Faculty of Engineering

COURSE OUTLINE

ELEC 481 – Analog VLSI Systems

Term – Spring 2016 (201601)

Instructor
Dr. H.L. Kwok
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Office Hours
Days: Wednesday
Time: 15:30-17:00
Location: EOW425

Course Objectives
The course deals with the design of analog circuits. The design and implementation of analog ICs is of fundamental importance to electrical/computer engineers interested in hardware. Even with the advancement in ULSI, the need to interface digital/analog circuits to the real world remains critical and essential at the systems level. This course teaches the fundamental circuit blocks in integrated circuit design and their implementation using bipolar and MOS technologies.

Learning Outcomes
LO-1. Study the operation of basic analog functional blocks, their constructions, design, operation and temperature sensitivity
Lo-2. Analyze the design of the different types of amplifiers and their applications in signal amplification, noise reduction and impedance matching including the use of feedback
Lo-3. Analyze the design of regulators; comparators; multipliers (modulators); oscillators; phase-locked loops and front-end circuits including filter design and the operation of sampled-data circuits
LO-4. Study the conversion between analog and digital signals and the design of analog-to-digital conversion circuits
LO-5. Evaluate the roles of analog and analog/digital circuits used in signal processing and communications systems
Lo-6. Study the basic concepts and implementation of massively-parallel analog networks

Syllabus
1. ANALOG IC COMPONENTS AND THEIR DESIGN – Analyses of basic analog functional blocks and their constructions.
2. AMPLIFIERS – Different types of amplifiers and their roles in signal amplification.
3. SIGNAL CONDITIONING AND PROCESSING CIRCUITS – Design of regulators, oscillators, phase-locked loops and front-end circuits. Filter design including the use of sampled-data circuits.
4. ANALOG/DIGITAL INTERFACE – Study of the conversion between analog and digital signals.
5. ANALOG CIRCUITS IN SIGNAL PROCESSING AND COMMUNICATIONS – Role of analog and analog/digital circuits in signal processing and communications systems.
6. ANALOG NEURAL NETWORKS – Basic concepts and implementation of massively parallel analog networks.
A-Section(s): A01 / CRN 21167; 21168
Days: Tues., Wed., and Fri.
Time: 10:30 a.m. – 11:20 p.m.
Location: COR A128

Required Text
Title: Bipolar and MOS Analog IC Design
Author: A.B. Grebene
Publisher: Wiley & Sons
Year: 2003

References:
Title: Design of A/D VLSI Circuits for Telecommunications and Signal Processing
Author: Franca/Tsividis Eds.
Publisher: Prentice Hall
Year: 1994

Assessment:
Assignments: 10% Due Dates: 2 weeks after distribution
Mid-term (x2) 50% Date: Feb.3 (Wed.) and Mar.2 (Wed.)
Final Exam 40%

Note:
The final grade obtained from the above marking scheme for the purpose of GPA calculation will be based on the percentage-to-grade point conversion table as listed in the current Undergraduate Calendar.

There will be no supplemental examination for this course.
http://web.uvic.ca/calendar/FACS/UnIn/UARe/Grad.html

Note to Students:
Students who have issues with the conduct of the course should discuss them with the instructor first. If these discussions do not resolve the issue, then students should feel free to contact the Chair of the Department by email or the Chair's Secretary to set up an appointment.

Accommodation of Religious Observance
http://web.uvic.ca/calendar/GI/GUPo.html

Policy on Inclusivity and Diversity
http://web.uvic.ca/calendar/GI/GUPo.html

Standards of Professional Behaviour
You are advised to read the Faculty of Engineering document Standards for Professional Behaviour, which contains important information regarding conduct in courses, labs, and in the general use of facilities.
https://www.uvic.ca/engineering/assets/docs/professional-behaviour.pdf
Cheating, plagiarism and other forms of academic fraud are taken very seriously by both the University and the Department. You should consult the entry in the current Undergraduate Calendar for the UVic policy on academic integrity.

http://web.uvic.ca/calendar/FACS/UnIn/UARE/PoAcI.html

Course Lecture Notes

Unless otherwise noted, all course materials supplied to students in this course have been prepared by the instructor and are intended for use in this course only. These materials are NOT to be re-circulated digitally, whether by email or by uploading or copying to websites, or to others not enrolled in this course. Violation of this policy may in some cases constitute a breach of academic integrity as defined in the UVic Calendar.