



JOINT INSTITUTE
交大密西根学院

Ve413 Monolithic Amplifier Circuits

Summer 2020

(Last Updated on May 4, 2020)

Instructor:

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Email: changching.tu@sjtu.edu.cn

Office Hour: Tue 13:00-15:00 via Zoom

Teaching Assistant:

AI, Yuchen

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TA Office Hour: T.B.D.

Lecturing:

Tue 8:00 to 9:40 via Zoom

Thu 8:00 to 9:40 via Zoom

Homework Assignments:

4 homework assignments in total

Posted on Canvas on Thursday and due next Thursday in class

Textbooks:

Design of Analog CMOS Integrated Circuits, Behzad Razavi

Course Description:

1. Lecturing: Working principles and design considerations of CMOS circuits, particularly operational amplifiers with or without feedback. Main topics include: frequency response, feedback, operational amplifiers and stability of operational amplifiers.
2. Homework Assignment: Circuit analysis by hand-calculation with proper approximations. Comparison of hand-calculation results with Pspice simulation results.
3. Final Project: Building and analysis of functional circuits on PCB.

Course Outcomes:

1. Able to design single-stage, multi-stage and high-gain amplifiers, and to analyze the amplifiers by hand-calculation and spice simulation.



2. Able to identify the key specifications of amplifiers according to their specific applications, and to implement the amplifiers on spice, breadboard and PCB to meet the specifications.

Course Outline:

- Current Mirror
Razavi, Chapter 5
- Frequency Response
Razavi, Chapter 6
- Feedback
Razavi, Chapter 8
- Operational Amplifiers
Razavi, Chapter 9
- Stability of Operational Amplifiers (if having enough time)
Razavi, Chapter 10

Grading Policy:

- 4 × Homework Assignments (with Pspice) (8%)
- 1 × Midterm Exam (22%)
- 1 × Final Exam (25%)
- 1 × Final Project (45%)

Final Project:

- Open topic (analog / digital mixed circuits preferable)
- All circuits are designed and simulated on Proteus
- Project Demo Day (25%)
 - Working or not working (5%)
 - Team work (5%)
 - Difficulty level (5%)
 - Completeness (5%)
 - Presentation clarity (5%)
- Final Report (20%)




In addition to presenting **experimental results** and **specifications achieved**, emphasize the following three aspects: (1) How your design produces solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors. (2) As a team, how you develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions. (3) When encountering difficulties beyond your



knowledge, how you acquire and apply new knowledge as needed, using appropriate learning strategies.

Course Schedule:

	May				Jun					Jul				Aug					
Mon	4	11	18	25	1	8	15	22	29	6	13	20	27	3	10	17	24	31	
Tue	5	12	19	26	2	9	16	23	30	7	14	21	28	4	11	18	25	1	
Wed	6	13	20	27	3	10	17	24	1	8	15	22	29	5	12	19	26	2	
Thu	7	14	21	28	4	11	18	25	2	9	16	23	30	6	13	20	27	3	
Fri	8	15	22	29	5	12	19	26	3	10	17	24	31	7	14	21	28	4	
	9	16	23	30	6	13	20	27	4	11	18	25	1	8	15	22	29	5	
	10	17	24	31	7	14	21	28	5	12	19	26	2	9	16	23	30	6	
		1	2	3	4	5	6	7	8	9	10	11	12	13					
Spr. Break	Summer Semester												Summer Break						

-  Lectures
-  Project Demo Day
-  Midterm/Final Exam

Course Policy:

- Honor Code: All students in the class are bound by the Honor Code of the Joint Institute (<http://umji.sjtu.edu.cn/academics/academic-integrity/honor-code/>). You may not seek to gain an unfair advantage over your fellow students; you may not consult, look at, or possess the unpublished work of another without their permission; and you must appropriately acknowledge your use of another's work.
- Exam: The rule will be announced prior to each exam. Anyone violating the rule will be given an 'F' as the score.
- Participation: Active participation in course meetings is expected for all students. With each submitted assignment, students should be prepared to explain their solutions to the class.
- Homework Assignments: Students are encouraged to discuss course topics and homework assignments with each other. However, all submissions must represent your own work. Duplicated submission is not allowed and will trigger an honor code violation investigation.