UVic Department of Electrical and Computer Engineering

COURSE OUTLINE
ELEC 481 – Analog VLSI Systems
Spring 2014

Instructor:

Dr. H.L. Kwok
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Office Hours:

Days: T and F
Time: 14:30-15:30
Location: EOW425

Lectures:

A-Section(s): A01 / CRN 21127
Days: TWF
Time: 1030-1120
Location: CLE C111

Labs: **Location: ELW**

B-Section(s) Days Time

Required Text:

Title: Bipolar and MOS Analog IC Design

Author: A.B. Grebene
Publisher: Wiley & Sons
Year: 2003

Optional Text:

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

References:

Assessment:

Assignments:	25%
Labs	%
Mid-term	30%
Final	45%

Date: Feb.26 (Wed.)

Note: Failure to complete all laboratory requirements will result in a grade of N being awarded for the course.

Due dates for assignments:

To be decided (normally 2 weeks after the assignment are handed out).

The final grade obtained from the above marking scheme will be based on the following percentage-to-grade point conversion:

Passing Grades	Grade Point Value	Percentage for Instructor Use Only	
A+ A A-	9 8 7	90 – 100 85 – 89 80 – 84	
B+ B B-	6 5 4	77 – 79 73 – 76 70 – 72	
C+ C	3 2	65 – 69 60 – 64	
D	1	50 – 59	
Failing Grades	**Grade Point Value**	**Percentage for Instructor Use Only**	**Description**
E	0	35 - 49	Fail, conditional supplemental exam. (For undergraduate courses only)
F	0	0 – 49	Fail, no supplemental.
N	0	0 – 49	Did not write examination, Lab or otherwise complete course requirements by the end of term or session; no supplemental exam.

The rules for supplemental examinations are found on page 80 of the current 2013/14 Undergraduate Calendar.

Term in which E Grade Was Obtained	Application Deadline for Supplemental Exam	Supplemental Exam Date
First term of Winter Session (Sept – Dec)	February 28 in the following term	First week of following May
Second term of Winter Session (Jan – Apr)	June 30 in the following term	First week of following September
Summer Session (May – Aug)	October 31 in the following term	First week of following January

Deferred exams will normally be written at the start of the student's next academic term; i.e., approximately 4 months following the deferral of the exam.

Course Description

1. 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.

2. Learning Outcomes

LO-1. Study the operation of basic analog functional blocks, their constructions, design, operation and temperature sensitivity.
Lo-2. Analyses 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.

3. Syllabus

a. ANALOG IC COMPONENTS AND THEIR DESIGN – Analyses of basic analog functional blocks and their constructions.
b. AMPLIFIERS – Different types of amplifiers and their roles in signal amplification.
c. 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.
d. ANALOG/DIGITAL INTERFACE – Study of the conversion between analog and digital signals.
e. ANALOG CIRCUITS IN SIGNAL PROCESSING AND COMMUNICATIONS – Role of analog and analog/digital circuits in signal processing and communications systems.
f. ANALOG NEURAL NETWORKS – Basic concepts and implementation of massively parallel analog networks.

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 ECE Chair by email or the ECE Chair's secretary to set up an appointment.

Accommodation of Religious Observance
See http://web.uvic.ca/calendar2013/GI/GUPo.html

Policy on Inclusivity and Diversity
See http://web.uvic.ca/calendar2013/GI/GUPo.html

Standards of Professional Behaviour

You are advised to read the Faculty of Engineering document Standards for Professional Behaviour at http://www.uvic.ca/engineering/assets/docs/professional-behaviour.pdf which contains important information regarding conduct in courses, labs, and in the general use of facilities.

Cheating, plagiarism and other forms of academic fraud are taken very seriously by both the University and the Department. You should consult

http://web.uvic.ca/calendar2013/FACS/UnIn/UARe/PoAcI.html for the UVic policy on academic integrity.

Plagiarism detection software may be used to aid the instructor and/or TA's in the review and grading of some or all of the work you submit.