University of Puerto Rico
Mayagüez Campus
College of Engineering
Department of Electrical and Computer Engineering
Bachellor 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

2. Course Description:

English: This course focuses on the design of analog integrated circuits' applications. It covers thecharacteristics 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 analogos integrados. Cubre en detalle las características y limitaciones de los amplificadores operacionales.Tambien discute aplicaciones lineares y no lineares, tales como generadores de onda, reguladores de voltaje, Voltages de referencia, Convertidores AD y DA, amplificadores logaritmicos,PLLs y filtros analogos.

3. Pre/Co-requisites and other requirements:

INEL 4202. Required

4. Course Objectives:

Design and analysis of applications using operational Amplifiers

5. Instructional Strategies:

☒ conference ☒ discussion ☐ computation ☐ laboratory

☒ seminar with formal presentation ☐ seminar without formal presentation ☐ workshop

☐ art workshop ☐ practice ☐ trip ☐ thesis ☐ special problems ☐ tutoring

☐ research ☐ 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) b) Signal generator (Chapter 8 in textbook) c) Voltage references (Chapter 9 in textbook) d) D/A and A/D Converters (Chapter 11 in textbook) e) Logarithmic Amplifiers (Chapter 12 in textbook) f) Phase-lock loops (instructor notes)	 6 3 3 3 3 4
Total hours: (equivalent to contact period)	44

8. Grading System

☒ Quantifiable (letters) ☐ Not Quantifiable

9. Evaluation Strategies

	Quantity	Percent
☒ Exams	3	60%
☐ Final Exam		
☐ Short Quizzes		
☐ Oral Reports		
☐ Monographies		
☐ Portfolio		
☒ Projects	1	40%
☐ Journals		
☐ 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. Course Outcomes

	Map to Program Outcomes
1. Design and analysis of amplifiers	(a)
2. Analog characteristics and limitations	(b)
3. Design of applications to solve problem	(e)
4. Be aware of Ethical Considerations	(f)

Person(s) who prepared this description and date of preparation: Gladys O. Ducoudray, feb 2007