

**ROY G. PERRY COLLEGE OF ENGINEERING
ELECTRICAL & COMPUTER ENGINEERING
DEPARTMENT
PRAIRIE VIEW A&M UNIVERSITY**

ASSESSMENT REPORT

ELEG 3043/3304 ELECTRONICS I

Fall 2021 SEMESTER

NAME OF INSTRUCTOR: Dr. Mohan Ketkar

TABLE OF CONTENTS

- 1. Report Cover Page**
- 2. Detailed Course Syllabus**
- 3. End of Semester Outcomes Assessment Report**
- 4. Grade Sheet Showing Student and Class Performance in Outcomes**
- 5. Supporting Outcomes Specific Assignments**
 - 5.1 Assignments assessing students' ability to develop and conduct appropriate experimentation, analyze, and interpret data, and use engineering judgment to draw conclusions. (Outcome "6")

Detailed Course Syllabus
(Distributed to Students at the beginning of the Semester)

Course Description in ABET Format

Please use the following format for the course syllabi (2 pages maximum in Times New Roman 12 point font)

1.	Course number and name:	ELEG 3304 ELECTRONICS - I
2.	Credits and contact hours:	3 credit hours; 3 contact hours
3.	Instructor's or course coordinator's name:	Dr. Mohan Ketkar
4.	Text book: Title:	MICROELECTRONIC CIRCUITS
	Author:	A.S. Sedra and K.C. Smith
	Publisher, Year & Edition:	Oxford University Press, 8 th Edition
	a. Other Supplemental material	1. J.O. Attia, "Circuits and Electronics: Hands-on learning with Analog Discovery" 2. Handouts 3. Electronics Circuits books in the library
5.	Specific course information	
	a. Brief description of the content of the course (catalog description)	Operational amplifiers. Diodes and nonlinear circuits. Field effect transistors. Analysis and design of linear amplifiers. Biasing, small and large signal behavior. Operation of bipolar junction transistors.
	b. Prerequisites or Co-requisites	ELEG 3033 Minimum Grade of C and ELEG 3013 Minimum Grade of C
	c. *Indicate whether a required, elective, or selected elective (as per definition provided) course in the program	Required
6.	a. Specific goals for the course specific outcomes of instruction (e.g. The student will be able to explain the significance of current research about a particular topic.) <i>Students will be able to :</i>	b. Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course. <i>The specific goals for the course specific outcomes listed on the left column will address the following student learning outcomes:</i>
	1. Understand the characteristics of operational amplifiers and should be able to design electronic circuits using operational amplifiers	
	2. Understand the operational characteristics of diodes, MOSFETs, and BJTs	

	3. Be conversant with basic electronic circuits such as rectifiers, inverting amplifiers, non-inverting amplifiers, integrators, differentiators, clipping and clamping circuits.	
	4. Recognize and analyze various MOSFET and BJT amplifier circuits	
	5. Use PSPICE or MATLAB to solve electronic circuits' problems	Outcome 6 An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
	6. Design, construct, test electronic circuit that satisfies multiple constraints	
7	Brief list of topics to be covered	Introduction to Electronics Operational Amplifiers Diodes Applications of Diodes MOSFETs Bipolar Junction Transistors

***Required** courses are required of all students in the program, **elective** courses (often referred to as open or free electives) are optional for students, and **selected elective** courses are those for which students must take one or more courses from a specified group

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SYLLABUS

ELEG 3304 Electronics – I Fall 2021

General Course Information

Information Item	Information
Instructor:	Dr. Mohan Ketkar
Section # and CRN:	ELEG 3304 P01 CRN 17529
Office Location:	NENR 351
Office Phone:	(936) 261-9847
Email Address:	maketkar@pvamu.edu
Office Hours:	1:30 pm – 4:30 pm R, and 9:30 am – 12:00 pm W via prearranged zoom meeting
Mode of Instruction:	Face to face
Course Location:	CL Wilson Rm. 109K
Class Days & Times:	11:00 am – 12:20 pm T R
Catalog Description:	ELEG 3304 Electronics I: 3 semester hours. Operational amplifiers. Diodes and nonlinear circuits. Field effect transistors. Analysis and design of linear amplifiers. Biasing, small and large signal behavior. Operation of bipolar junction transistors.
Prerequisites:	Undergraduate level ELEG 3033 Minimum Grade of C and Undergraduate level ELEG 3013 Minimum Grade of C
Co-requisites:	
Required Text(s):	A.S. Sedra and K.C. Smith, 'Microelectronic Circuits', 8 th Edition, Oxford University Press
Recommended Text(s):	1. J.O. Attia, "Circuits and Electronics: Hands-on learning with Analog Discovery" 2. Handouts 3. Electronics Circuits books in the library

General Course Information Table

Student Learning Outcomes:

Upon successful completion of this course, students will be able to:	Program Learning Outcome Alignment	Core Curriculum Outcome Alignment
1. understand the characteristics of operational amplifiers and should be able to design electronic circuits using operational amplifiers		
2. understand the operational characteristics of diodes, MOSFETs, and BJTs		
3. be conversant with basic electronic circuits such as rectifiers, inverting amplifiers, non-inverting amplifiers, integrators, differentiators, clipping and clamping circuits		
4. recognize and analyze various MOSFET and BJT amplifier circuits		
5. use PSPICE or MATLAB to solve electronic circuits' problems	6	
6. design, construct, test electronic circuit that satisfies multiple constraints		

Student Learning Outcomes Table

ABET PROGRAM OUTCOMES (ABET Criterion 3, Student Outcome 6)

On completion of course the student should have demonstrated an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

ASSIGNMENTS: Problems on the topics discussed in class will be assigned. Assignments should be completed and uploaded on time. Late homework will not be accepted. The completed homework assignments will not be graded but they should be considered as practice sets that will help you to prepare for tests/exams. Solutions to the homework problems will be provided.

COMPUTER APPLICATION PROBLEMS:

There will computer applications problems that will involve the use of the MATLAB and/or MULTISIM/PSPIICE for solving electronics problems.

DESIGN PROJECT:

You will be asked to design an electronic circuit that meets some specifications. You have to select the circuit components, build and test the circuit in the lab (e.g., using Analog Discovery board/development kit). A design project report is also required. The report should include, among other things, the circuit diagram, component values, and design equations, testing methodology, test results and conclusions.

EXAMS/TESTS: There will be three in-class tests and a final examination. Your two highest test scores and the final exam (comprehensive) will count towards the final course grade. The tentative dates for the tests/exams are as follows:

Test #1: Tuesday September 14, 2021*

Test #2: Thursday October 7, 2021*

Test #3: Thursday November 3, 2021*

Final Exam: December 2 – 8, 2021

The dates for the tests* and final exam are subject to change.

Major Course Requirements**Method of Determining Final Course Grade**

Course Grade Requirement	Value	Total
1. Class Attendance & Homework (not graded, for practice only)	10	10
2. Course Design Projects / Computer Application Problems	20	20
3. Tests (two best test scores)	20	40
4. Final Exam (Comprehensive)	30	30
Total:		100

Course Grade Requirement Table

Grading Criteria and Conversion:

A = 90 – 100 %

B = 80 – 89 %

C = 70 – 79 %

D = 60 – 69 %

F = 0 – 59 %

Detailed Description of Major Assignments:

Assignment Title	Description
1. Test # 1	Test covering Chapter 1 and 2
2. Test # 2	Test covering Chapter 4
3. Test # 3	Test covering Chapter 5

4.Final Exam	Comprehensive
5.Computer Assignment	Based on Chapters 4, 5 and 6

Course Procedures or Additional Instructor Policies

Taskstream

Taskstream is a tool that Prairie View A&M University uses for assessment purposes. One of your assignments may be required to be submitted as an "artifact," an item of coursework that serves as evidence that course objectives are met. If applicable, more information will be provided during the semester by your department, but for general information, you can visit Taskstream via the link in eCourses/Canvas.

