ADVANCED MOBILE COMMUNICATIONS

Course Code:15EC2111

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Course outcomes: After completion of the course, the student is able to

CO1: Comprehend the characterization of Fading Channels.
CO2: Model cellular mobile communication system.
CO3: Analyze the performances of CDMA and OFDM.
CO4: Configure MIMO scheme for channel performance improvement.
CO5: Analyze the Error performance of Ultra Wide Band systems and applications to 4G Wireless standards.

UNIT-I (10-Lectures)

WIRELESS COMMUNICATIONS AND DIVERSITY:

Fast Fading Wireless Channel Modeling, Rayleigh/RicIan Fading Channels, BER Performance in Fading Channels, Diversity modeling for Wireless Communications, BER Performance Improvement with diversity, Types of Diversity – Frequency, Time, Space

BROADBAND WIRELESS CHANNEL MODELING:

WSSUS Channel Modeling, RMS Delay Spread, Doppler Fading, Jakes Model, Autocorrelation, Jakes Spectrum, Impact of Doppler Fading.

UNIT-II (10-Lectures)

CELLULAR COMMUNICATIONS

Introduction to Cellular Communications, Frequency reuse, Multiple Access Technologies, Cellular Processes- Call Setup, Handover etc., Teletraffic Theory.

UNIT-III (10-Lectures)

CDMA

Introduction to CDMA, Walsh codes, Variable tree OVSF, PN Sequences, Multipath diversity, RAKE Receiver, CDMA Receiver Synchronization.

OFDM

Introduction to OFDM, Multicarrier Modulation and Cyclic Prefix, Channel model and SNR performance, OFDM Issues – PAPR Frequency and Timing Offset Issues.

UNIT-IV (10-Lectures)

MIMO

Introduction to MIMO, MIMO Channel Capacity, SVD and Eigen modes of the MIMO Channel, MIMO Spatial Multiplexing – BLAST, MIMO Diversity – Alamouti, OSTBC, MRT, MIMO - OFDM.

UNIT-V (10-Lectures)

UWB (ULTRAWIDE BAND)

UWB Definition and Features, UWB Wireless Channels, UWB Data Modulation, Uniform Pulse Train, Bit-Error Rate Performance of UWB

3G AND 4G WIRELESS STANDARDS

GSM, GPRS, WCDMA, LTE, WiMAX.

TEXT BOOKS:

1. Theodore Rappaport, "*Wireless Communications: Principles and Practice*", Prentice Hall, 2009.
2. Ezio Biglieri, "*MIMO Wireless Communications*" Cambridge University Press, 2007

REFERENCES:

1. David Tse and Pramod Viswanath, "*Fundamentals of Wireless Communications*", Publisher - Cambridge University Press, 2005.
2. Andrea Goldsmith, "*Wireless Communications*" Cambridge University Press, 2004.
3. Arogyaswami Paulraj, "*Introduction to Space-Time Wireless Communications*", Cambridge University Press, 2003.
4. John G Proakis, "*Digital Communications*" McGraw Hill, 5th Edition, 2008.