Faculty of Engineering & Technology

Analog Integrated Circuits Design

Information :

Course Code :	ELE 526	**Level**	: Undergraduate	**Course Hours :**	3.00- Hours

Department :	Specialization of Electronics & Communication

Instructor Information :

Title	Name	Office hours
Associate Professor	Mohamed Hassan Mohamed Elmahlawy	11
Teaching Assistant	Roshan Mohyeldeen Ahmed Abdelaziz	

Area Of Study :

Énrich studentsknowledge about analysis, design, and applications of modern analog circuits using integrated bipolar and field effect transistor technologies.
Train students about the principles of analog circuits and apply the techniques for the design of analog integrated circuit (Analog ICs).
Develop studentsskills to implement a complete analog system.

Description :

Introduction to analog VLSI, Device modelling, Basic analog building blocks (current mirrors, common source, common drain, common gate, cascode), Noise, Voltage and current references differential pair, Frequency response, Stability and frequency compensation, Operational amplifiers (basic, two-stage, Miller, symmetrical, telescopic, folded, cascode), Noise, Voltage and current references.

Course outcomes :

a.Knowledge and Understanding: :

1 -	a1. Explain the fundamentals of the amplifiers and their frequency response.
2 -	a2. Recognize the design of the OPAMP amplifier circuits and their problems and applications.
3 -	a3. Define the principles of the voltage and current references differential pair
4 -	a4. Explain the principles of feedback amplifier circuits.
5 -	a5. Define the suitable device model for VLSI applications.

b.Intellectual Skills: :

1 -	b1. Analyze problems of amplifier circuits.
2 -	b2. Use professional software tools for design and implementing of electronic circuits.
3 -	b3. Design of electronic circuits for engineering applications.
4 -	b4. Assess and evaluate the characteristics and performance of analog circuits.

c.Professional and Practical Skills: :

1 -	c1. Build a complete application circuit.

| 2 - | c2. Use computational facilities and related software tools, measuring instruments, workshops and/or relevant laboratory equipment to design and diagnosis experiments. |
| 3 - | c3. Read thoroughly datasheets and identify appropriate specifications for required device and circuits. |

d.General and Transferable Skills: :

1 -	d1. Collaborate effectively within multidisciplinary team
2 -	d2. Communicate effectively.
3 -	d3. Effectively manage tasks, time, and resources.
4 -	d4. Search for information and engage in life-long self-learning discipline.

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
Introduction to analog VLSI	5	3	2
Device modelling and parameters	10	6	4
Basic analog building blocks (current mirrors, common source, common drain, common gate, cascode), and Noise	10	6	4
Voltage and current references differential pair,	15	9	6
Frequency response,	10	6	4
Stability and frequency compensation,	10	6	4
Operational amplifiers (basic, two-stage, Miller, symmetrical, telescopic, folded, cascode)	15	9	6

Teaching And Learning Methodologies :

Interactive Lecturing
Problem Solving
Discussion
Experiential Learning

Course Assessment :

Methods of assessment	Relative weight %	Week No	Assess What
˝Final exam	40.00		
o In Class Quizzes	10.00		
o Mid-Term exams	30.00		
o Participations	10.00		
o Project	10.00		

Course Notes :

- Taken by the student inside classroom

Recommended books :

- P.R. Gray and R.G. Meyer, Analysis and Design of Analog Integrated Circuits, Fourth Edition, John Wiley and Sons.

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