Semester Calendar	
Week	Description
Week One: Topic Description	Introduction to Electronics
Readings:	Chapter 1 sections 1.1 – 1.4
Assignment (s):	
Week Two: Topic Description	Introduction to Electronics and Operational Amplifiers
Readings:	T Chapter 1 sections 1.5 – 1.6 R Chapter 2 sections 2.1 – 2.3
Assignment (s):	
Week Three: Topic Description	Operational Amplifiers
Readings:	Chapter 2 sections 2.4 – 2.7
Assignment (s):	
Week Four: Topic Description	Operational Amplifiers and Test # 1
Readings:	Chapter 2 section 2.8
Assignment (s):	
Week Five: Topic Description	Review of Semiconductors and Diodes
Readings:	Chapter 3 Selected sections Chapter 4 sections 4.1 – 4.2
Assignment (s):	
Week Six: Topic Description	Diodes
Readings:	Chapter 4 sections 4.3 – 4.6
Assignment (s):	
Week Seven: Topic Description	Applications of Diodes and Test # 2
Readings:	Chapter 4 sections 4.7
Assignment (s):	
Week Eight: Topic Description	MOSFETs
Readings:	Chapter 5 sections 5.1
Assignment (s):	
Week Nine: Topic Description	MOSFETs

Readings:	Chapter 5 sections 5.2
Assignment (s):	
Week Ten: Topic Description	MOSFET's
Readings:	Chapter 5 sections 5.3 – 5.4
Assignment (s):	
Week Eleven: Topic Description	Test # 3 and Computer assignment
Readings:	
Assignment (s):	Computer assignment(s) for Taskstream
Week Twelve: Topic Description	Bipolar Junction Transistors
Readings:	Chapter 6 section 6.1
Assignment (s):	
Week Thirteen: Topic Description	Bipolar Junction Transistors
Readings:	Chapter 6 sections 6.2 – 6.3
Assignment (s):	
Week Fourteen: Topic Description	Bipolar Junction Transistors
Readings:	Chapter 6 sections 6.3 – 6.4
Assignment (s):	
Week Fifteen: Topic Description	Review for Final Exam
Readings:	
Assignment (s):	
FINAL EXAM	Exact date according to University Final Exam Schedule

The instructor reserves the right to adjust the syllabus according to lecture progress. NOTE: Scheduling of TESTS may change depending on the progress of the class. At the discretion of the instructor, additional (optional) assignments and or makeup exam may be given for extra credit. The instructor reserves the right to change the grading matrix and/or the grading scale of individual assignments/ tests/make ups based on the continuous class performance.

Student Support and Success

John B. Coleman Library

The John B. Coleman Library's mission is to enhance the scholarly pursuit of knowledge, to foster intellectual curiosity, and to promote life-long learning and research through our innovative services, resources, and cultural programs, which support the Prairie View A&M University's global mission of teaching, service, and research. It maintains library collections and access both on campus, online, and through local agreements to further the educational goals of students and faculty. Website: <https://www.pvamu.edu/library/>; Phone: 936-261-1500

Academic Advising Services

Academic Advising Services offers students a variety of services that contributes to student success and leads towards graduation. We assist students with understanding university policies and procedures that affect academic progress. We support the early alert program to help students get connected to success early in the semester. We help refer students to the appropriate academic support services when they are unsure of the best resource for their needs. Faculty advisors support some students in their respective colleges. Your faculty advisor can be identified in PantherTracks. Advisors with Academic Advising Services are available to all students. We are located across campus. Find your advisor's location by academic major at www.pvamu.edu/advising. Phone: 936-261-5911

The University Tutoring Center

The University Tutoring Center (UTC) offers free tutoring and academic support to all registered PVAMU students. The mission of the UTC is to help provide a solid academic foundation that enables students to become confident, capable, independent learners. Competent and caring staff and peer tutors guide students in identifying, acquiring, and enhancing the knowledge, skills, and attitudes needed to reach their desired goals. Tutoring and academic support are offered face-to-face in the UTC, in virtual face-to-face sessions (<https://www.pvamu.edu/student-success/sass/university-tutoring-center/>), and through online sessions (<https://www.pvamu.edu/pvplace/>). Other support services available for students include Supplemental Instruction, Study Break, Academic Success Workshops, and Algebra Study Jam. Location: J. B. Coleman Library, Rm. 307; Phone: 936-261-1561; Email: pvtutoring@pvamu.edu; Website: <https://www.pvamu.edu/student-success/sass/university-tutoring-center/>

Writing Center

The Writing Center provides well-trained peer tutors to assist students with writing assignments at any stage of the writing process. Tutors help students with various writing tasks from understanding assignments, brainstorming, drafting, revising, editing, researching, and integrating sources. Students have free access to Grammarly online writing assistance. Grammarly is an automated proofreading and plagiarism detection tool. Students must register for Grammarly by using their student email address. In addition, students have access to face-to-face and virtual tutoring services either asynchronously via email or synchronously via Zoom. Location: J. B. Coleman Library, Rm. 209; Phone: 936-261-3724; Website: <https://www.pvamu.edu/student-success/writing-center/>; Grammarly Registration: <https://www.grammarly.com/enterprise/signup>

Academic Early Alert

Academic Early Alert is a proactive system of communication and collaboration between faculty, academic advisors, and PVAMU students that is designed to support student success by promptly identifying issues and allowing for intervention. Academic Early Alerts help students by providing a central location to schedule advising appointments, view advisor contact information, and request assistance. Students who recognize that they have a problem that is negatively affecting their academic performance or ability to continue school may self-refer an Academic Early Alert. To do so, students will log in to PV Place and click on Academic Early Alert on the left sidebar. Phone: 936-261-5902; Website: <https://www.pvamu.edu/student-success/early-alert/>

Student Counseling Services

The Student Counseling Services unit offers a range of services and programs to assist students in maximizing their potential for success: short-term individual, couples, and group counseling, as well as

crisis intervention, outreach, consultation, and referral services. The staff is licensed by the State of Texas and assists students who are dealing with academic skills concerns, situational crises, adjustment problems, and emotional difficulties. Information shared with the staff is treated confidentially and in accordance with Texas State Law. Location: Hobart Taylor, 2nd floor; Phone: 936-261-3564; Website: <https://www.pvamu.edu/healthservices/student-counseling-services/>

Office of Testing Services

Testing Services serves to create opportunities by offering a suite of exams that aid in the students' academic and professional success. Currently, we administer entrance (HESI A2), college readiness (TSI assessment), Prior Learning (CLEP, DSST), and proctored exams. Location: Wilhelmina Delco, 3rd Floor, Rm. 305; Phone: 936-261-3627; Email: aetesting@pvamu.edu; Website: www.pvamu.edu/testing

Office of Diagnostic Testing and Disability Services

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, contact the Office of Disability Services. As a federally-mandated educational support unit, the Office of Disability Services serves as the repository for confidential disability files for faculty, staff, and students. For persons with a disability, the Office develops individualized ADA letters of request for accommodations. Other services include learning style inventories, awareness workshops, accessibility pathways, webinars, computer laboratory with adapted hard and software, adapted furniture, proctoring non-standardized test administrations, ASL interpreters, ALDs, digital recorders, Livescribe, and a comprehensive referral network across campus and the broader community. Location: Hobart Taylor, Rm. 1D128; Phone: 936-261-3583; Website: <https://www.pvamu.edu/disabilityservices/>

Center for Instructional Innovation and Technology Services (CIITS)

Distance Learning, also referred to as Distance Education, is the employment of alternative instructional delivery methods to extend programs and services to persons unable to attend college in the traditional manner. The Center for Instructional Innovation and Technology Services (CIITS) supports student learning through online, hybrid, web-assist, and 2-way video course delivery. For more details and contact information, visit:

<https://www.pvamu.edu/dlearning/distance-learning-2-2/students-2/>; Phone: 936-261-3283

Veteran Affairs

Veterans Services works with student veterans, current military and military dependents to support their transition to the college environment and continued persistence to graduation. The Office coordinates and certifies benefits for both the G.I. Bill and the Texas Hazlewood Act. Location: Evans Hall, Rm. 102; Phone: 936-261-3563; Website: <https://www.pvamu.edu/sa/departments/veteranaffairs/>

