

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 5207 Course Title: Analog Design with Operational Amplifiers and Integrated Circuits Number of credits: 3 Contact Period: 3 credit hours, 3 hours of lecture per week Elective in INEL	
2. Course Description:	
English: This course focuses on the design of analog integrated circuits' applications. It covers the characteristics and limitations of operational amplifiers in detail. Linear and non-linear applications, such as signal generators, voltage references, voltage regulators, A-D and D-A converters, logarithmic amplifiers, phase-lock-loops and analog filters are also discussed.	
Spanish: Este curso esta enfocado al diseño de aplicaciones de circuitos análogos integrados. Cubre en detalle las características y limitaciones de los amplificadores operacionales. También discute aplicaciones lineares y no lineares, tales como generadores de onda, reguladores de voltaje, Voltajes de referencia, Convertidores AD y DA, amplificadores logarítmicos, PLLs y filtros análogos.	
3. Pre/Co-requisites and other requirements:	
INEL 4202. Required	
4. Course Objectives:	
Design and analysis of applications using operational Amplifiers	
5. Instructional Strategies:	
<input checked="" type="checkbox"/> conference <input checked="" type="checkbox"/> discussion <input type="checkbox"/> computation <input 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 type="checkbox"/> special problems <input type="checkbox"/> tutoring <input type="checkbox"/> research <input type="checkbox"/> other, please specify:	
6. Minimum or Required Resources Available:	
7. Course time frame and thematic outline	
Outline	Contact Hours
1. Course Introduction	1
2. Operational Amplifier (OA) Fundamentals (Chapter 1 in textbook;)	2
3. Examples of Linear OA Circuits (Instructor notes;)	3
4. Examples of Non-linear OA Circuits (Instructor notes;)	2
5. OA Limitations (Chapter 5 in textbook;)	5
6. Stability and Frequency Compensation (Ch. 6 in textbook)	3
7. Noise (Chapter 14 in textbook)	3
8. Current-feedback amplifiers (Instructor notes)	3
9. OA Building Blocks and Analog Integrated Circuits	
a) Active filters types and design methods (Chapters 3 and 4 in textbook)	6
b) Signal generator (Chapter 8 in textbook)	
c) Voltage references (Chapter 9 in textbook)	3
d) D/A and A/D Converters (Chapter 11 in textbook)	3
e) Logarithmic Amplifiers (Chapter 12 in textbook)	3
f) Phase-lock loops (instructor notes)	3
	4
Total hours: (equivalent to contact period)	44
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	3	75%
<input type="checkbox"/> Final Exam		
<input type="checkbox"/> Short Quizzes		
<input type="checkbox"/> Oral Reports		
<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:

DESIGN WITH OPERATIONAL AMPLIFIERS AND ANALOG INTEGRATED CIRCUITS, Third Edition (2001), by Sergio Franco, ISBN: 0-07-021857-9, McGraw-Hill

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:

Math	Basic Science	General	Engineering Topic
			√

13. Course Outcomes

1. Design and analysis of amplifiers
2. Analog characteristics and limitations
3. Design of applications to solve problem
4. Be aware of Ethical Considerations

Map to Program Outcomes

- (a)
- (b)
- (e)
- (f)

Person(s) who prepared this description and date of preparation: Manuel Toledo,
Submitted by: Gladys O. Ducoudray, Feb 2007