

MERIT MASTER DISTINGUISHED LECTURES SERIES

Signal Theory and Communication Department - Universitat Politècnica de Catalunya (Barcelona-Spain)

The Department of Signal Theory and Communications organizes the Distinguished Lectures Series as part of its MERIT master program. The Distinguished Lectures Series are organized as intensive seminars on hot topics delivered by world-class specialists. The seminars are open on a limited basis to non-enrolled master students, and registrations are considered on first come first serve basis.

For more information and registration:

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List of courses:

UMTS AND LONG TERM EVOLUTION	
Christoph Mecklenbräuer Institute of Communications and Radio Frequency Engineering Vienna University of Technology (TU Wien), Austria	11/05/2009 – 15/05/2009
Summary In this course, the fundamentals of 3rd generation mobile cellular communications and its evolution towards MIMO OFDM are discussed. The network architecture and the tasks and procedures of the lower three protocol layers are explained: modulation and coding, power control procedures and rate adaptation, hybrid ARQ, soft and softer handovers, transmit and receive diversity. Further, a brief introduction to receiver architectures is given: the basic rake receiver and its performance, and linear equalisers for High Speed Downlink Packet Access (HSDPA). Finally, we give an outlook on system architecture evolution (SAE) and long term evolution (LTE): a key innovation will be interference management by base station cooperation for fractional frequency re-use. This course completes the instruction that Master MERIT gives on wireless communications.	
Lecture Table of Contents 1.- Introduction (History and UMTS overview) 2.- Radio Access Network Architecture 3.- Spreading, Scrambling, Multiplexing, and Coding 4.- Rake receiver and its performance, soft handover 5.- Transmit Power Control (Inner- and Outer Loop) 6.- Space-Time Transmit Diversity 7.- High Speed Downlink Packet Access (Rate Adaptation and Hybrid ARQ) 8.- Advanced Receivers for HSDPA 9.- Multimedia Broadcast Multicast Service (MBMS) 10.- System Architecture Evolution (Base station cooperation) 11.- Long Term Evolution (MIMO OFDM)	
IMAGE PROCESSING FOR REMOTE SENSING	
Javier Marcello Ruiz Department of Signals and Communications Universidad de Las Palmas de Gran Canaria, España	15/06/2009 - 19/06/2009
Summary Remote sensing is a multidisciplinary matter orientated to applications of observation of the Earth that uses a wide range of technologies. The basic objectives of this course are to provide the necessary knowledge about remote sensing (physical principles, sensors and space missions) and to analyze the required procedures of multi-spectral image processing in order to obtain final products.	
Lecture Table of Contents 1.- Fundamentals of Remote Sensing 1.1.- Introduction to remote sensing: definitions. Objectives and historic evolution 1.3.- Remote sensing sensors and platforms 1.4.- Information extraction from remote sensing imagery. Fields of application 1.6.- Main agencies and organizations 2.- Space-borne Remote Sensing systems 2.1.- Elements of a satellite remote sensing system 2.2.- Orbital parameters and types of orbits 2.3.- Space-borne sensors 3.- Physical principles of Remote Sensing 3.1.- Introduction 3.2.- Radiometric magnitudes 3.3.- Principles and laws of electromagnetic radiation 3.4.- Interactions of electromagnetic radiation with the atmosphere and matter 4.- Optical and infrared sensors 4.1.- Properties of electromagnetic radiation in the optical spectrum 4.2.- Properties of electromagnetic radiation in the infrared spectrum 4.3.- Space programs 5.- Processing of multispectral imagery 5.1.- Processing hierarchy levels of multispectral data 5.2.- Radiometric, atmospheric and geometric modeling 6.- Advanced processing of satellite imagery 6.1.- General considerations 6.2.- Spectral and spatial transformations 6.3.- Image classification and segmentation techniques 6.5.- Movement estimation 6.7.- Image fusion	

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