Office for Student Engagement

The Office for Student Engagement delivers comprehensive programs and services designed to meet the co-curricular needs of students. The Office implements inclusive and accessible programs and services that enhance student development through exposure to and participation in diverse and relevant social, cultural, intellectual, recreational, community service, leadership development, and campus governance. Location: Memorial Student Center, Rm. 221; Phone: 936-261-1340; Website: <https://www.pvamu.edu/studentengagement/>

Career Services

Career Services supports students through professional development, career readiness, and placement and employment assistance. The Office provides one-on-one career coaching, interview preparation, resume and letter writing, and career exploration workshops and seminars. Services are provided for students at the Northwest Houston Center and College of Nursing in the Medical Center twice a month or on a requested basis. Distance Learning students are encouraged to visit the Career Services website for

information regarding services provided. Location: Anderson Hall, 2nd floor; Phone: 936-261-3570; Website: <https://www.pvamu.edu/careerservices/>

University Rules and Procedures

Academic Misconduct

Academic dishonesty is defined as any form of cheating or dishonesty that has the effect or intent of interfering with any academic exercise or fair evaluation of a student's performance. The college faculty can provide additional information, particularly related to a specific course, laboratory, or assignment.

You are expected to practice academic honesty in every aspect of this course and all other courses. Make sure you are familiar with the *University Administrative Guidelines on Academic Integrity*, which can be found on the [Academic Integrity webpage](#). Students who engage in academic misconduct are subject to university disciplinary procedures. As listed in the *University Administrative Guidelines on Academic Integrity*, the University Online Catalog, and the Student Code of Conduct, the following are examples of prohibited conduct. This list is not designed to be all-inclusive or exhaustive. In addition to academic sanctions, any student found to have committed academic misconduct that is also a violation of criminal law may also be subject to disciplinary review and action by the Office of Student Conduct (as outlined in the Student Code of Conduct).

Forms of Academic Dishonesty:

1. Cheating: Deception in which a student misrepresents that he/she has mastered information on an academic exercise that he/she has not learned, giving or receiving aid unauthorized by the instructor on assignments or examinations. Examples: unauthorized use of notes for a test; using a "cheat sheet" on a quiz or exam; any alteration made on a graded test or exam which is then resubmitted to the teacher;
2. Plagiarism: Careless or deliberate use of the work or the ideas of another; representation of another's work, words, ideas, or data as your own without permission or appropriate acknowledgment. Examples: copying another's paper or answers, failure to identify information or essays from the internet and submitting or representing it as your own; submitting an assignment which has been partially or wholly done by another and claiming it as yours; not properly acknowledging a source which has been summarized or paraphrased in your work; failure to acknowledge the use of another's words with quotation marks;
3. Collusion: When more than one student or person contributes to a piece of work that is submitted as the work of an individual;
4. Conspiracy: Agreeing with one or more persons to commit an act of academic/scholastic dishonesty; and
5. Multiple Submission: Submission of work from one course to satisfy a requirement in another course without explicit permission. Example: using a paper prepared and graded for credit in one course to fulfill a requirement and receive credit in a different course.

Nonacademic Misconduct

The university respects the rights of instructors to teach and students to learn. Maintenance of these rights requires campus conditions that do not impede their exercise. Campus behavior that interferes with either (1) the instructor's ability to conduct the class, (2) the inability of other students to profit from the instructional program, or (3) campus behavior that interferes with the rights of others will not be tolerated. An individual engaging in such disruptive behavior may be subject to disciplinary action. The Office of Student Conduct will adjudicate such incidents under nonacademic procedures.

Sexual Misconduct

Sexual harassment of students and employees at Prairie View A&M University is unacceptable and will not be tolerated. Any member of the university community violating the university's sexual harassment policy will be subject to disciplinary action. In accordance with the Texas A&M University System guidelines, your instructor is obligated to report to the Office of Title IX Compliance (titleixteam@pvamu.edu) any instance of sexual misconduct involving a student, which includes sexual assault, stalking, dating violence, domestic violence, and sexual harassment, about which the instructor becomes aware during this course through writing, discussion, or personal disclosure. The faculty and staff of PVAMU actively strive to provide a learning, working, and living environment that promotes respect that is free from sexual misconduct, discrimination, and all forms of violence. If students, faculty, or staff would like assistance or have questions, they may contact the Title IX Coordinator at 936-261-2144 or titleixteam@pvamu.edu. More information can be found at www.pvamu.edu/titleix, including confidential resources available on campus.

Pregnancy, Pregnancy-related, and Parenting Accommodations

Title IX of the Education Amendments of 1972 prohibits sex discrimination, which includes discrimination based on pregnancy, marital status, or parental status. Students seeking accommodations related to pregnancy, pregnancy-related conditions, or parenting (reasonably immediate postpartum period) are encouraged to contact Student Disability Services or the Dean of Students' Office for additional information and to request accommodations.

Non-Discrimination Statement

Prairie View A&M University does not discriminate on the basis of race, color, sex, religion, national origin, age, disability, genetic information, veteran status, sexual orientation, or gender identity in its programs and activities. The University is committed to supporting students and complying with The Texas A&M University System non-discrimination policy. It seeks to establish an environment that is free of bias, discrimination, and harassment. If you experience an incident of discrimination or harassment, we encourage you to report it. If you would like to speak with someone who may be able to afford you privacy or confidentiality, there are individuals who can meet with you. The Director of Equal Opportunity & Diversity has been designated to handle inquiries regarding the non-discrimination policies and can be reached at Harrington Science Building, Suite 109 or by phone at 936-261-1744 or 1792.

Class Attendance Policy (See the University Online Catalog for Full Attendance Policy)

Prairie View A&M University requires regular class attendance. Attending all classes supports the full academic development of each learner, whether classes are taught with the instructor physically present or via distance learning technologies such as interactive video and/or the internet. Excessive absenteeism, whether excused or unexcused, may result in a student's course grade being reduced or in the assignment of a grade of "F." Absences are accumulated beginning with the first day of class during regular semesters and summer terms. Each faculty member will include the University's attendance policy in each course syllabus.

Student Academic Appeals Process

Authority and responsibility for assigning grades to students rest with the faculty. However, in those instances where students believe that miscommunication, errors, or unfairness of any kind may have adversely affected the instructor's assessment of their academic performance, the student has a right to appeal by the procedure listed in the University Online Catalog and by doing so within thirty days of receiving the grade or experiencing any other problematic academic event that prompted the complaint.

Technical Considerations

Minimum Recommended Hardware and Software:

- Intel PC or Laptop with Windows 10 or later version; Mac with OS High Sierra*
- Smartphone or iPad/Tablet with Wi-Fi*
- High-speed Internet access
- 8 GB Memory

- Hard drive with 320 GB storage space
- 15" monitor, 800x600, color or 16 bit
- Sound card w/speakers
- Microphone and recording software
- Keyboard & mouse
- Most current version of Google Chrome, Safari, or Firefox

Note: Be sure to enable Java & pop-ups in the Web browser preferences

* Smartphones, Google Chrome books, and Android tablets may not be supported. iPads are the only tablets supported.

Participants should have a basic proficiency of the following computer skills:

- Sending and receiving email
- A working knowledge of the Internet
- Microsoft Word (or a program convertible to Word)
- Acrobat PDF Reader
- Windows or Mac OS
- Video conferencing software

Netiquette (online etiquette)

Students are expected to participate in all discussions and virtual classroom chats as directed. Students are to be respectful and courteous to others on discussion boards. Foul or abusive language will not be tolerated. Do not use ALL CAPS for communicating to others AS IT CAN BE INTERPRETED AS YELLING. Avoid slang terms such as "wassup?" and texting abbreviations such as "u" instead of "you." Limit and possibly avoid the use of emoticons. Be cautious when using humor or sarcasm as tone is sometimes lost in an email or discussion post, and the message might be taken seriously or sound offensive.

