Characterizing and Modeling Wireless Channels

(06 June 2017 to 10 June 2017)

Overview

The wireless propagation channel is the most challenging element (or subsystem) impeding reliable communication in many communication systems today. Wireless channels in multiple environments and in various frequency bands have been studied for decades, this is still an active area of research because of the growth and breadth of wireless applications. A larger user population, higher data rates, and connectivity over larger areas and longer durations all require accurate models for the channel for system analysis, design, and development.

In this course, a detail discussion on statistical modeling of wireless channel and statistical channel parameters: delay spread, coherence bandwidth, Doppler spread, and coherence time for wide-sense stationary uncorrelated scattering (WSSUS) channel will be covered. Following this overview of channel characterization, practical consideration will be described. This includes some description of measurements and modeling techniques (analytical and simulation), including examples and issues regarding model complexity. Some specific (non-cellular) channel models: the airport surface channel, satellite channels, ultra-wideband, and free-space optical channels, MIMO channels and the vehicle-to-vehicle (V2V) channel will also be addressed. Modeling of wireless channels for computer simulation and current active research areas in wireless channel modelling will also be addressed. Advanced topics like description of atypical or unusual wireless channel effects including atmospheric effects due to hydrometeors, ducting, and tropospheric scatter and currently-active areas in wireless channel modeling, the V2V channel, the air-ground channel for unmanned aircraft, and a short treatment of millimeter wave channels will be described.

Course participants will learn these topics through lectures and hands-on experiments. Also case studies and assignments will be shared to stimulate research motivation of participants.

Modules	**A: Basics of wireless communication and signal propagation: June 06** **B: Large scale and small scale path loss, its practical measurement, Channel characterization and modeling: June 07 - June 08** **C: Advance topics in channel characterization and modelling: June 09 - June 10**
You Should Attend If…	• You are a B.E./ B.Tech / M.Tech student within the broad domain of communication Engineering, with a focus on Wireless Communications.. • You are a Ph.D. student or faculty from academic institution with research area wireless communication, channel modelling and advance communication. • You are a Researcher from industry, involved in wireless channel modelling and chracterisation,V2V and millimeter wave channels. **Number of participants for the course will be limited to Thirty**.
Fees	The participation fee per person for taking the course is as follows: **Industry/ Research Organizations : INR 3000** **Academic Institutions(Faculty): INR 1000** **Ph.D & M.Tech. Students: INR 500** The above fee include all instructional materials, computer use for tutorials and assignments, laboratory equipment usage charges, 24 hr. free internet facility. The participants will be provided with accommodation & food on payment basis. Request for accommodation should be done prior.

The Faculty

Prof. David W. Matolak received the B.S. degree from The Pennsylvania State University, the M.S. degree from The University of Massachusetts, and the Ph.D. degree from The University of Virginia, all in Electrical Engineering. He worked for AT&T Bell Laboratories on the characterization of nonlinearities and their effect on QAM transmission; for Lockheed Martin Tactical Communication Systems as Lead System Engineer; for the MITRE Corporation on analysis and modeling of terrestrial and satellite communication systems. In 2012, he joined the Department of Electrical Engineering at the University of South Carolina. He has been a visiting professor at the National Institute of Standards & Technology, Boulder, CO, the University of Malaga, Spain, and NASA Glenn Research Center. He is an associate editor for the IEEE Transactions on Vehicular Technology, an area editor for the International Journal of Intelligent Transportation Systems Research, and an editor for the International Journal of Antennas and Propagation. His research interests are radio channel modeling and communication techniques for non-stationary fading channels, spread spectrum, multicarrier transmission, and mobile ad hoc networks.

Dr. Susmita Das is an Associate Professor in the Department of Electrical Engineering at National Institute of Technology Rourkela. She is a. Senior Member of IEEE, IETE, ISTE and a Fellow of Institution of Engineers (IE) India. Her research area includes wireless Communication, 4G & 5G wireless n technologies: Co-operative Communication, UWB Body Area Network, Cognitive radio etc.

06th to 10th

June

2017

at

NIT Rourkela

Course Coordinator

Dr. SUSMITA DAS

Associate Professor

Department of Electrical Engineering

National Institute of Technology

Rourkela-769008

Odisha

Phone: +91-661-2462402(O)

+91-9438539606(M)

Email: sdasgian17@gmail.com