

EE 330

1. **Course Number and Name:** EE 330, Electronics II
2. **Course Credit and Contact hours:** 2 Units, 1 hour lecture and 3 hours laboratory
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:** Laboratory instructions and information is provided.
6. **Specific course information:**
 - a. **Description:** Output stage design of the amplifiers, non-linear op-amp circuits, differential amplifiers, common mode and differential mode circuit analysis, half-circuit analysis, study of current mirrors and active load design, analysis of two stage active load CMOS op-amp, high frequency models of BJT and MOSFET, analysis of low and high frequency responses of amplifiers, open circuit time constant (OTC) and short circuit time constant (STC), study of tuned amplifier.
 - b. **Prerequisites:** EE 230 and MATH 241, or consent of instructor.
 - c. **Co-Requisite:** None
 - 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. Assemble electronic circuits using a breadboard, resistors, capacitors, diodes, and transistors.
 - iii. Perform small-signal analysis of transistor circuits.
 - iv. Measure the gain, input resistance, and output resistance of discrete circuit amplifiers using laboratory instruments.
 - v. Assemble and measure the output current of a transistor-based current source and mirror.
 - vi. Demonstrate an ability to acquire new knowledge by constructing and testing functioning electronic circuit.

b. This course supports the following ABET Student Outcomes

- i. SO-1: an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics*
- ii. 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.** Bipolar Junction Transistor (BJT)
- b.** Principles of transistor amplifiers
- c.** Small-signal modeling of transistor amplifiers
- d.** Basic configurations of amplifiers
- e.** Building blocks of integrated-circuits amplifiers
- f.** Current sources and mirrors
- g.** Basic gain cells of integrated-circuit amplifiers
- h.** Amplifier differential pairs
- i.** Common-mode rejection
- j.** Multi-stage amplifiers
- k.** Frequency response of amplifiers