EE-427

Analog IC design (for MNIS)

Koukab Adil

Cursus	Sem.	Type
MNIS	MA3	Obl.

Language of teaching	English
Credits	3
Session	Winter
Semester	Fall
Exam	Written
Workload	90h
Weeks	14
Hours	**3 weekly**
Courses	2 weekly
Exercises	1 weekly
Number of positions	

Summary

This course deals with the analysis, design, and optimization of CMOS analog circuits, emphasizing low-power solutions required in a broad range of applications (e.g., IoT, wearables, Biosensors ...). Some examples of mixed-signal design are also addressed.

Content

- Introduction: Low-Power AMS design and application (IoT, Wearable, Sensors, Healthcare, â#Š)
- MOS Transistor: Modelling, Operation, and trade-offs
- Voltage references and regulators
  - Supply and temperature-independent biasing
  - Low-Voltage solution

- Operational-Amplifiers:
  - Applications (Amplification, Filtering, and Regulation)
  - Frequency analysis and Stability
  - Noise, Offset, and Mismatch
  - Filly Differential and common mode feedback
  - LV solution: Rail to Rail Amp.

- Mixed-Signal Design examples:
  - Digital calibration of analog circuits
  - Comparators
  - Practical aspects in MS-SOC

Keywords

- MOS transistor, Modelling, Analog Design, Current Mirrors, Voltage references, Regulators, Amplifiers, Stability, low-power, Low-noise, Low Voltage, digital calibration

Learning Prerequisites

Required courses

Electronics I, II, IC Design I, (Analog Design for MNIS)

Recommended courses

- Analog Design Essentials / Sansen
- CMOS Circuit Design, Layout, and Simulation / Baker
- Design of Analog CMOS Integrated Circuits / Razavi

Resources

Moodle Link

- https://go.epfl.ch/EE-427