

ELE539 Analog Integrated Circuit Design

Syllabus Fall 2016

Instructor:	Dr. A. J. Davis davis@ele.uri.edu Kirk 204 (401) 874-5482
Office Hours:	TBA.
Lecture:	Friday 5pm-7:50pm Kelly 102
Credits:	4
Pre-requisite:	ELE 447/448 or permission of instructor.
Text:	B. Razavi, <i>Design of Analog CMOS Integrated Circuits</i> , 1 st edition, McGraw-Hill, 2001. ISBN 0-07-238032-2. B. Razavi, <i>Design of Analog CMOS Integrated Circuits</i> , 2 nd edition, McGraw-Hill, 2017. ISBN 978-0-07-252493-2.
Objective:	Gain experience in the design of bulk CMOS analog cells in deep sub-micron process technologies. Develop cells and design using the 500nm ONSemiconductor & the 180 nm TSMC process..

Topics

Device Physics
Single-Stage Amplifiers
Differential Amplifiers
Current Mirrors & References
Layout & Matching Techniques
Frequency Response
Noise
Operational Transconductance Amplifiers (unbuffered op amps)
Comparators
Nanometer Design Issues
Looking beyond bulk CMOS: SOI & Other Technologies
Switched-Capacitor Circuits
A/D Converters – Sigma-Delta Modulators
Scaling in Deep Sub-micron Technologies (180/130nm, 90-65nm & beyond)

Design Flow

Synthesis/Tools: Cadence Virtuoso Schematic & Layout Editor
Verification/Tools: Synopsys HSPICE, Cadence Virtuoso/HSPICE
Basic Economics for Full and Semi Custom Approaches

Grading

<u>Element</u>	<u>Weight</u>
Assignments	25%
Mini-Projects	25%
Final Design Project	50%