Selected Topics in Analog Integrated Circuits
Lecture 0: Introduction

ELC701A – Spring 2014
Dr. Mohamed M. Aboudina
maboudina@gmail.com
Department of Electronics and Communications Engineering
Faculty of Engineering – Cairo University
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](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.
  
  – 1\(^{st}\) 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)
  
  – 2\(^{nd}\) 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.
  
  – 3\(^{rd}\) 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 of 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)