EE429)ject 3 - FET amplifier

Purpose:
The purpose of this project is design an amplifier using FETs, and sizing them like you would in designing an IC.

What to do:

You need to design a two stage amplifier, to the following specifications:

Voltage gain = 12 dB, (+/- 1 dB) with 2k load. Inverting.
Output impedance, less than 200 ohms.
Output voltage swing: 5 volts peak-to-peak.
Power supply: +15 volts.
Frequency response: within +0, -3 dB from 20 Hz to 20 kHz.
Use FETs with KP=20u, Lambda=0.
Try to minimize the cost.
Try to minimize power consumption.

Procedure:

You need to determine any missing specs, and make sure that the specs are clear to you.

First, determine a reasonable topology, then determine component values. You must make sure it works over the reasonable variations of component values.

Verify by hand calculation that it works for the "corner cases", that is, extremes of component values.

After you are satisfied with the hand calculations, verify it with simulation. You must first verify the DC bias, then AC gain and frequency response, then the output voltage swing, using transient analysis.

What to hand in:

Your report should consist of the following sections:

1. A cover sheet, with a schematic on it.
2. Specifications, in two columns, requested and simulated, also on cover.
3. Design calculations.
4. Manual design verification.
5. Simulation procedures and results.
6. Discussion
7. References and acknowledgements

Discussion:

In your discussion, you should point out any difficulties with the procedure, including any deviations between the predicted results and the results obtained by simulation. You should also justify any design decisions you made. If you chose to relax any of the specs, justify it here.

References and acknowledgements:

List all sources of information here, including texts, faculty, and classmates. You will not be penalized for working together with other students, if you say so. You will be penalized if you claim the work of someone else as your own.

Due date:
This project is due Friday, October 4.