

Selected Topics in Analog Integrated Circuits

Lecture 0: Introduction

ELC701A – Spring 2014

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This Course Information

- Lecture Time : Saturday 9:30am-12
- Office hours:
 - After the Lecture or by appointment
- Lecture Notes
 - <http://www.eece.cu.edu.eg/~maboudina/teaching.html>

Course Objective

- Acquire a **VERY** thorough understanding of the basic principles and analog design;
 - Focus on concepts, architectures and design challenges;
 - Preparation for further studies.
- Strategy
 - Acquire breadth understanding via a survey of existing architectures and techniques;
 - Acquire depth through a midterm project that entails design and thorough simulations of a specific circuit example in modern technology.

Course Organization

- We are going to make this course as **interactive** as possible.
 - 1st Part of the time will be spent as **normal lectures**: In this part we will usually start new topics giving some hints, trade-offs, ... etc. (75 min each)
 - 2nd part will be given by you:
 - In this part, you will: Either 1- describe a topic that was introduced in my lectures BUT in more details, or 2- Introduce a new topic to the whole class. (45 min each)
 - Relying more on text-book kind of information.
 - 3rd part, will be also given by you
 - seminar series (30 min each)
 - Up to date research ideas/Challenges
 - Relying mainly on recent scientific papers

Responsibilities

- Total Grade is divided as follows:
 - Final Exam (50%)
 - Term Paper: To be submitted before the Final Exam to an international Journal, Conference or Letter. (25%)
 - One 45-min seminar + one 30-min seminar (10%)
 - Weekly or bi-weekly simulations assignments (10%)
 - Simulation Day (10%)

Tentative Course Contents

- Deep Submicron Technology
 - Charge-based MOS Model
 - **Sub-threshold operation (weak inversion)**
- Low Voltage Architectures
- Advanced Compensation Techniques (Nested Miller, ...)
- Output Stages
- FVF (Flipped voltage follower)
- Offset Cancellation and Low Noise Techniques
- Instrumentation Amplifiers
- Reference Circuits
- Analog Techniques
- Discrete-time processing (Discrete-time filters)