



6. **Student Learning Outcomes** (Identify 1-6 expected learner outcomes using active verbs.)

Upon successful completion of the course, the student will be able to:

1. Predict, through calculations, all of the operating circuit parameters for multistage audio amplifiers, and power amplifiers, using discrete and monolithic devices
2. use, with competence, a variety of basic and sophisticated electronic test instrumentation, make accurate measurements, record data in an orderly form and perform calculations requisite to completing the laboratory assignments
3. Critically analyze experimental results to verify that the theoretical and practical results are within the accepted tolerance for the circuit under test. then, if any error exists, determine the source or sources of the variance
4. develop an intuitive sense for proper circuit operation, and when needed, a logical approach to troubleshooting the various circuits being analyzed
5. use computer-based circuit simulation tools to predict and verify circuit performance

7. **Course Objectives** (Identify specific teaching objectives detailing course content and activities. *For some courses, the course objectives will be the same as the student learning outcomes. If this is the case, please simply indicate this in this section).*

Same as above

8. **Course Content** (Brief but complete topical outline of the course that includes major subject areas [1-2 pages]. Should reflect all course objectives listed above. In addition, you may attach a sample course syllabus with a timeline.)

See attachment

9. **Representative Instructional Methods** (Describe instructor-initiated teaching strategies that will assist students in meeting course objectives. Include examples of out-of-class assignments, required reading and writing assignments, and methods for teaching critical thinking skills.)

1. Lectures
2. analytical problem sets
3. essay question sheets
4. topic reading assignments
5. assigned lab activities
6. assigned computer simulation activities

10. **Representative Methods of Evaluation** (Describe measurement of student progress toward course objectives. Courses with required writing component and/or problem-solving emphasis must reflect critical thinking component. If skills class, then applied skills.)

1. graded problem sets
2. graded homework word problems
3. graded lab activities
4. computer based simulation activities
5. quizzes
6. Midterm
7. final exam

11. **Representative Text Materials** (With few exceptions, texts need to be current. Include publication dates.)

Bogart, Theodore. Electronic Devices and circuits. Merril, 1993  
MacDonald, Lorne. Practical analysis of Amplifier Circuits, 4<sup>th</sup> edition. Technical Education Press, 1994

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## ELECT 320

## Topical Outline

- I Single Stage Transistor Amplifier Circuits and Frequency Response
  - A Single Stage Transistor Amplifier Review
  - B Frequency Response Considerations
- II Single Stage JFET Amplifier Circuits and Frequency Response
  - A Single Stage JFET Amplifier Review
  - B Frequency Response
- III Multistage Cascaded Transistor Amplifier Circuits
  - A Two Stage Cascaded Amplifier Circuits
    - 1 Common-Emitter Common-Emitter NPN-PNP Amplifier
    - 2 Common-Emitter, Common-Collector NPN-NPN Amplifier
    - 3 Common-Source, Common-Emitter Cascaded Amplifier
    - 4 Common Collector, Common-Emitter Bootstrapped Amplifier
  - B Three Stage Cascaded Amplifier Circuits
- IV Cascode Amplifier Circuits
  - A Cascade Transistor Amplifiers
    - 1 Common-Emitter, Common-base Cascode Amplifier Circuit
    - 2 Folded Cascode Amplifier
  - B JFET-Bipolar Cascode Circuit
    - 1 Common-Source Common-base Amplifier Circuit
    - 2 Constant Current Common-Source Circuit
  - C FET Amplifiers
    - 1 The Cascode JFET Amplifier
    - 2 The Cascode, Dual-Gate MOSFET amplifier
- V Differential Amplifier Circuits
  - A Symmetrical Differential Amplifier Circuits
    - 1 Basic Connection
    - 2 Constant Current Source Differential Amplifier
  - B Nonsymmetrical Differential Amplifier
    - 1 Beta 1 does not equal beta 2 differential Amplifier Circuits
    - 2 Single-Ended Output Differential Amplifier Circuits
    - 3 JFET Differential Amplifier Circuits
- VI Negative feedback Amplifiers
  - A Negative Feedback in single Stage Amplifier Circuits
    - 1 Base-Biased, Common-Emitter Circuit Analysis
    - 2 Controlor-Feedback, Common-Emitter Circuit Analysis
  - B Multistage Negative Feedback Amplifiers

- C Voltage-sample, Current-Sum, Circuit Analysis
- D Voltage-sample, Voltage-Sum, Circuit Analysis
- E Basic operational Amplifier circuits
- F The monolithic operational amplifier
- G Operational amplifier electrical parameters
- H Practical Inverting operational amplifiers
- I Practical Non-Inverting Operational Amplifiers
- VII Operational Amplifier Applications
  - A Summing, scaling, and averaging operational amplifier circuits
  - B Differential Amplifiers
  - C Integrator and differentiator operational amplifiers
- VIII Audio Power amplifiers
  - A Class A power amplifiers
  - B Medium Power amplifiers
    - 1 Multistage Medium Power Amplifiers
    - 2 Single Stage Driver Using Bootstrapping
    - 3 Op-Amp Driven Complementary Symmetry Amplifier
  - C Higher Power Amplifiers
  - D Multistage Power Amplifiers with negative Feedback
    - 1 Complementary Darlington Pair Power Amplifier
    - 2 Modified Complementary Darlington Pair Power Amplifier
    - 3 MOSFET Power Amplifiers
    - 4 Monolithic Power Amplifiers