Video Conferencing Etiquette

When using Zoom, WebEx, or other video conferencing tools, confirm the visible area is tidy, clear of background clutter, inappropriate or offensive posters, and other distractions. Ensure you dress appropriately and avoid using high traffic or noisy areas. Stay muted when you are not speaking and avoid eating/drinking during the session. Before the class session begins, test audio, video, and lighting to alleviate technology issues.

Technical Support

Students should go to <https://mypassword.pvamu.edu/> if they have password issues. The page will provide instructions for resetting passwords and contact information if login issues persist. For other technical questions regarding eCourses, call the Center for Instructional Innovation and Technology Services at 936-261-3283 or email ciits@pvamu.edu.

Communication Expectations and Standards

Emails or discussion postings will receive a response from the instructor, usually in less than 48 hours. Urgent emails should be marked as such. Check regularly for responses.

Discussion Requirement

Online courses often require minimal to no face-to-face meetings. However, conversations about the readings, lectures, materials, and other aspects of the course can occur in a seminar fashion. The use of the discussion board will accomplish this. The instructor will determine the exact use of discussion boards.

It is strongly suggested that students type their discussion postings in a word processing application such as Word and save it to their PC or a removable drive before posting to the discussion board. This is important for two reasons: 1) If for some reason your discussion responses are lost in your online course, you will have another copy; 2) Grammatical errors can be greatly minimized by the use of the spell-and-

grammar check functions in word processing applications. Once the post(s) have been typed and corrected in the word processing application, copy and paste to the discussion board.

COVID-19 Campus Safety Measures [NOTE: Delete this section when the COVID-19 pandemic is over]

To promote public safety and protect students, faculty, and staff during the coronavirus pandemic, PVAMU has adopted policies and practices to limit virus transmission.

- **Self-monitoring** - Students should follow CDC recommendations for self-monitoring. Students who have a fever or exhibit symptoms of COVID-19 should participate in class remotely and should not participate in face-to-face instruction.
- **Face Coverings** - Face coverings (cloth face covering, surgical mask, etc.) are recommended in classrooms, teaching laboratories, common spaces such as lobbies and hallways, public study spaces, libraries, academic resource, and support offices, and outdoor spaces where 6 feet of physical distancing is challenging to maintain reliably.
- **Physical Distancing** - Physical distancing should be maintained between students, instructors, and others in course and course-related activities where possible.
- **Personal Illness and Quarantine** - Students required to quarantine are to participate in courses and course-related activities remotely and must not attend face-to-face course activities. Students should notify their instructors of the quarantine requirement. Students under quarantine are expected to participate in courses and complete graded work unless they have symptoms that are too severe to participate in course activities. Students experiencing personal injury or illness that is too severe for the student to attend class qualify for an excused absence. To receive an excused absence, students must provide appropriate documentation to the Office for Student Conduct, studentconduct@pvamu.edu.

End of Semester Course Assessment Report

This summary contains the following Information

1. Performance Statistics

- Total number of students in class
- The class average performance (**stated as %**) in each course outcome assessed in this class and the **two previous times course was assessed**.
- The acceptable class average for the class in each outcome area as set by your Department. **You cannot use any number of your choice**
- Percentage of students who scored below the expected average in each outcome.

2. Implementation Summary

- Brief summary of plans implemented during the semester based on last assessment report

3. Perceived Problems

- Instructor's **critical evaluation** of perceived problems that affected students' performance. **Realistic problems should be identified throughout the semester and summarized in this section of the report.**

4. New Plans for Addressing Problems

- Instructor's plans for addressing the perceived problems the next time the class is taught. **These should be specific enough for another instructor to implement. Most of these should be things that, you, the instructor can implement to help students to improve. Be creative.**

5. Overall Trend over last three assessment periods

- Instructor's summary of overall performance trend for each outcome measured over the last three periods.

5. Were Expectations Met?

Answer **YES** if the **class average was above the expected average** and the **stated percentage of students** scored at or above the expected average, else answer **NO**.

END OF SEMESTER COURSE OUTCOME ASSESSMENT REPORT
ELEG 3304-P01 ELECTRONICS I (ELECTRICAL ENGINEERING MAJORS)
Fall 2021 SEMESTER

Report Prepared by: Dr. Mohan Ketkar

Report Date: December 17, 2021

Semester	Analysis Type	Number of Students	Outcome 6 Ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions			
			Expected Class Average/	Expected Percent of students at or above average	Class Average	% Students meeting Expected Average
Fall 2021	Direct	7	70	70	88.6	100
Spring 2021	Direct	21	70	70	80.2	85.7
Fall 2020	Direct	2	70	70	87.9	100
Spring 2020	Direct	24	70	70	82.7	91.7
Implementation Summary	Items implemented from previous report or after meeting previous instructor	Students designed circuits that meet desired specifications, create circuit for simulation, run simulation, and modify to ascertain that the specifications were met. In addition, the students wrote reports that have the following parts: (i) introduction, (ii) circuit design with calculations, (iii) experimental setup to simulate and test the designed circuit, (iv) conducting the experiment, (v) analysis and interpretation of simulation results, (vi) discussion of results, and (vii) conclusions.				
Perceived Problems	Perceived problems are directly related to the PC and the sub items under them	Some of the students did not follow the required format for writing the project report. This resulted in students writing reports without describing in detail the experimental setup and how the experiments were conducted. Due to this semester being online/off-campus, there were limitations for students to do physical experimentation.				
Plans for Addressing Problems	Plans for address specific measures to address PC and their sub areas	The following plans will be implemented the next time the course is taught: (a) Require all the students to follow the format for writing the design project report. The instructor will not accept project reports that do not have the required format that address all the parts of Outcome 6. (b) Emphasize to the students the importance of (i) describing the experimental setup for testing the designed circuit, (ii) the data collected, and analyzed, and (iii) interpretation of results. (c) Sample of a good report will be provided to help the students				
Overall Trend over Periods	Ascertain if there were improvements over previous semesters	The class average increased 8.4 points, higher than expected level				
Were Expectations Met?		YES				

Course Grades

	Student's Name	ABET outcome '6'
1		90
2		95
3		80
4		100
5		95
6		80
7		80
	Average	88.6
	% Above target of 70	100

**ELECTRICAL & COMPUTER ENGINEERING
OUTCOMES SPECIFIC ASSIGNMENT COVER SHEET**

ELEG3043 ELECTRONICS I

Fall 2021

Instructor: Dr. Mohan Ketkar

Title of Assignment

Analysis of Diode, MOSFET and BJT Circuits

Outcome Measured Using this Assignment

Outcome 6

An ability to develop and conduct appropriate experimentation, analyze, and interpret data, and use engineering judgment to draw conclusions.

Check the experimentation problem characteristics related to this assignment

X	Involves identifying the specific needs to be met by defining/understanding the problem and developing plans for the project to satisfy the need	
X	Involves conducting a review of the literature and performing preliminary design by generating alternative ideas/solutions and applying creativity	
X	Involves performing detailed engineering design leading to specification and fabrication/selection of components for system being designed.	
	Involves consideration of one or more of the following (Please check those involved in this assignment.)	
		Public health
	X	Safety and welfare
		Global factors
		Cultural factors
		Social factors
		Environmental factors
	X	Economic factors
	Involves fabrication and testing of model or prototype	

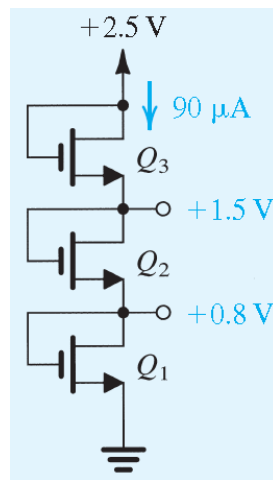
Brief justification of the suitability of assignment for the outcome

Students will select circuit configuration from the various circuits studied and expected performance. Implementation of Safety and protection features are required. Students will design the amplifier to meet given specifications. Utilize circuit simulation to evaluate performance such as power level, distortion, and frequency response. Students will also perform a sensitivity analysis

