

EC432- Microelectronic Circuits

CREDIT HOURS

3 Hours

CONTACT HOURS (Hours/week)

Lecture: 2; Tutorial: 2; Lab: 2

COURSE COORDINATOR

Dr. Khaled Shehata

TEXT BOOK

Behzad Razavi, "Design of Analog CMOS Integrated Circuits", McGraw Hill, 2001.

COURSE DESCRIPTION

Differential Amplifiers - Current Mirrors - Noise in Electronic Circuits - Operational Amplifiers
- Phase Locked Loops - Switched Capacitor Circuits - IC Fabrication Steps

PREREQUISITE:

EC333

RELATION OF COURSE TO PROGRAM

Required

COURSE INSTRUCTION OUTCOMES

The student will be able to be familiar with:

- Integrated circuit technology
- Linear Integrated circuits: Operational amplifiers and their applications
- IC fabrication.

TOPICS COVERED

- MOSFET Differential Amplifiers
- BJT Differential Amplifier Stage (Concepts)
- MOSFET Current Sources
- BJT Current Sources
- MOSFET / BJT Current Mirror (Concepts)
- Noise in Electronic Circuits
- Noise in Single-Stage Amplifier and Differential Pair
- Ideal Operational Amplifiers Characteristics and Applications
- Operational Amplifiers applications
- Non –Ideal Operational Amplifiers
- Phase Locked Loops
- Charge-Pump PLL – Switched Capacitor Circuits (Sampling)
- Switched Capacitor Amplifiers
- MOSFET Circuits Fabrication Steps

- MOSFET Circuits Design Rules

CONTRIBUTION OF COURSE TO MEET THE REQUIREMENTS OF CRITERION 5:

Professional component Content			
Math and Basic Sciences	Engineering Topics	General Education	Other
	✓		

RELATIONSHIP OF COURSE TO STUDENT OUTCOMES:

Student Outcomes		Course aspects
A	An ability to apply knowledge of mathematics, science, and engineering	a ₁ a ₂
B	An ability to design and conduct experiments, analyze and interpret data.	b ₁ b ₂ b ₃ b ₄
C	An ability to design a system, component, or process to meet desired needs within realistic constraints such as economics, environmental, social, political, ethical, health, and safety, manufacturability, and sustainability	
D	An ability to function on multi-disciplinary teams.	d ₁ d ₂ d ₃ d ₄
E	An ability to identify, formulate, and solve engineering problems	e ₁ e ₂ e ₃
F	An understanding of professional and ethical responsibility	f ₁ f ₂
G	An ability to communicate effectively	g ₁ g ₂ g ₃
H	The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and social content	
I	A recognition of the need for, and an ability to engage in life-long learning.	
J	A knowledge of contemporary issues within and outside the electrical engineering profession.	
k	An ability to use the techniques, skills, and modern engineering tools necessary for electrical engineering practice.	