees • Semester: 2 	
Number of ects credits: (Laurea Magistrale in Ingegneria delle Telecomunicazioni) 9 (workload 225 hours)	
Teachers: Fabio Graziosi	
1	<p>Course objectives</p> <p>Acquire basic knowledge on the theory of digital modulations. For each modulation format, evaluate the performance on the AWGN channel. Acquire knowledge on the performance of the digital modulation schemes on fading channels. Acquire knowledge on adaptive equalization and channel coding.</p>
2	<p>Course content and learning outcomes (dublin descriptors)</p> <p>Topics of the module include:</p> <ul style="list-style-type: none"> • Information Theory (basic elements) • Detection Theory (basic elements) • Waveform Transmission over Gaussian Channels • Digital Modulation Schemes • Digital Transmission over Real Channels • Design of Digital Transmission Systems: the Intersymbol Intereference Problem • Adaptive Channel Equalization • Channel Coding <p>On successful completion of this module, the student should :</p> <ul style="list-style-type: none"> • This course aims to provide the basics for understanding the techniques of digital transmission theory and for its protection against noise and disturbances superimposed. • At the end of the course, students will acquire the basic knowledge for understanding and characterizing of the main digital modulation formats. Moreover, the course will stimulate students regarding their ability to apply the acquired theoretical knowledge on real design issues. • The assessment of the degree of preparation by the student will be made, first, by establishing the ability to translate theoretical knowledge acquired in simple design examples. Particular attention will be given to the student's ability to make connections between the various topics examined and to assess their impact in a real telecommunications system. • There are no intermediate checks other than those arising from the interaction daily during lessons and individual meetings between teacher and students. Based on the perceived level of preparation the teacher could calibrate, as much as possible, the contents of the course. An optional check will be made, for students who will request it, through the development of a research paper on a topic of the course. The evolution of this integrative study activity will give the teacher more individual elements of assessment, usable also for the final exam.
3	<p>Course prerequisites</p>
4	<p>Teaching methods and language</p> <p>Learning happens through theoretical lectures alternating with exercises. As part of the course are also offered monographic issues that the student can develop independently and that can be possibly used also for the examination.</p> <p>Language: English</p> <p>Reference textbooks</p> <ul style="list-style-type: none"> • J. G. Proakis,, <i>Digital Communications</i>. Mc Graw Hill. • S. Benedetto, E. Biglieri, V. Castellani, <i>Digital Transmission Theory</i>. Prentice- Hall International Editions,.
5	<p>Assessment</p> <p>he assessment of the degree of preparation by the student will be made, first, by</p>

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establishing the ability to translate theoretical knowledge acquired in simple design examples. Particular attention will be given to the student's ability to make connections between the various topics examined and to assess their impact in a real digital communications system. There are no intermediate checks other than those arising from the interaction daily during lessons and individual meetings between teacher and students. Based on the perceived level of preparation the teacher could calibrate, as much as possible, the contents of the course. An optional check will be made, for students who will request it, through the development of a research paper on a topic of the course. The evolution of this integrative study activity will give the teacher more individual elements of assessment, usable also for the final exam. The exam consists of an oral exam. Exam booking must be done exclusively via the internet at segreteriavirtuale.univaq.it / Start.do.