Electrical Engineering 3120: Electronics II
Prior Number - Electrical Engineering 254

Credit and Contact Hours
3 credit hours lecture (Three 50-minute sessions per week are typical).

Instructor
Varies: D. DuBroff, Ph.D.; R. Moss, Ph.D.; J. Fan, Ph.D.; B. Shrestha, Ph.D.; and T. Odu-Ayo, Ph.D.

Text(s)

Course Information
Course Description
Continuation of Electrical Engineering 3100 (253). Diode and transistor circuits, small-signal analysis, amplifier design, differential and operational amplifiers, logic families, flip-flop circuits and waveshaping.

Prerequisites
Electrical Engineering 3100 (253) and Electrical Engineering 3101 (255) with a grade of “C” of better. Electrical Engineering 3120 (256) is optional. But recommended.

Required or Elective
Elective for electrical engineering majors

Course Goals
General Outcomes
1. Gain experience in finding circuit transfer functions and the resulting Bode plots.
2. Learn how to analyze and design the elements that determine amplifier low-frequency and high-frequency behavior of transistor circuit configurations.
3. Learn how feedback affects amplifier response and stability.
4. Gain experience in applying integrated circuits to solve engineering problems.
5. Obtain an overview of the main logic families and how to use them in mixed-signal applications.
### Relationship of Course to Program Outcomes

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<td>Understanding specifications and effective communication of design problems are especially emphasized.</td>
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<td>Throughout the course, students are exposed to manufacturers’ data sheets and application suggestions to convey the importance of continuing education.</td>
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S – strong connection; M – medium connection; W – weak connection

### Topics Covered

1. S-domain analysis – poles and zeros—Bode plots (1 week)
2. Frequency response of BJT and MOSFET amplifier circuits, low-frequency and high-frequency approximate models. (3 weeks)
3. Power amplifier and thermal management. (1 week)
4. Feedback theory, stability and compensation. (1.5 weeks)
5. Op-amp parameters and applications. (2 weeks)
6. Digital logic gates, TTL, ECL and CMOS families (3 weeks)
7. Logic interfacing techniques; transmission-line environments. (1 week)
8. Data conversion circuits (S/H, A/D and D/A) (1 week)
9. Reviews, Examinations, and Final Examination (2 weeks)