ADVANCED MOBILE COMMUNICATIONS

Course Code: 13EC2111

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Course Objectives:

After completion of the course, the student is able to

CO1: Comprehend the characterization of Fading Channels.

CO2: Design and analyze cellular mobile communication system.

CO3: Analyze the performances of CDMA and OFDM.

CO4: Configure MIMO scheme for channel performance improvement.

CO4: Analyze the Error performance of Ultra Wide Band systems and applications to 4G Wireless standards.

UNIT-I

WIRELESS COMMUNICATIONS AND DIVERSITY:

Fast Fading Wireless Channel Modeling, Rayleigh/Ricean 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

CELLULAR COMMUNICATIONS:

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

UNIT-III

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 – PAPRFrequency and Timing Offset Issues.

UNIT-IV
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
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] EzioBiglieri, "*MIMO Wireless Communications*" Cambridge University Press, 2007

REFERENCES:
[1] David Tse and PramodViswanath, "*Fundamentals of Wireless Communications*", Publisher - Cambridge University Press, 2005.

[2] Andrea Goldsmith, "*Wireless Communications*" Cambridge University Press, 2004.

[3] ArogyaswamiPaulraj, "*Introduction to Space-Time Wireless Communications*", Cambridge University Press, 2003.

[4] John G Proakis, "*Digital Communications*" McGraw Hill, 5 Ed., 2008.