INFORMATION ABOUT THE FINAL EXAM

Office Hours:

We will hold regular office hours during RRR Week. During Finals Week, we will hold office hours as follows:

Additional Office Hours: (in addition to regular office hours, of which there are plenty)

- Qiu Tong Jin: Tuesday, Dec. 15, 11 a.m.-12 noon, via Zoom
  Wednesday, Dec. 16, 1-2 p.m., via Zoom
- Kieran Peleaux: Monday, Dec. 14, 11-12 a.m., via Zoom
  Wednesday, Dec. 16, 2:30-3:30 p.m., via Zoom
- Prof. Nguyen: Monday, Dec. 14, 3-4 p.m., via Zoom
  Wednesday, Dec. 16, 11:30 a.m.-12:30 p.m., via Zoom

You will receive Zoom links for these office hours.

Review Session:

Monday, Dec. 7, 2-3 p.m. and Wednesday, Dec. 9, 2-3 p.m.

Date of Exam:

Thursday, Dec. 17, 3-6 p.m. (sharp)

Exam Logistics:

This will be a remote exam. We will release the exam on Piazza at 3:00 p.m. PT sharp. The first page of the exam will have an Honor Pledge that you will need to sign. If you cannot print out that page, then please write out the Honor Pledge on your own paper (that you will also use to write out your exam answers) and sign it. When taking the exam, make sure your writing is dark enough to scan well. It is best to use a dark pen. You must turn in your exam before 6:00 p.m. PT. Make sure you leave enough time to scan your solutions and email the pdf file to Prof. Nguyen at ctnnguyen@berkeley.edu, Kieran Peleaux at kpeleaux@berkeley.edu, and Qiu Tong Jin at qiutong-jin@berkeley.edu before 6:00 p.m. PT.

General Information:

You must work on this exam alone. The exam will be open book, and you can use a calculator. You should show and include all your work on your exam sheets. The exam will consist of a few problems, each with a number of parts.

Material to be Covered:

The final exam is meant to cover all the material in this course, including the reading in Sedra & Smith, class lecture notes, handouts, labs, and homework. It might have a slight focus on more recent material. You might pay more attention to the following areas:
1. Frequency response calculation and determination. Be familiar with Bode plots (both gain and phase) and know how to determine the frequency response of circuits containing reactive components (e.g., capacitors).

2. Op-amp circuits. Know how to analyze various op-amp circuits that utilize feedback. Specifically, know the characteristics and operation of inverting and non-inverting amplifiers, and be prepared to analyze other (possibly unfamiliar) op-amp circuits. Make sure you understand the differences between open-loop and closed-loop op-amp circuit performance.

3. Ideal and non-ideal op-amp operation and characteristics. Know the various op-amp nonlinearities and be prepared to predict how they influence circuit performance. Understand their effect on feedback amplifier performance.

4. Semiconductor physical concepts and device operation for pn-junction diodes and transistors, particularly MOS. Be able to determine regions of operation and the DC operating points for transistors in specified bias configurations. Also, be prepared to handle op amp circuits using transistors in their feedback loops, such as in Lab#3.

5. Interpretation of devices as nonlinear elements and methods for modeling physical devices using nonlinear models.

6. The concept of large and small signals and the need for small signal analysis. Large and small signal models for bipolar and MOS transistors and determination of small signal elements/parameters.


10. Analysis of multi-stage amplifiers, particularly biasing, midband parameter determination, and frequency response determination of such amplifiers. The topologies to be given could include those covered in lecture and in the text, or circuits you’ve never seen before. Be prepared to see an unconventional circuit and remember that you have all the fundamental skills required to analyze it.

11. Design of single- and multi-stage amplifiers. This could be open-ended or you could be asked to modify an existing design to meet given specifications. For this, you must be familiar with characteristics of the single-transistor amplifiers and combinations of them (i.e., which combinations give high bandwidth with high midband gain?).

12. Fundamentals of digital circuits, including voltage transfer characteristics (VTC) and propagation delay. You should know how to determine important VTC points, and you should be able to determine the propagation delay of a CMOS inverter, or a simple CMOS logic gate.