NEWCOM++ Ph.D. course	
Course title:	**Key technologies for next generation digital video broadcasting standard**
Author's name:	Dr. Stefano Tomasin, Prof. Lorenzo Vangelista and Prof. Nevio Benvenuto
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Enrollment	Email to lorenzo.vangelista@unipd.it with **subject [DVB-NEWCOMM++] no later than October 9th, 2009**

Course abstract:

As the European Telecommunications Standard Institute is finalizing the standardization of the next generation digital video broadcasting standard (DVB-T2), this course aims at providing an overview of technologies that will play a key role in the future of video broadcasting. We will provide insights on orthogonal frequency division multiplexing (OFDM), advanced coding (low density parity check codes, LDPC), multiantenna (MIMO) systems applied to broadcast transmission over large areas and with a high spectral efficiency. Topics will include time/frequency synchronization and channel estimation for OFDM, LDPC codes with decoding strategies, decoding of block space-time codes. The technologies will be investigated in the frame of DVB-T2 standard and an overview of the standard will be provided.

Course objectives:

Provide basic knowledge on key technologies in current telecommunication systems, with a focus on the next generation digital video broadcasting standard.

Course outline:

Topics:
- Transmission over dispersive channels
- DVB-T network and channel model
- Low density parity check codes
- OFDM, sychronization, channel estimation
- space-time block codes: shere decoder. Alamouti code.
- overview of DVB-T2 standard

Author's short biography:

Stefano Tomasin received the Laurea degree and the Ph.D. degree in Telecommunications Engineering from the University of Padova, Italy, in 1999 and 2002, respectively. In the Academic year 1999-2000 he was on leave at the IBM Research Laboratory, Zurich, Switzerland, doing research on signal processing for magnetic recording systems. In the Academic year 2001-2002 he was on leave at Philips Research, Eindhoven, the Netherlands, studying multicarrier transmission for mobile applications. He joined University of Padova first as contractor researcher for a national research project (2002) and then as Assistant Professor (2005). In the second half of 2004 he was visiting faculty at Qualcomm, San Diego (CA) doing research on receiver design for mobile cellular systems. In 2007 he has been visiting Polytechnic University in Brooklyn, NY, working with prof. Elza Erkip on cooperative networks. His current research interests include signal processing for wireless communications, access technologies for multiuser/multiantenna systems and cross-layer protocol design and evaluation.

Nevio Benvenuto received the Laurea degree in electrical engineering from the University of Padova, Italy, in 1976, and the Ph.D. degree in electrical engineering from the University of Massachussetts, Amherst, in 1983. From 1983 to 1985 he was with AT&T Bell Laboratories, Holmdel, NJ, working on signal analysis problems. He spent the next three years alternating between the University of Padova, where he worked on communication systems research, and Bell Laboratories as a Visiting Professor. He is currently a Professor with the Electrical Engineering

Department at the University of Padova, having been on the faculty of the University of Ancona from 1987 to 1990 and the University of L'Aquila from 1994 to 1995. His research interests are in the areas of voice and data communications, digital radio and signal processing.

Lorenzo Vangelista received the "Laurea" degree in 1992 in Electronics Engineering and the Ph.D. degree in Telecommunications and Electronics Engineering in 1995, both from Padova University, Padova, Italy. He has been with CSELT (now Tilab, in Turin, Italy), from 1995 to 1996, doing research on optical networks and techno-economic evaluations. He joined then Telit Mobile Terminals (Trieste, Italy) at the end of 1996 as a GSM layer 1 designer, leaving on 2001 when he was head of the advanced developments department, doing research on second and third generation mobile telephony, from physical layer to protocol and services implementation. In 2002 he joined Microcell A/S (Copenhagen, Denmark) where he started from scratch a design center for 2.5G mobile phones, working for major brands and reaching 90 employees in the middle of 2003. He joined then the worldwide organization of Infineon Technologies where he worked as program manager for the first mass produced single GSM/GPRS single chip (including both baseband, protocol stack, applications and RF processing) in CMOS. Since October 2006 he is an associate professor at Padova University, Department of Information Engineering, leading a strategic initiative focused on system on a chip design. His interests are in embedded system design, wireless communications, OFDM modulation, synchronization and channel estimation.

Software tool:
PC or Mac, standard browser, audio – input and output – enabled, fast internet connection
Date of course availability:
19-21-26-28 October, 2-4-9-11 November between 10a.m. and 12a.m. G.M.T+1, 20min break
Course duration:
16 hours