



ELC4005 Selected Topics in Electronics II: RF/mm-wave IC Design

Course Introduction Slides

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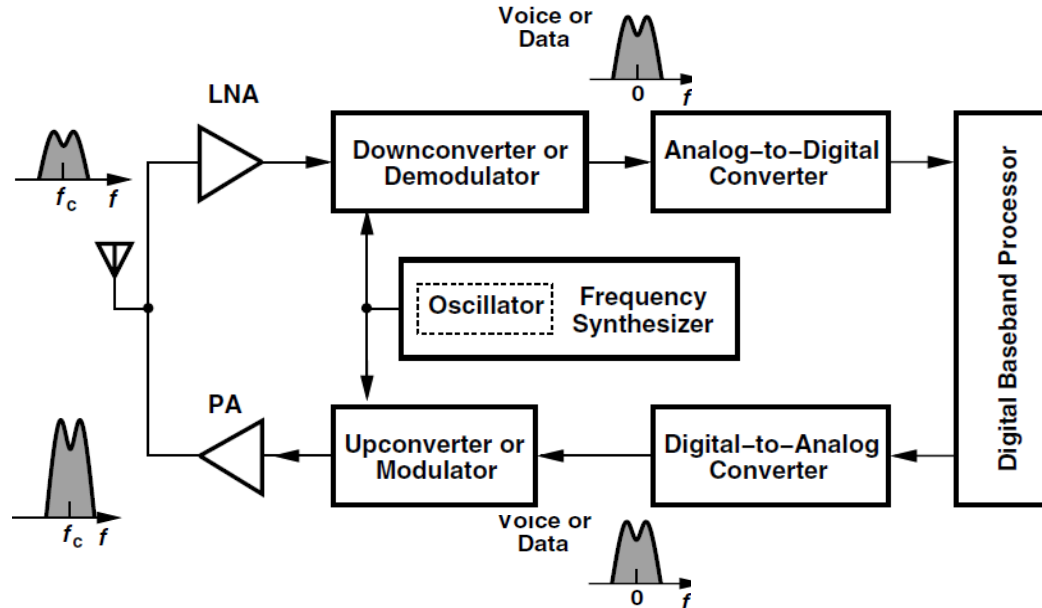
Course Contents

- Basic Concepts in RF/mm-wave Design
 - Noise, Linearity & Cascade Analysis
- Transceiver Architectures
- High Frequency Device modeling
- Passive Devices
- Low Noise Amplifier design
- Variable gain amplifiers/Attenuators
- Mixers
- Power Amplifiers

Course Text books/References

- RF Microelectronics (2nd Edition), Prentice Hall Communications Engineering and Emerging Technologies Series, Prentice Hall Press, USA, by Behzad Razavi, 2011.
- High-Frequency Integrated Circuits, The Cambridge RF and Microwave Engineering Series, by: Sorin Voinigescu, 2013.

Course Objective



- To be capable of designing RF integrated circuits and systems in CMOS & SiGe HBT technologies starting from standard specification down to circuit level design
- Transceiver architectures and system metrics are discussed to derive circuit specifications
- Circuit design of basic building blocks of transceiver RF fronts is introduced
- Different circuit techniques are discussed to implement and integrate these building blocks in a fully integrated Silicon IC

Course ILOs

- Identify different RF Wireless transceiver systems.
- Identify Basic building blocks used in a wireless transceiver system and understand their challenges.
- Understand RF metrics (NF, IIP3, IIP2, P1dB)
- Perform a complete system design for one international wireless standard and generate all block specifications
- Design input and output matching networks for an RF amplifier to achieve a certain gain and Noise figure while maintaining stability.
- Design a Low Noise amplifier and perform all required checks to achieve a specific performance.
- Design an RF Mixer and perform all required checks to achieve a specific performance.
- Design a Power Amplifier and perform all required checks to achieve a specific performance.
- Conduct a design project in a group to perform a challenging course project.
- Document the outcomes of the project in a proper scientific report.
- Present the outcomes of the project in front of an audience