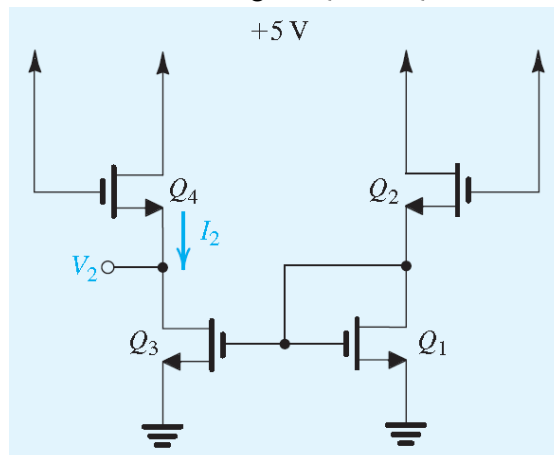
ELEG 3304 Fall 2021 Computer Simulation Assignment

In this assignment you have to solve the problem manually and verify using MultiSim. You will need to set the device parameters in MultiSim accordingly. Submit your report containing your calculations, schematic capture with measured voltage/currents using current and voltage meters. Finally, write conclusions for each circuit. You have to upload your report on Canvas and Taskstream by 11/23/2021 11.59pm. I expect few (2-4) pages for each circuit in your report.

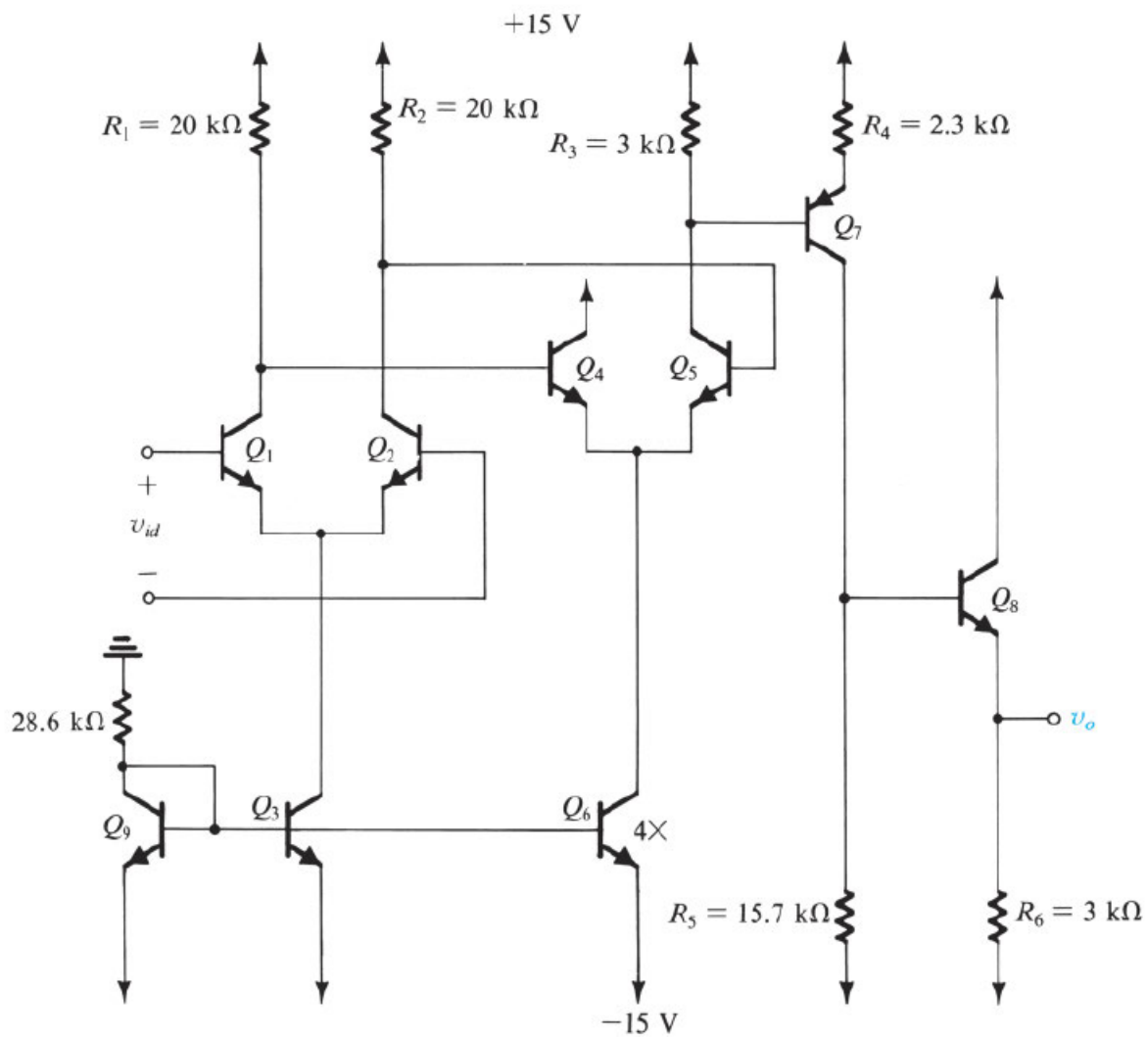
1. The NMOS transistor in the figure below have $V_t = 0.5 \text{ V}$, $\mu_n C_{ox} = 90 \mu\text{A}/\text{V}^2$, $\lambda = 0$, and $L_1 = L_2 = L_3 = 0.5 \mu\text{m}$. Find required values of gate width for each of Q_1 , Q_2 , and Q_3 to obtain the voltage and current values indicated.



2. For the circuit in the figure below, $V_t = 1.0 \text{ V}$, $\lambda = 0$, $\mu_n C_{ox} = 50 \mu\text{A}/\text{V}^2$, $L = 1 \mu\text{m}$, and $W = 10 \mu\text{m}$.
(a) Find V_2 and I_2 . (b) How do these values change if Q_3 and Q_4 are made to have $W = 100 \mu\text{m}$?



3. Perform DC analysis on following circuit. Assume V_{id} to be 0.0V and connected to ground. Run simulation and compare with your analysis results. Tabulate your results of voltages at each Collector and emitter. Use $\beta \gg 1$, $|V_{BE}| = 0.7$ V



GRADING SCHEME FOR ASSIGNMENT

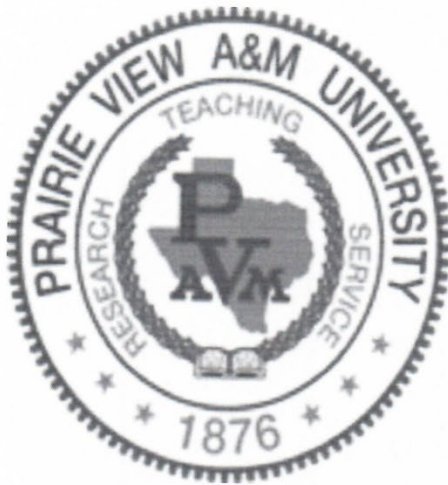
Ben Nguyen

Item	Points achieved	Maximum Points
1. Objectives and constraints - Plan of the project - Involve safety and economic features	25	30
2. Literature review and preliminary design Simulation results	5	5
3. Circuit design - Calculations and simulations - Include safety and economic considerations	15	15
4. Conduct experiments and/or simulation Collect data to show that your circuit meets the specifications	20	20
5. Analysis and interpretation of results - Present data in tabular form or graphical form. - Use of appropriate statistical method to analyze the results.	15	15
6. Discussion of results and Conclusions Draw appropriate conclusions	10	10
7. General write-up of report Grammar and adequacy of graphs and figures Proper labeling of graphs and figures Proper references	5	5
8. Composite Grade	95	100
9. Grade for Student Outcome 6 (Items #3, 4, 5, and 6)	60	60
10. Grade for Student Outcome 6 (Normalized to 100%)	100	100

