

ECE 332
Electronics Principles II

Lab TA: Ming-Hao Cheng, MingHao.Cheng@colostate.edu

Jacob Alfieri, jalfieri@rams.colostate.edu

HW Grader: Ryan Way, rway@rams.colostate.edu

Office: Scott Building, Room 352

Textbook: Lecture notes (required) supplemented by “Fundamentals of Microelectronics” by Behzad Razavi (strongly recommended to own)

Objectives: This course is the continuation of Electronics I. It builds on the knowledge of device characteristics, models and operation in linear and non-linear circuits. This course will focus on basic analog circuits based on the MOS technology. Progression of design concepts from simple, single stage linear circuits, to multi-stage linear circuits, to reference circuit, and output stages covers the basic set of design principles and guidelines. The learning will be further enforced by actual circuit designs students perform in the corresponding lab sessions and the knowledge integration modules. The lab activities focus on design principles and verification of the designs with SPICE simulation results with the goal of understanding design tradeoffs.

Assessments: Two assessments (tests) are planned during the semester. Students can use any reference books, notes, and calculators to solve problems during the test period. Each assessment lasts a class period. If you fail any assessment, you **MUST** contact the instructor to arrange for remedial actions. Failed to do so will result in your failing the class.

Final Exam: The final exam is open-book, open-notes. Use of calculators is allowed.

Homework: Homework assignments are posted online and they are due by midnight of the due date. All HWs must be submitted via Canvas by midnight of the due date. Homework solutions will also be posted on Canvas.

Laboratory: 5 laboratory sessions are planned. This may change depending on the overall learning progress over the semester. All lab reports must be turned by midnight of the due date via Canvas. The lab report must follow the required format. Fail to do so will have a negative impact on your lab grade.

Knowledge Integration: There are three knowledge integration (KI) modules. Each KI module deals with a set of anchoring concepts taught in ECE312, ECE332, and ECE342 and shows how these concepts are integrated in a practical design. A set of questions related to the concepts used in each KI will be distributed before each KI module begins. Students are required to complete the pre-work in the form of a report by working through the questions and to understand how individual concepts are integrated in the practical design. Online presentations by each student to demonstrate his/her understanding of the materials in the first two KIs are required.

Use of Online Homework Helper Sites:

The online “homework helper” sites including, but not limited to, Chegg, NoteHall, Quizlet and Koofers, is meant as study resources to help students better understand basic concepts covered in this course. They are NOT intended to do homework/exams of this course for you. The use of these online sites to ask them to do homework/exams for you is not permitted in this course.

Grading:

- Laboratory 25%
- Homework 10%
- KI pre-work reports 4%
- KI presentations 3%
- KI peer-peer assessment 3%
- Assessment I 15%
- Assessment II 15%
- Final exam 25%
- Math Foundation 2% (extra)

Assessments and Final Exam Dates:

- Assessment I Feb. 23 (tentative)
- Assessment II April 8 (tentative)
- Final exam May 13, 2-4pm

Missing or Late HWs and Lab Reports:

No credit will be given to any lab work/report/HWs submitted after the solutions have been posted and discussed in the class. Each student must complete all pre-laboratory assignments, attend lab sessions and submit a lab report. Lab reports must be done individually. Points will be deducted proportionally for any late submissions.

Remedial Work:

Students who failed any assessment test must contact the instructor to arrange for potential remedial work. This is to ensure that the learning gaps do not carry over to the following topics.

Topics covered:

1. MOS single transistor circuits (review)
2. MOS current sources (review)
3. MOS differential circuits
4. MOS output stage design
5. MOS OTA and Opamp
6. Frequency response of CMOS circuits
7. Principle of feedback structures
8. Stability analysis and compensation
9. Noise analysis (optional)

Office Hours:

Instructor office hours: T, Th, 11-noon, and W, noon-1pm, or by appointment. All office hours will be conducted via MS Teams, unless specified otherwise.

Instructor office telephone: 491 6574.

Instructor email address: thomas.chen@colostate.edu

Any questions related to the labs should be directed to the lab TA during any of the lab hours, or via email.

Any questions regarding grading of HWs should be addressed to Ryan Way via email (rway@rams.colostate.edu).

Important information for students: All students are expected and required to report any COVID-19 symptoms to the university immediately, as well as exposures or positive tests from a non-CSU testing location. If you suspect you have symptoms, please fill out the COVID Reporter (<https://covid.colostate.edu/reporter/>).

*If you know or believe you have been exposed, including living with someone known to be COVID positive, or are symptomatic, it is important for the health of yourself and others that you complete the online COVID Reporter. Do not ask your instructor to report for you. If you do not have internet access to fill out the online COVID-19 Reporter, please call (970) 491-4600. You will not be penalized in any way for reporting. If you report symptoms or a positive test, you will receive immediate instructions on what to do, and CSU's Public Health Office will be notified. Once notified, that office will contact you and most likely conduct contact tracing, initiate any necessary public health requirements and/or recommendations and notify you if you need to take any steps. For the latest information about the University's COVID resources and information, please visit the **CSU COVID-19 site**: <https://covid.colostate.edu/>.*