



FUNDAMENTALS OF MIMO WIRELESS COMMUNICATION

PROF. SUVRA SEKHAR DAS

Department of Electronics and Communications Engineering
IIT Kharagpur

PRE-REQUISITES : Course on "Power System Engineering", which is generally offered in 2nd year/third year of B.Tech program

INTENDED AUDIENCE : B.Tech fourth year/M.Tech

INDUSTRIES APPLICABLE TO : PGCIL, NHPC, all state power transmission companies

COURSE OUTLINE :

This course introduces the computational aspects of the power system analysis. The thrust of this course is description of the computer algorithms for analysis of any general power transmission system. Starting with load flow analysis, which is essentially the backbone of any power system analysis tool, this course further deals with computer algorithms for contingency analysis, state estimation and phase domain fault analysis method of any general power transmission system.

ABOUT INSTRUCTOR :

Prof. Suvra Sekhar Das is currently serving as associate professor at the G. S. Sanyal School of Telecommunications in Indian Institute of Technology Kharagpur. He has completed Ph.D. from Aalborg University, Aalborg, Denmark. He has worked as Senior Scientist with the Innovation Laboratory of Tata Consultancy Services. His research interests include cross-layer optimization of mobile broadband cellular networks, 5G, Broadband Mobile Communications, 5G Waveform design GFDM FBMC UFMC, heterogeneous networks Femto Cells Device to Device communication, Multi objective optimization for radio access networks, Green radio network design Packet Scheduling and radio resource allocation with link adaptation, MIMO communications, base-band transceiver design for broadband wireless communication systems. He has delivered several tutorials and seminars on next generation wireless communications. He has guided several PhD students, published several research papers in international journals and conferences. He has co-authored two books titled "Adaptive PHY-MAC Design for Broadband Wireless Systems" and "Single- and Multi-Carrier MIMO Transmission for Broadband Wireless Systems". He has developed teaching resource "fading channel and mobile communications" freely available as interactive web material for learners of mobile communications (<http://fcmcvlab.iitkgp.ac.in/> with nearly 2 lacs hits). He has taught several subjects such as Modern digital communication techniques, Broadband access systems, mobile communications and fading, teletraffic engineering, introduction to wireless communication and MIMO communications.

COURSE PLAN :

Week 1: Introduction to wireless communication systems and wireless channels

Week 2: Wireless channel models

Week 3: MIMO channel model

Week 4: Information Theory basics for MIMO communication

Week 5: Capacity of MIMO Communication systems

Week 6: Diversity performance of MIMO channels

Week 7: Space Time Coding schemes

Week 8: Multi-user MIMO communications