E2-251 Aug. 3:0

Commnication Systems Design

Instructor

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Teaching Assistant

Email:

Department: Department of ECE

Course Time:

Lecture venue:

Detailed Course Page:

Announcements

Brief description of the course

The course is offered as an Elective course of M.Tech/Ph.D students who want to get in-depth knowledge of various aspects of modern communication systems design.

Prerequisites

A course/background in digital communications is preferred.

Syllabus

Communication link design for AWGN channels; path loss models, noise figure, receiver sensitivity; link budget for deep space communication - a case study.

Communication subsystem requirements and specifications: analog/digital front-end, oscillator phase noise, analog/digital up/down conversion, carrier frequency offset (CFO), sampling frequency offset (SFO), sampling jitter, DAC/ADC interface, quantization noise and clipping, dynamic range, ADC selection, automatic gain control (AGC), I/Q imbalance, DC offset, error vector magnitude (EVM), harmonic/intermodulation distortion, 1-dB compression point, intercept points, power amplifier non-linearities and models.

-IQ imbalance estimation and correction, CFO estimation and correction, SFO estimation and correction, DC offset correction.

- Visible light wireless communications (VLC); transmitter, channel, receiver, performance, MIMO-VLC.

Course outcomes

This course will give exposure and in-depth treatment to modeling or RF impairments in communication systems and use these models for design and performance evaluation of communication systems.

Grading policy

2 tests (25 marks each)

1 final exam (50 marks)

Total: 100 marks

Assignments

Resources

Text Books / Reference Material

- Lydi Smaini, RF Analog Impairments Modeling for Communication Systems Simulation: Application to OFDM-based Transceivers, John-Wiley & Sons, 2012.
- Tony J. Rouphael, Wireless Receiver Architectures and Design: Antenna, RF, Synthesizers, Mixed Signal and Digital Signal Processing, Academic Press, 2014.
- Abbas Mohammadi and Fadhel M. Ghannouchi, RF Transceiver Design for MIMO Wireless Communications, Springer-Verlag, 2012.
- Research papers in journals and conferences.