EE 334

1. **Course Number and Name:** EE 334, Microelectronic Circuits
2. **Course Credit and Contact hours:** 3 Units, 3 hour lecture
3. **Course Coordinator:** Dr. Mohamed Salem
4. **Textbook:** Adel S. Sedra and Kenneth C. Smith, *Microelectronic Circuits*, 7th Edition, Oxford University Press, 2015. ISBN 978-0-19-933913-6.
5. **Supplemental Materials:** None.
6. **Specific course information:**
   a. **Description:** Integrated Circuit (IC) design philosophy, biasing IC amplifiers, current mirrors, current sources, gain cells, and cascode amplifiers. Differential and multistage IC amplifiers. Amplifier frequency response and frequency response analysis. Feedback and stability. Power amplifier classes, bipolar and CMOS realizations of IC power amplifiers. CMOS and bipolar operational amplifier design.
   b. **Prerequisites:** EE 230, EE 231 and MATH 241, or consent of instructor.
   c. **Co-Requisite:** EE 334L
   d. **Status: ☑ Required for EE program, ☐ Elective, ☐ Selected Elective**
7. **Specific goals for the course**
   a. **Specific outcomes of instruction:**
      i. Ability to apply basic electric circuit concepts to understand transistor amplifier circuits.
      ii. Ability to perform small-signal analysis of transistor circuits.
      iii. Ability to perform analysis and design of current sources and mirrors.
      iv. Ability to perform analysis and design of multistage amplifier circuits.
      v. Ability to apply electronic circuit concepts to understand frequency response of transistor circuits.
      vi. Ability to acquire new knowledge by constructing and testing functioning electronic circuit.

b. This course supports the following ABET Student Outcomes

i. *SO-7: an ability to acquire and apply new knowledge as needed, using appropriate learning strategies*

8. Brief list of topics to be covered:

a. Principles of transistor amplifiers

b. Small-signal modeling of transistor amplifiers

c. Basic configurations of amplifiers

d. Building blocks of integrated-circuits amplifiers

e. Current sources and mirrors

f. Basic gain cells of integrated-circuit amplifiers

g. Amplifier differential pairs

h. Common-mode rejection

i. Multi-stage amplifiers

j. Frequency response of amplifiers