

## COURSE PROJECT IDEAS

- Single stage Amplifier synthesis , frequency Analysis and its Layout part
- Study and Comparison of different current mirror topologies
- Synthesis of Telescopic Operational Amplifier with frequency Analysis
- Design of Differential Amplifier, Current Mirrors with basic Layout
- Synthesis and Frequency Response Analysis of Operational Amplifier
- Qualitative Noise Analysis of any topology(Amplifier or any other)
- Design of Voltage Reference Circuit (Existing Topologies )
- Low Power CMOS Voltage Comparator Circuits with high speed and high resolution (at least  $<1\text{mv}$ )
- Design of Folded Cascode Amplifier with frequency analysis  
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- Design of charge pump (Till layout RC extraction)
- Design of high speed sampling circuits
- Design of Biasing Networks for Analog IC's (Obtaining Biasing response w.r.t temperature, Noise etc... and Gain)
- Design of Switching capacitor circuit Amplifiers/Filters
- Multi Stage amplifier with Mismatch Compensation
- Statistical Analysis on various mismatches and its types occurring in CMOS current mirrors with some compensation techniques to reduce them.
- Design of Oscillator circuits with variable frequency which are robust to temperature, process and voltage variations

### REFERENCES:

- [1] Baker, R.J. "CMOS Circuit Design, Layout, and Simulation", Wiley
- [2] Operation and Modeling of the MOS Transistor, Yannis Tsividis, Oxford University Press; 2nd edition, 2003
- [3] The Art of Analog Layout, Alan Hastings, Prentice Hall; 2 edition, 2005

[4] Switched Capacitor Circuits, P.E. Allen and E. Sanchez-Sinencio, Van Nostrand Rienhold, 1984

[5] Allen P.E., Holberg, D.R. "CMOS Analog Circuit Design", Oxford University Press

[6] F. Yuan, CMOS Circuits for Passive Wireless Microsystems, Springer, New York, Oct. 2010.

[7] <http://www.ece.umn.edu/~harjani/courses/5333/5333.html>