

COURSE TITLE	TE142441: Broadband Communication Systems Credits: 2 ELECTIVE COURSE
LEARNING OBJECTIVES	To study digital communication techniques over broadband channel for high speed data transmission and resistant to channel adverse effects.
COMPETENCY	The students are expected to understand: <ul style="list-style-type: none"> • Statistical characterisation of wideband communication channel: wireless & wired • Coding and modulation techniques over broadband channel and system performance analysis
SUBJECTS	Concept of and problems in broadband wireless communications, models of frequency-selective channels, channel capacity, principles of water-filling: adaptive MQAM modulation and multi-carrier systems, principles of multi-carrier systems without and with sub-channel overlaps, principles of OFDM, channel orthogonalization: OFDM vs. vector coding, OFDM performance in AWGN and frequency-selective channels, ICI cancellation, frequency and timing synchronization, principles and performance of MC-CDMA, MIMO channel models, channel capacity and water-filling for MIMO systems, principles of spatial multiplexing, BLAST architecture, diversity-multiplexing tradeoff, principles and performance of UWB.
MAIN REFERENCES	<ul style="list-style-type: none"> • S. Haykin and M. Moher, <i>Modern Wireless Communications</i>, Wiley, 2004. • A. Goldsmith, <i>Wireless Communications</i>. • D. Tse and P. Viswanath, <i>Fundamentals of Wireless Communication</i>, Cambridge University Press • L. Hanzo and T. Keller, <i>OFDM and MC-CDMA: A Primer</i>. • U. S. Jha and R. Prasad, <i>OFDM Towards Fixed and Mobile Broadband Wireless Access</i>. • A. Hottinen, O. Tirkkonen and R. Wichman, <i>Multi-antenna Transceiver Techniques for 3G and Beyond</i>. • H. Arslan, Z. N. Chen, M. G. Di Benedetto, <i>Ultra Wideband Wireless Communication</i>.
OPTIONAL REFERENCES	<ul style="list-style-type: none"> • IEEE Trans. on Communications • IEEE Trans. on Wireless Communications • IEEE Trans. on Signal Processing • IEEE J. on Selected Areas in Communications