ORT Braude College
Department of Electrical and Electronic Engineering

Course 31090: Analog Integrated Circuits Design Lab
תכן מעגלים משולבים אנלוגיים

Lecturer: Dr. Thomas Reiner
Credits: **3.0** points
Hours: 1 hour Lecture, 4 hours Computer Aided Design Laboratory
Grade Composition: 20% - Prelab Questions/Quiz
30% - Lab reports
30% - Mini project
20% - Individual Evaluation comprising demonstration of pertinent knowledge during lectures and laboratory sessions.

Prerequisites: 31410 Linear Electronics

Course Description:
This course covers the design of analog CMOS integrated circuits, with focus on the basic building blocks. The lab experiments involve hands-on design using state of the art CAD tools common in the industry. The course follows the design cycle: from specification definitions, through architecture selection and basic design, to fine-tuning with exact simulations. To summarize the course the students will be given independent design tasks (mini-projects) to implement the techniques studied.

Course Content:
1. Basic MOSFET structure, device operation and physical parameters. MOSFET simulation: Ideal and non-ideal performance parameters and understanding of MOSFET and implications in circuit design such as channel length modulation and bulk-source voltage variations on current and voltage in the device.
2. Computer Aided Design (CAD) employing Cadence Virtuoso: schematic capture, simulation and graphical presentation of circuit performance.
3. Design Analog Building Blocks including current source/mirror (simple and advanced), single stage amplifiers, differential stage amplifier. Emphasis on design parameters such as channel length and width dimensions on accuracy.
4. Simulation employing CAD tools of performance parameters such as DC and AC gain, frequency response, stability, input and output voltage span, operating point, slew rate and offset.

Bibliography:

1. B. Razavi, Design of Analog CMOS Integrated Circuits, McGraw-Hill.
2. Baker, Li & Boyce, CMOS Circuit Design, Layout & Simulation, Wiley-IEEE press.
3. Allen & Holberg, CMOS Analog Circuit Design, Oxford University press.

Learning Outcome:

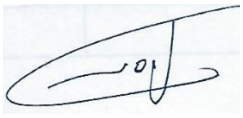
The mini-project entails the design and detailed characterization of an operational amplifier according to a detailed set of specifications. The design comprises all the building blocks the student has previously studied and implements them in the design of the specified operational amplifier. Additional performance parameters such as open loop gain and stability as a function of temperature, supply voltage and process variation are required.

Consultation hours: Sunday 13:30-14:30 EM 301 or by Appointment

Last Update: August 2019

Thomas Reiner

Dr. Thomas Reiner
25 August 2019



אישור ראש המחלקה: **ד"ר סבאג ניסים** תאריך: _25/08/19_