KL University
Department of Electronics & Computer Engineering
M.Tech (wcsn) 2015-2017

Course Code : 15-EM52G4
Course Title : CDMA and OFDM for Wireless Communications
Course Structure : 3-0-0

Credits : 3

SYLLABUS:

Unit 1: **Principles of Code Division Multiple Access**
Spread spectrum technique – Direct sequence and frequency hopping spread spectrum communication system – PN codes and Walsh codes – Rake receiver – Capacity – Effects of loading, sectorization and voice activity – Power control – Hand off – Link structure – Forward link – Pilot, synchronization, paging and traffic channels – Reverse Link – access and traffic channel.

Unit 2: **Call Processing and Traffic**
Call processing states – Initialization, idle, access and traffic states – Forward link and Reverse link analysis - Calculation of Ec/I0 and Eb/N0 – Traffic intensity – Grade of Service – Erlang- B and C models.

Unit 3: **OFDM Basics**
OFDM principles – system model – Generation of sub carrier using IFFT, guard time and cyclic extensions – windowing - Choice of OFDM parameters - OFDM signal processing.

Unit 4: **Coding, Modulation and Channel Estimation**
FEC coding – Interleaving – QAM – Coded modulation – Synchronization – Synchronization using cyclic extension and special training symbols – Coherent detection – One and two dimensional channel estimation – Special training symbols – Decision directed channel estimation – Differential detection in the time and frequency domain.

Unit 5: **OFDMA and MC-CDMA**
Frequency hopping in OFDMA - OFDMA system description – Channel coding, modulation, time and frequency synchronization, Combination of OFDM and CDMA - MC-CDMA, MT-CDMA and MC-DS CDMA systems - Difference between OFDMA and MC-CDMA

Text books:
1. Samuel C Yang, “CDMA RF System Engineering”, Artech House, 1998.
2. Richard Van Nee and Ramjee Prasad, “OFDM for wireless Multimedia Communication”, Artech House, 2000.

Reference Books:
1. Lajas Hanzo, “OFDM and MC-CDMA for Broadband Multiuser Communications,” 2003
2. Khaled Fazal and Stephen Kaiser, “Multicarrier and Spread Spectrum Systems,” 2008