

EE438: Fundamentals of Electronic Circuits

Unique Numbers: 16280, 16285, 16290

Fall 2019, T/Th, 12:30-2PM, BUR 134

Lab Sections: F 9AM-12PM (16280), F 12:00-3:00PM (16285), F 3:00-6:00PM (16290)

Course Instructor

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Office Location: EER 4.864

Office Hour: Monday 2-3 PM, Wednesday 1-2 PM

Note: OH may be updated during the semester

Teaching Assistants

Suresh Rayudu

Course Description

Analysis and design of electronic circuits using semiconductor devices. Basic device physics and small-signal modeling for diodes, bipolar junction transistors, and metal-oxide-semiconductor transistors; operation region and biasing; basic switching circuits; single-stage and multi-stage amplifier design and analysis; input and output impedance characteristics of amplifiers; frequency response; AC and DC coupling techniques; differential amplifiers and output stages. Laboratory work covers generation and acquisition of test signals; current, voltage, and impedance measurements; transfer function measurement; and spectrum measurements and analysis. Three lecture hours and three laboratory hours a week for one semester.

Prerequisites

Electrical Engineering 411 with a grade of at least C-; credit with a grade of at least C- or registration for Biomedical Engineering 343 or Electrical Engineering 313; and credit with a grade of at least C- or registration for one of the following: Aerospace Engineering 333T, Biomedical Engineering 333T, Chemical Engineering 333T, Civil Engineering 333T, Electrical Engineering 333T, Mechanical Engineering 333T, Petroleum and Geosystems Engineering 333T.

Textbooks

Required

B. Razavi, "Fundamentals of Microelectronics" 2nd Ed., Wiley

Reference

A. S. Sedra and K. C. Smith, "Microelectronic Circuits," 7th Ed., Oxford University Press

P. R. Gray, P. J. Hurst, S. H. Lewis and R. G. Meyer, "Analysis and Design of Analog Integrated Circuits," 5th Ed., Wiley

Exams and Assignments

- **HW** (5 points): The HW with lowest grade will be dropped. All HW is due by the end of class on the due date. Submissions beyond this time will not be accepted.

- **Exam 1** (15 points): Closed book, closed notes, 1 side of a single letter-size page of reference material, in class.
Date: Sep. 26
- **Exam 2** (15 points): Closed book, closed notes, 1 side of a single letter-size page of reference material, in class.
Date: Oct. 17
- **Exam 3** (15 points): Closed book, closed notes, 1 side of a single letter-size page of reference material, in class.
Date: Nov. 14
(Internet access will be specified for Exams 1-3)
- **Final** (50 points): Closed book, closed notes, no internet access, 2 sides of a single letter-size page of reference material.
Date: Date and time to be confirmed

Note: The Final Exam will be comprehensive. Exam 2 and Exam 3 will emphasize material covered after the prior exam.

- Total class grade: **75% Exams + Assignments, 25% Lab**

Grading

- Grading will be on the curve. Plus/minus grading system will be used.

Tentative Course Topics

Lecture # (Dates)	Chapter	Topic
1 (Aug. 29)	1	Circuits Review/Semiconductor Physics
2-3 (Sep. 3, Sep. 5)	2	Semiconductor Physics
4-5 (Sep. 10, Sep. 12)	2	PN Junctions
6-7 (Sep. 17, Sep. 19)	3	Diode Circuits
8 (Sep. 24)	6	MOS Transistors
Sep. 26		Exam 1
9-10 (Oct. 1, Oct. 3)	6	MOS Transistors
11-13 (Oct. 8, Oct. 10, Oct. 15)	7	Single-Device MOS Amplifiers
Oct. 17		Exam 2
14-15 (Oct. 22, Oct. 24)	9	Cascode Stages and Current Mirrors (MOSFET)
16-18 (Oct. 29, Oct. 31, Nov. 5)	10	Differential Amplifiers (MOSFET)
18-19 (Nov. 7, Nov. 12)	11	Frequency Response
Nov. 14		Exam 3
20 (Nov. 19)	4	Bipolar Junction Transistors
21-23 (Nov. 21, Nov. 26, Dec. 3)	5, 9, 10	BJT Amplifiers
24 (Dec. 5)		Review (or make-up class)

- It is anticipated that the above plan will be followed closely. However the plan may be modified based on class progress or other unforeseen circumstances.

Course Policies

- **Regrading requests**

Regrading requests will not be accepted as a general rule, except in cases of error. Similarly, grades will not be changed after the class, except in cases of error. If you suspect an error, please send an email outlining the nature of the error and why you think you deserve a different grade. Partial grade assignments are consistent for the entire class and depend on specific issues missed or addressed in the solution and therefore regrading requests to increase partial credit, in absence of an error, will not be accepted.

- **Make-up exams**

- By UT Austin policy, “a student who misses classes or other required activities, including examinations, for the observance of a religious holy day should inform the instructor as far in advance of the absence as possible, so that arrangements can be made to complete an assignment within a reasonable time after the absence.”
- Requests for make up exams for medical reasons must be supported by appropriate documentation.
- There will be **no make up exams for any other reasons.**
- If you are unable to take an exam for reasons other than the above, the percentage grade of the exam will be added to the final, provided you have taken prior permission for missing the exam. Exams missed without permission of the instructor will receive a score of zero.
- If you miss the final, it will count as a zero. Please keep in mind that this can have a serious impact on your overall grade, and can lead to an F. An X (incomplete) will not be granted, unless there is a justified medical reason, which will need supporting documentation. Request for absence from the final must be sent by email before the exam.

- Cases of academic dishonesty will lead to zero on the specific assignment or exam, and/or a reduction in the overall course grade, and/or an F on the course. Details about academic integrity and what constitutes scholastic dishonesty can be found at the website for the UT Dean of Students Office and the General Information Catalog, Section 11-802.

Classroom Evacuation for Students

All occupants of university buildings are required to evacuate a building when a fire alarm and/ or an official announcement is made indicating a potentially dangerous situation within the building.

- **Familiarize yourself with all exit doors of each classroom and building you may occupy. Remember that the nearest exit door may not be the one you used when entering the building.**
- **If you require assistance in evacuation, inform your instructor in writing during the first week of class.**

For evacuation in your classroom or building:

1. Follow the instructions of faculty and teaching staff.
2. Exit in an orderly fashion and assemble outside.
3. Do not re-enter a building unless given instructions by emergency personnel.

Other University Policies

All departmental, college and university regulations concerning drops will be followed. Students with disabilities may request appropriate academic accommodations from the Division of Diversity and Community Engagement, Services for Students with Disabilities, 512-471-6259, <http://www.utexas.edu/diversity/ddce/ssd/>