**ELECTRICAL AND COMPUTER ENGINEERING DEPARTMENT
PRAIRIE VIEW A&M UNIVERSITY**

Excellent

95/100



ELEG 3304: Electronics I Lab
Fall 2021

Course Design

Prof. Mohan Ketkar

Ben Nguyen

Submitted on:
November 23rd, 2021

Circuit 1

Procedure

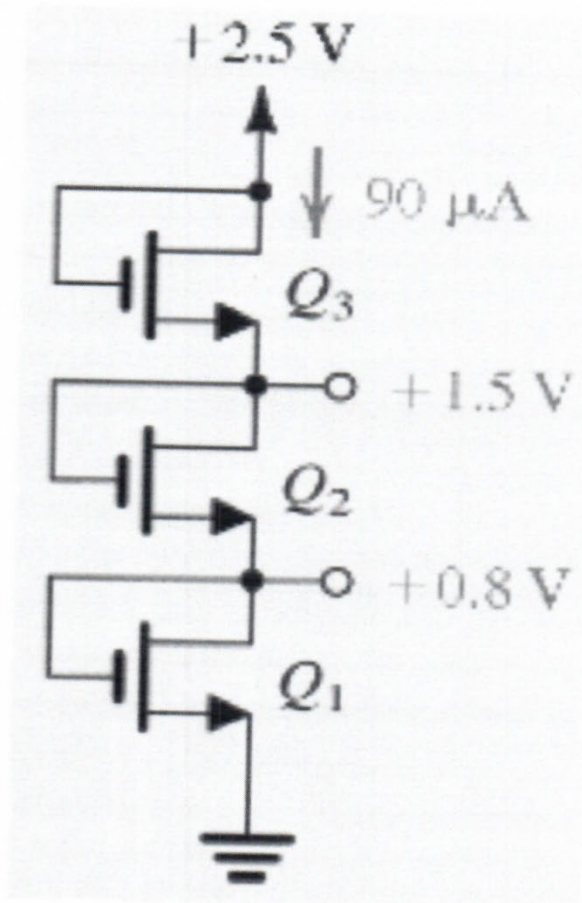
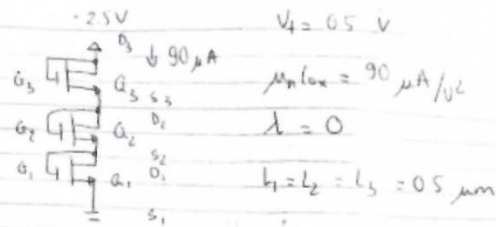


Figure 1: Circuit Schematic

Analyzing the circuit to determine the width of NMOS. Then, construct the circuit on Multisim to verify the calculation. ✓



$$V_{D3} = V_{G3} = 2.5V$$

$$V_{GS3} = V_{G3} - V_{S3} = 2.5 - 1.5 = 1V$$

$$I_D = \frac{1}{2} k_n' \frac{W_3}{L_3} \cdot (V_{GS3} - V_t)^2$$

$$\frac{I_D \cdot 2 \cdot L}{\mu_n C_{ox} \cdot W} = (V_{GS3} - V_t)^2 = W_3$$

$$= \frac{90 \times 10^{-6} \cdot 2 \cdot 0.5 \times 10^{-6}}{50 \times 10^{-6} \cdot (1 - 0.5)^2} = W_3 = 4 \mu m$$

$$V_{GS2} = V_{G2} - V_{S2} = 1.5 - 0.8 = 0.7V$$

$$I_D = \frac{1}{2} k_n' \frac{W_2}{L_2} \cdot (V_{GS2} - V_t)^2$$

$$\Rightarrow W_3 = \frac{I_D \cdot 2 \cdot L}{\mu_n C_{ox} \cdot (V_{GS2} - V_t)^2} = \frac{90 \times 10^{-6} \cdot 2 \cdot 0.5 \times 10^{-6}}{90 \times 10^{-6} \cdot (0.7 - 0.5)^2} = 25 \mu m$$

$$V_{GS1} = V_{G1} - V_{S1} = 0.8 - 0 = 0.8V$$

$$I_D = \frac{1}{2} k_n' \frac{W_1}{L_1} \cdot (V_{GS1} - V_t)^2$$

$$\Rightarrow W_1 = \frac{I_D \cdot 2 \cdot L_1}{\mu_n C_{ox} \cdot (V_{GS1} - V_t)^2} = \frac{90 \times 10^{-6} \cdot 2 \cdot 0.5 \times 10^{-6}}{90 \times 10^{-6} \cdot (0.8 - 0.5)^2} = 16.11 \mu m$$

Figure 2: Hand Calculation

Result

Table (i): Calculated Length Values

	Length
Q1	11.11 micrometer
Q2	25 micrometer
Q3	4 micrometer

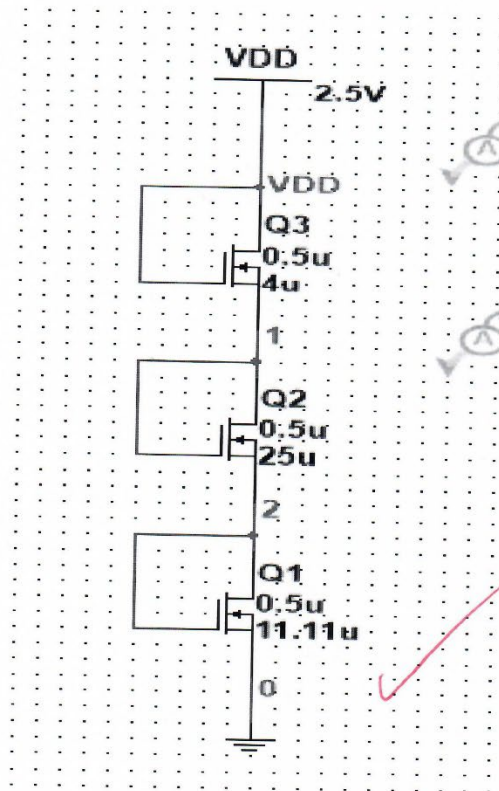


Figure 3: Multisim Circuit

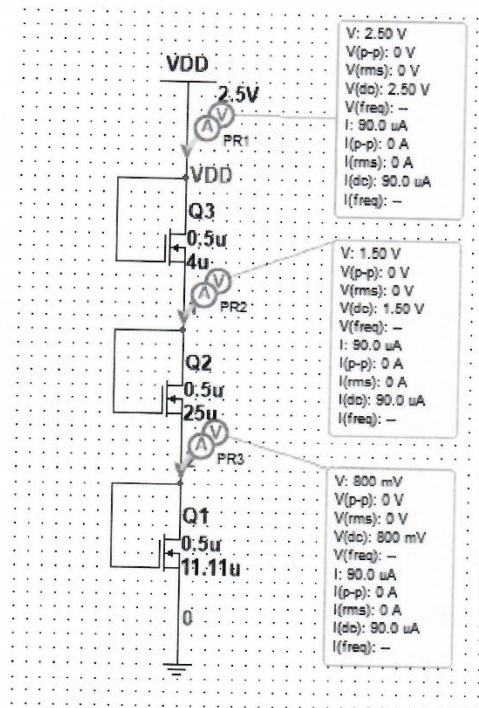


Figure 4: Measuring the Values

Table (ii): Measuring Values on Multisim

	Measured
V drain 3	2.50 V
V drain 2	1.50 V
V drain 1	800 mV

Conclusion and Discussion

The measuring values on Multisim showed to match exactly the desired values. The drain-voltage of Q3 was measured to be 2.50 V. The drain-voltage of Q2 was indicated to be 1.50 V. The drain-voltage of Q1 was shown to be 800 mV in Figure 4. Therefore, it confirmed that the analysis and calculating were done correctly.

