BASICS OF SOFTWARE DEFINED RADIOS

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PRE-REQUISITES : A background in electrical engineering helps to some extent, but this is not required

INTENDED AUDIENCE : Both UG/PG can take this course, Industry people can also register.

INDUSTRY SUPPORT : Telecommunication Industry, Defence Industry , Aeronautical Industry, and Space Industry.

COURSE OUTLINE :

Software-defined radio (SDR) is an inherent part of the modern communication system, where many processes, which used to be implemented in hardware, are defined in the software domain for flexibility and configurability. This course describes various components of software-defined-radios with the understanding of their limitation and application of 'software-defined-solutions' to overcome such limitations. Understanding the interplay of analog and digital signal processing for power as well as spectrum efficient transmission and reception of signal leads to an optimized, yet, practical radio solution. This course will allow students to understand (1) the terminology used in industrial data-sheets and (2) motivation for selecting appropriate commercial solutions for a practical transceiver design.

ABOUT INSTRUCTOR :

Prof. Meenakshi Rawat received the BTech degree in electrical engineering from the GovindBallabh Pant University of Agriculture and Technology, Uttarakhand, India, in 2006, and the MSc and PhD degrees in electrical and computer engineering from the University of Calgary, Calgary, AB, Canada, in 2012. From September 2012 to June 2013, she was a Post-Doctoral Research Fellow with the University of Calgary. From July 2013 to June 2014, she was a Post-Doctoral Project Researcher/Scientist with the Ohio State University. She is currently an Assistant Professor with the Indian Institute of Technology (IIT), Roorkee, Uttarakhand, India. Prof. Rawat was workshop co-chair for ARFTG-82 and session co-chair for MMwave and THz Designs for iMARC 2014, Bangalore, India. She was part of the Calgary group that won Overall Championship and Best Design Prize of the 3rd Annual Smart Radio Challenge, Wireless Innovation Forum. She was also the three-time recipient of the Research Production Award in the University of Calgary and Best Poster Award of the 82nd Automatic RF Techniques Group (ARFTG) Conference, Columbus, OH, USA, in 2013. She is currently handling four research projects with funding from defense, private telecommunication industries and one internationational funding related to SDR for 5G communication.Recently, she was listed as Featured Engineer on EEweb.com

COURSE PLAN :

Week1: Basic components of software defined radios, Software defined radio architectures-Part A, Software defined radio architectures- Part B

Week2: Distortion parameters-Sources and metrics of distortion in a transceiver,Nonlinear distortion and nonlinearity specifications, Power amplifiers: Nonlinear Distortion in Transmitted Signals

Week3: Power amplifier Line-up for linearity & power requirement calculations,Linearization Techniques for nonlinear distortion in SDR, Predistortion Techniques for nonlinear distortion in SDR

Week4: Digital Predistortion Techniques for Linear/Nonlinear Distortion