

**WIRELESS MIMO COMMUNICATIONS****22ECMC2T5A****Lecture: 4 periods/week****Credits: 4****Internal assessment: 40 marks****Semester end examination: 60 marks****Prerequisites:** Signals & Systems, Digital Signal Processing, Digital Communications**Course Outcomes**

At the end of the course Student will be able to

- Understand the fading channels and calculate Error Probability and Outage Probability
- Model a MIMO Channel and find its capacity
- Articulate basic equalization schemes commonly used in wireless system
- Analyze multiple antenna systems and techniques such as space time codes and singular value decomposition

**UNIT I****Introduction:** MIMO wireless communication, MIMO channel and signal model, A fundamental trade-off, MIMO transceiver design, MIMO in wireless networks, MIMO in wireless standards**UNIT II****Capacity limits of MIMO systems:** Introduction, Mutual information and Shannon capacity, Single-user MIMO, Multi-user MIMO, Multi-cell MIMO..**UNIT III****Fundamentals of receiver design:** Introduction, Reception of uncoded signals, Factor graphs and iterative processing, MIMO receivers for uncoded signals, MIMO receivers for coded signals, some iterative receivers**UNIT IV****Multi-user receiver design:** Introduction, Multiple-access MIMO systems, Iterative space–time multi-user detection, Multi-user detection in space–time coded systems, Adaptive linear space–time multi-user detection**Learning Resources****Text Books**

1. Ezio Biglieri, Robert Calderbank, Anthony Constantinides, Andrea Goldsmith, Arogyaswami Paulraj, H. Vincent Poor, MIMO Wireless Communications, Cambridge university press
2. Mimo Wireless Networks: Channels, Techniques And Standards For Multi-Antenna, Multi-User And Multi-Cell Systems, 2Nd Edition by Clerckx and Oestges, Elsevier Science

**References**

1. Rakesh Singh Kshetrimayum Fundamentals of MIMO Wireless Communications