

University of Puerto Rico
 Mayagüez Campus
 College of Engineering
 Department of Electrical and Computer Engineering
 Bachelor of Science in Electrical Engineering

Course Syllabus

1. General Information:	
Alpha-numeric codification: INEL 5265 Course Title: Analog Integrated Circuit Design3 Number of credits: 3 Contact Period: 3 credit hours, 3 hours of lecture per week Elective in INEL and ICOM	
2. Course Description:	
English: Design and Analysis of analog and mixed signal integrated circuits through the usage of analytical circuit design techniques and advanced cad tools. Discussion of issues involved in the layout and test of analog IC's. Spanish: Análisis y Diseño de circuitos analógicos y de tecnología mixta (analógico-digital) mediante el uso de técnicas de diseño analíticas y herramientas avanzadas de diseño asistido por computadoras. Discusión de tópicos referentes al diseño físico y desarrollo de pruebas funcionales de circuitos integrados analógicos.	
3. Pre/Co-requisites and other requirements:	
INEL 4205 and INEL 4201.	
4. Course Objectives:	
To develop in the students the fundamental skills in the design and analysis of analog and mixed signal integrated circuits using advanced CAD tools, and to provide an understanding of the central issues involved in the layout and test of such a type of circuits.	
5. Instructional Strategies:	
<input checked="" type="checkbox"/> conference <input checked="" type="checkbox"/> discussion <input type="checkbox"/> computation <input checked="" type="checkbox"/> laboratory <input checked="" type="checkbox"/> seminar with formal presentation <input type="checkbox"/> seminar without formal presentation <input type="checkbox"/> workshop <input type="checkbox"/> art workshop <input type="checkbox"/> practice <input type="checkbox"/> trip <input type="checkbox"/> thesis <input checked="" type="checkbox"/> special problems <input type="checkbox"/> tutoring <input type="checkbox"/> research <input type="checkbox"/> other, please specify:	
6. Minimum or Required Resources Available:	
Basic Knowledge of Cadence Design Tools. All students are expected to have basic notions on: 1- Design techniques for digital circuits 2- Familiarity with transistor operation 3- Spice circuit modeling and simulation	
7. Course time frame and thematic outline	
Outline	Contact Hours
Models for large and small signal IC devices.	3
Model considerations in evolving technological trends.	3
Introduction to CAD tools for analog design.	6
Concepts of analog layout, Bipolar, MOS, and BiCMOS technologies.	2
Basic integrated circuit amplifiers: Darlington, differential pairs, and cascode configurations.	2
Dynamic range considerations in integrated amplifier circuits.	1
Current sources, active loads, and reference circuits.	3
Operational amplifier architectures: analysis and design considerations	3
Frequency response of ICs, feedback analysis, and stability.	1
Issues in the design of mixed signal ICs.	2
Test and measurement techniques of analog and mixed signal ICs.3	2
Total hours: (equivalent to contact period)	28
8. Grading System	
<input checked="" type="checkbox"/> Quantifiable (letters) <input type="checkbox"/> Not Quantifiable	
9. Evaluation Strategies (Suggested): The faculty member teaching the course will provide the student with the evaluation strategy he/she will be using throughout the semester. This will be done within the first week of classes.	

	Quantity	Percent
<input checked="" type="checkbox"/> Exams	2	50%
<input type="checkbox"/> Final Exam		
<input type="checkbox"/> Short Quizzes		
<input checked="" type="checkbox"/> Oral Reports	1	25%
<input type="checkbox"/> Monographies		
<input type="checkbox"/> Portfolio		
<input checked="" type="checkbox"/> Projects	1	25%
<input type="checkbox"/> Journals		
<input type="checkbox"/> Other, specify:		
TOTAL:		100%

10. Bibliography:

Razavi, B. Design of Analog CMOS Integrated Circuits, McGraw Hill, (2001).

11. According to Law 51

Students will identify themselves with the Institution and the instructor of the course for purposes of assessment (exams) accommodations. For more information please call the Student with Disabilities Office which is part of the Dean of Students office (Chemistry Building, room 019) at (787)265-3862 or (787)832-4040 extensions 3250 or 3258.

12. Contribution of Course to meeting the requirements of Criterion 5:

Map to Program Outcomes

Math	Basic Science	General	Engineering Topic
			√

13. Course Outcomes

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|---|-----|
| 1. Analysis of medium complexity Analog and Mixed Signal Circuits | (b) |
| 2. Competence in Cadence Tools for Analog Environment | (k) |
| 3. Design Layout Mask generation of analog circuits | (c) |

Person(s) who prepared this description and date of preparation: Gladys O. Ducoudray, Nov. 2006