BASICS OF SOFTWARE DEFINED RADIOS
AND PRACTICAL APPLICATIONS

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TYPE OF COURSE: Rerun | Elective | UG/PG
COURSE DURATION: 4 weeks (26 Jul’21 - 20 Aug’21)
EXAM DATE: 26 Sep 2021

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.


COURSE OUTLINE:
Software-defined radio (SDR) is an inherent part of modern communication system, where many processes, which used to be implemented in hardware, are defined in 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 Govind Ballabh 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.

COURSE PLAN:
- **Week 1:** Basic components of software defined radios, Software defined radio architectures-Part A, Software defined radio architectures- Part B
- **Week 2:** Distortion parameters-Sources and metrics of distortion in a transceiver, Nonlinear distortion and nonlinearity specifications, Power amplifiers: Nonlinear Distortion in Transmitted Signals
- **Week 3:** Power amplifier Line-up for linearity & power requirement calculations, Linearization Techniques for nonlinear distortion in SDR, Predistortion Techniques for nonlinear distortion in SDR
- **Week 4:** Digital Predistortion Techniques for Linear/Nonlinear Distortion