

## **EC333- Electronic Amplifiers**

### **CREDIT HOURS**

3 Hours

### **CONTACT HOURS (Hours/week)**

Lecture: 2; Tutorial: 2; Lab: 2

### **COURSE COORDINATOR**

Dr. Khaled Shehata

### **TEXT BOOK**

Sedra-Smith, Microelectronic Circuits, Oxford Pub., 6<sup>th</sup> ed, 2004.

### **COURSE DESCRIPTION**

Revision on Single Stage BJT Amplifiers - Cascode - MOSFET Common Source, Source Follower and Common Gate Amplifier – MOSFET Cascode and Folded Cascode Amplifier - Frequency Response of MOSFET Circuits - Feedback Amplifiers - Feedback Topologies - Stability - Ring Oscillator and LC Oscillators - Voltage Controlled Oscillators - Power Amplifier - Tuned Amplifiers

### **PREREQUISITE:**

EC332, EC334

### **RELATION OF COURSE TO PROGRAM**

Required

### **COURSE INSTRUCTION OUTCOMES**

The student will be able to:

- Analyze and design of all types of electronic amplifiers and oscillators.
- Introduce the concept of the feedback in amplifiers.
- Verify measured amplifier response through computer simulation and Lab experiment

### **TOPICS COVERED**

- Revision on Single Stage BJT Amplifiers
- MOSFET Amplifier Configurations (Common Source Amplifier, Common Drain and Gate Amplifier) – IC Environment
- Cascode and Folded Cascode Amplifier
- Frequency Response of MOSFET Circuits & BJT Circuits
- Feedback Amplifiers, Types, Effects
- Analysis of Feedback Amplifiers Topologies
- Stability of Feedback amplifiers, Nyquist Criterion Frequency Compensation
- Oscillators (Ring Oscillator and LC Oscillators, RC Oscillators and Voltage Controlled Oscillators)

- Power Amplifier (Definitions, Classes of operation, Class A, Push-Pull and Complementary Symmetry Class B/AB)
- Tuned Amplifiers (Single, Synchronous Tuned , Stagger Tuned)

**CONTRIBUTION OF COURSE TO MEET THE REQUIREMENTS OF CRITERION 5:**

| <b>Professional component Content</b> |                           |                          |              |
|---------------------------------------|---------------------------|--------------------------|--------------|
| <b>Math and Basic Sciences</b>        | <b>Engineering Topics</b> | <b>General Education</b> | <b>Other</b> |
|                                       | ✓                         |                          |              |

**RELATIONSHIP OF COURSE TO STUDENT OUTCOMES:**

| <b>Student Outcomes</b> |   | <b>Course aspects</b>                                       |
|-------------------------|---|---|
| A                       | An ability to apply knowledge of mathematics, science, and engineering  |   |
| B                       | An ability to design and conduct experiments, analyze and interpret data.   | b <sub>1</sub> b <sub>2</sub> b <sub>3</sub> b <sub>4</sub> |
| 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 <sub>1</sub> d <sub>2</sub> d <sub>3</sub> d <sub>4</sub> |
| E                       | An ability to identify, formulate, and solve engineering problems   | e <sub>1</sub> e <sub>2</sub> e <sub>3</sub>                |
| F                       | An understanding of professional and ethical responsibility   | f <sub>1</sub> f <sub>2</sub>                               |
| G                       | An ability to communicate effectively   | g <sub>1</sub> g <sub>2</sub> g <sub>3</sub>                |
| 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.   |   |