UNIVERSITÀ DI PAVIA

Anno Accademico 2019/2020

DIGITAL COMMUNICATIONS

Anno immatricolazione	2019/2020
Anno offerta	2019/2020
Normativa	DM270
SSD	ING-INF/03 (TELECOMUNICAZIONI)
Dipartimento	DIPARTIMENTO DI INGEGNERIA INDUSTRIALE E DELL'INFORMAZIONE
Corso di studio	ELECTRONIC ENGINEERING
Curriculum	Photonics
Anno di corso	1°
Periodo didattico	Secondo Semestre (02/03/2020 - 12/06/2020)
Crediti	6
Ore	46 ore di attività frontale
Lingua insegnamento	English
Tipo esame	ORALE
Docente	GAMBA PAOLO ETTORE (titolare) - 4 CFU MARINONI ANDREA - 2 CFU
Prerequisiti	The course is aimed at students with a basic knowledge of electrical communication and signal theory
Obiettivi formativi	The student will learn some of the advanced techniques for digital transmission and coding of the information. Accordingly, he/she will be able to design the basic elements of a modern digital communication system, explaining the rational behind his/her choices.
Programma e contenuti	The course is for students with a basic knowledge of transmission techniques and is devoted to digital communications. Course introductory notes. Stochastic variables and processes

	Information Theory: entropy. Information Theory: source coding. Channel capacity. Coding techniques for information protection Codes for error detection and correction Algebraic codes Convolutional codes, maximum likelihood decoding, Viterbi algorithm Concatenated codes Turbo codes LDPC codes Transmission on AWGN channels Digital signals: PSD and power Nyquist criterion to avoid intersymbol interference (ISI) Optimum decoder Upper and Lower bounds for BER values Channels with fading Fading definition and effects Diversity techniques Linear equalizers: Zero Forcing Equalizers Linear equalizers: LMS, fractional and Decision Feedback equalizers. Introduction to ML equalizers. Synchronization and syntonization Frequency error estimates (open-loop and closed-loop) Phase error estimates (open-loop and closed-loop) Timing error estimates (open-loop and closed-loop) OFDM modulation (introduction)
Metodi didattici	Lectures (hours/year in lecture theatre): 45 Practical classes (hours/year in lecture theatre): 0 Workshops (hours/year in the lab): 0 The concepts are introduced by means of lectures with slides integrated with explanation at the blackboard. Complementary topics are presented by means of one or two seminars by company representatives introducing examples of real digital communication systems
Testi di riferimento	J.R. Barry, E.A. Lee, D.G. Messerschmitt. Digital Communication (third edition). Springer 2004
Modalità verifica apprendimento	Oral test, with questions aiming at understanding which are the concepts acquired by the student and his/her ability to explain how the functional blocks of digital systems work. The minimum score to pass the exam is 18, the top one is 30 cum laude.
Altre informazioni	Oral test, with questions aiming at understanding which are the concepts acquired by the student and his/her ability to explain how the functional blocks of digital systems work. The minimum score to pass

	the exam is 18, the top one is 30 cum laude.
Obiettivi Agenda 2030 per lo sviluppo sostenibile	$lbl_legenda_sviluppo_sostenibile