Some issues were encountered during the simulating process on Multisim. The tough part was to pick the correct NMOS version and enter the correct parameters. The MOS_N was

chosen. Not only the length and width needed to be adjusted, but also the voltage threshold (VTO) and Kn values had to be changed. ✓

Circuit 2

Procedure

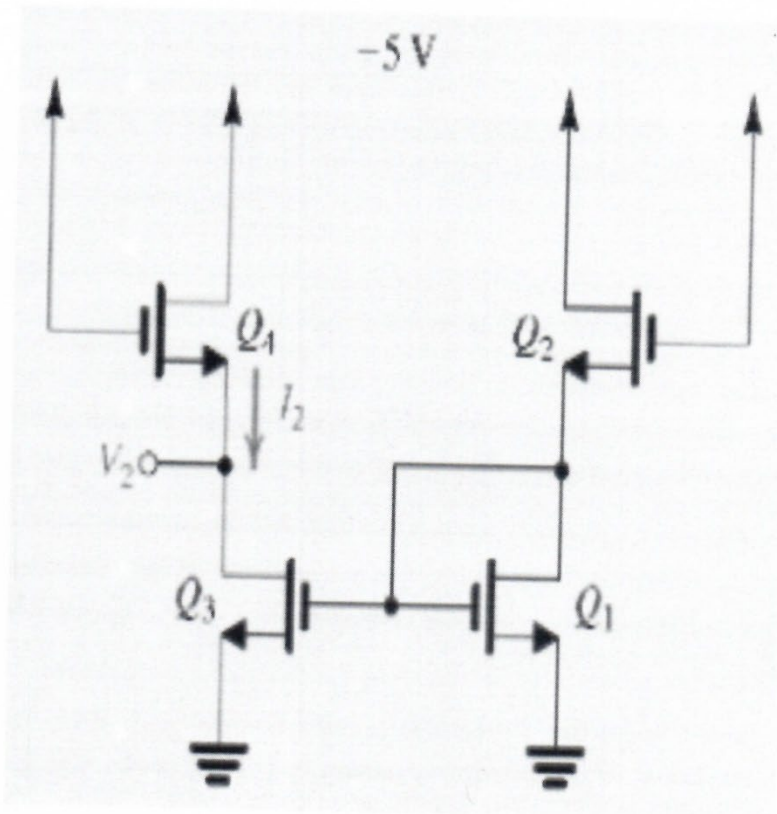


Figure 5: Circuit Schematic

After analyzing the circuit above in Figure, hand calculating the I_2 and V_2 . Then, simulating and measuring the circuit and values on Multisim to confirm. ✓

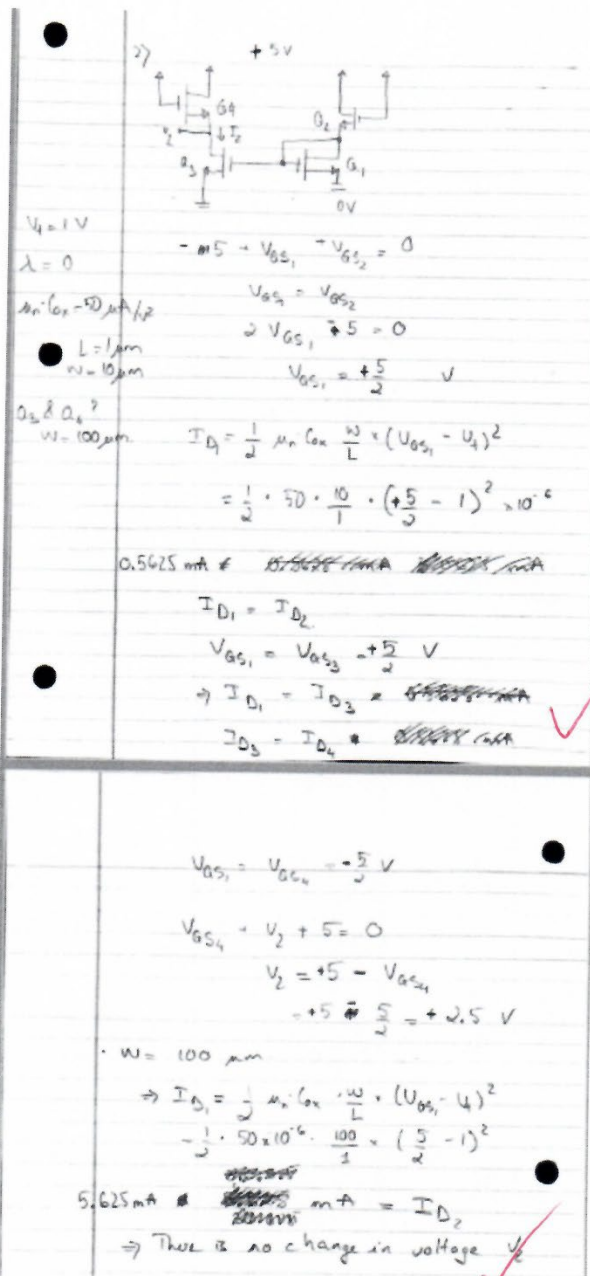


Figure 6: Hand Calculation

Result

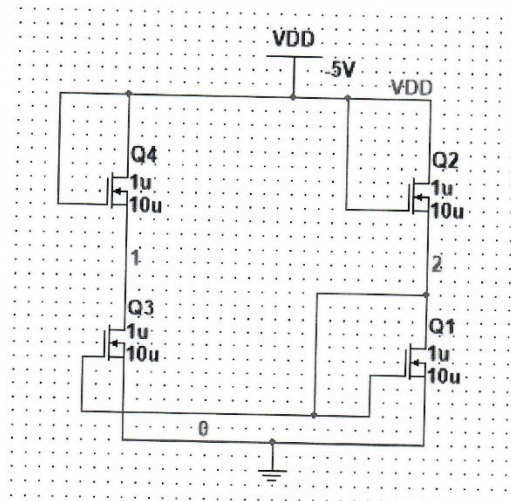


Figure 7: Multisim Circuit

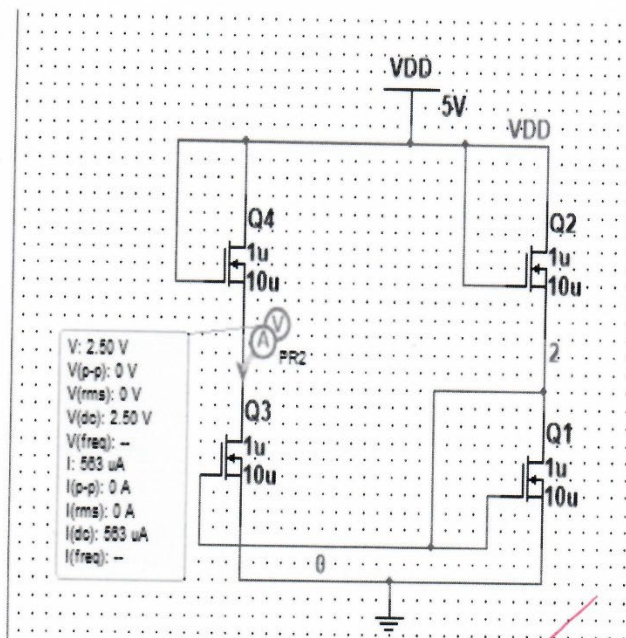


Figure 8: Measuring Voltage V2

Table (iii): Measured Values

	Measured Values
Drain current I_{d3} or I_2	563 microA
Drain voltage V_{d3} or V_2	2.50 V

Conclusion and Discussion

The gate-and-source voltages and drain currents of Q1 and Q2 were the same. The I_2 was calculated to be 0.5625 mA. On Multisim, the drain current of Q3 was measured to 563 microA which would be 0.563 mA. The reason could be rounding. However, the values were extremely close. V_2 was analyzed and determined to be 2.5 V. The drain-voltage of Q3 was measured to be 2.50 V on Multisim.

The calculating values were similar to measuring values. That confirmed the analysis and math were correct. Some issues were encountered during the simulation. As these problems were mentioned before. Picking the correct version of NMOS was the most difficult part. By consulting with the instructor, NMOS_N was chosen. The VTO or voltage threshold and K_n values needed to be adjusted accordingly to result in the correct numbers.

