University of Wisconsin - Madison
College of Engineering [EGR]
Last Offered: 2015 Spring [1154]
Direct Link to this Syllabus :
http://aefis.engr.wisc.edu/index.cfm/page/CourseAdmin.ViewABET?coursecatalogid=175&pdf=True

1. **E C E 340, Electronic Circuits I**
2. **Credits :** 3 **Contact Hours :** 4.0
3. **Textbook and Materials :** Microelectronic Circuits; Sedra and Smith; 1st edition; No Year Given

a. **Other Supplemental Materials :** None

- **Specific Course Information :**

a. **Brief description of the content of the course (Course Catalog Description) :** A first course in modeling, characterization, and application of semiconductor devices and integrated circuits. Development of appropriate models for circuit-level behavior of diodes, bi-polar and field effect transistors, and non-ideal op-amps. Application in analysis and design of linear amplifiers. Frequency domain characterization of transistor circuits.
b. **Pre-requisites or Co-requisites :** ECE 230
c. **This is a Required course.**

- **Specific Goals for the Course :**

a. **Course Outcomes :**

1. Knowledge of signals, frequency response and semiconductors.
2. Mastery of component level models of bipolar and field effect transistors.
3. Ability to design and analyze transistor amplifier circuits
4. Knowledge of building blocks of integrated circuit amplifiers.

- **ABET Student Learning Outcomes :**

(a) Ability to apply mathematics, science and engineering principles.
(d) Ability to function on multidisciplinary teams.
(e) Ability to identify, formulate and solve engineering problems.
(i) Recognition of the need for and an ability to engage in life-long learning.
(k) Ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

- **Brief List of Topics to be Covered :**
  1. Basic knowledge of signals, frequency response and amplifiers
  2. Semiconductor properties and pn junctions
  3. Diodes and modeling
  4. MOSFET device structure, physical operation and current-voltage characteristics
  5. MOSFET DC circuits
  6. MOSFET small-signal operation and models
  7. Basic MOSFET amplifiers

8. Biasing in MOSFET amplifier circuits
9. Discrete-circuit MOSFET amplifiers
10. BJT device structure, physical operation and current-voltage characteristics
11. BJT DC circuits
12. BJT small-signal operation and models
13. Basic BJT amplifiers
14. Biasing in BJT amplifier circuits
15. Discrete-circuit BJT amplifiers
16. Building blocks of integrated circuit amplifiers: cascade amplifier, IC biasing
17. Introduction to differential and multiple stage amplifiers