



MANIPAL UNIVERSITY JAIPUR

School of Electrical, Electronics & Communication Engineering (SEEC)

Department of Electronics & Communication Engineering
Course Hand-out

Wireless Communication| EC 1703 | 4 Credits

Session: July 14 – Dec. 14 | Faculty: Tarun Kumar Dubey | Class: Program Elective

Course Outcomes: At the end of the course, students will be able to

[EC1703.1] Apply the principles of communication systems to quantify the information and analyze communication system.

[EC1703.2] Develop various channel models and analyse for research skills.

[EC1703.3] Apply the concepts, transmission and channel encoding, which is also useful in employability.

[EC1703.4] Discuss different algorithms and their performances use in wireless applications.

A. SYLLABUS

Introduction: Modeling of wireless channels, wireless channel as a random linear time varying system, stochastic characterization of time varying systems; **Modeling:** Wireless channel modeling, Wide-sense stationary uncorrelated scattering assumption; characterizing key parameters of wireless channels, wireless channel discretization and discrete-time representation; **Fading and diversity techniques:** Noncoherent and coherent reception - error probability for uncoded transmission. Time diversity, interleaving, constellation rotation Frequency diversity, spread spectrum systems for anti jamming and counter multipath fading- CDMA. Rake receiver; code design for wireless channels, product distance design criterion, diversity order estimates on the basis of the scattering function. OFDM, MC-CDMA, MIMO systems and space time coding; **Wireless channel capacity:** Capacity of parallel Gaussian channels; capacity of fading channels: ergodic capacity and outage capacity; high versus low SNR regime, waterfilling capacity.

B. TEXT BOOKS

- D. Tse & P. Vishwanath, "Fundamentals of Wireless Communication", Cambridge University Press, 2005
- T. S. Rappaport, "Wireless Communication: Principles and Practice", Pearson, 2002
- J. G. Proakis & M. Salehi, "Digital Communications", McGraw-Hill, 2008
- K. Fazel & S. Kaiser, "Multicarrier and Spread Spectrum Systems", Wiley, 2003