Circuit 3

Procedure

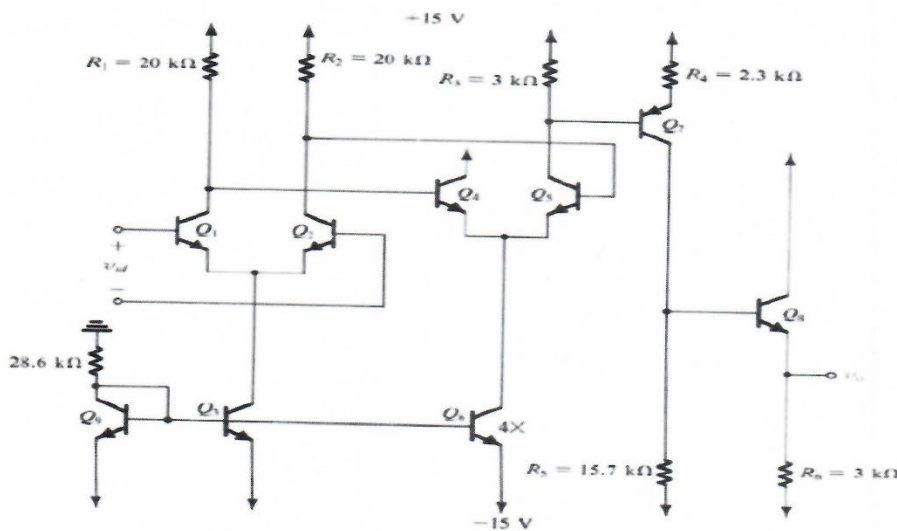


Figure 9: Circuit Schematic

Simulating the circuit in **Figure 9** above on Multisim and measuring all the collector and emitter from all the junctions.

Result

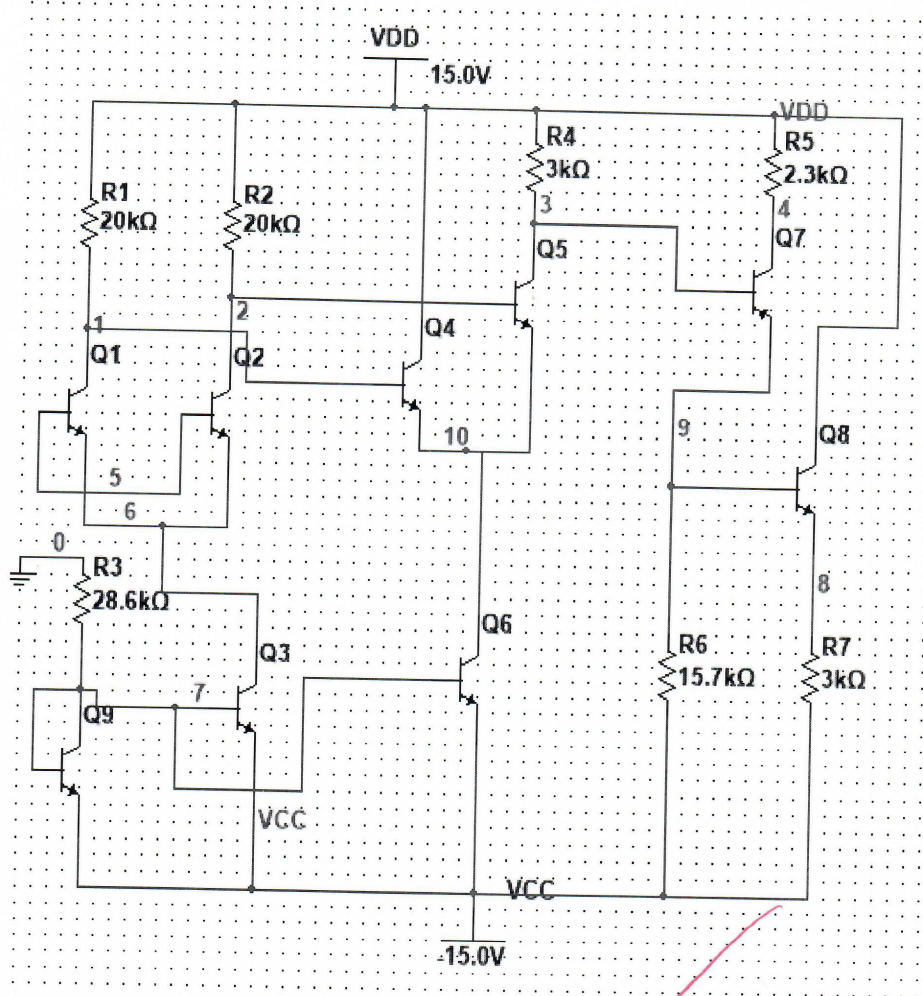


Figure 10: Multisim Circuit

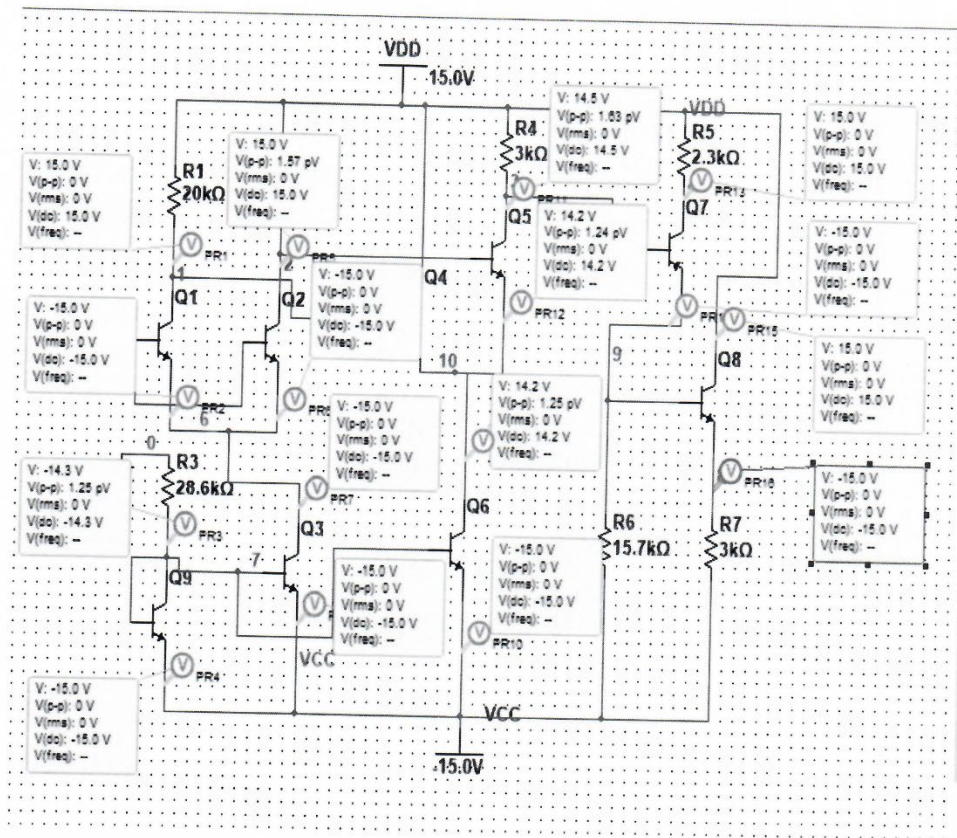


Figure 11: Measuring Voltages at Each Collector and Emitter

Table (iv): Measured Collector and Emitter Voltages

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
Vc (V)	15	15	- 15	15	14.5	14.2	-15	15	-14.3
Ve (V)	-15	-15	-15	14.2	14.2	-15	15	15	-15

Conclusion and Discussion

Since some material still needed to be covered in class, circuit analysis and hand calculating were not included for this circuit.

The circuit was constructed and simulated successfully on Multisim. The collector and emitter voltages for each junction were measured as shown in the Table (iv).

Excellent Report