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Please, click on the following link to access A&M-Commerce Covid 19 Information, https://new.tamuc.edu/coronavirus/

EE 321.001 ELECTRONICS II

3 (2, 2) [Credit Hours (Lecture, Lab)]

COURSE SYLLABUS: SPRING 2024

INSTRUCTOR INFORMATION

Instructor: Redha M. Radaydeh, PhD
Assistant Professor, Electrical Engineering
Department of Engineering and Technology
Office Location: AGIT 208.
Office Hours: Monday 10:00-12:50, Monday 14:15-15:15, Wednesday 14:15-15:15, or with appointment. Virtual meetings can be scheduled.
Office Phone: 903-886-5471
Office Fax: 903-886-5960
University Email Address: Redha.Radaydeh@tamuc.edu
Preferred Form of Communication: email.
Communication Response Time: within 24 hours (weekdays) to email.

COURSE INFORMATION

Class Meeting Schedule: Meets 1/10/2024 through 5/10/2024.
Class Meeting Dates: Weekly meetings; Monday and Wednesday 15:30-17:30.
Classroom: AGIT 214. Lectures will be given on campus. Labs will involve software simulations and hardware in AGET 214 Lab.
Course Format: This course contains lectures and Lab sessions. The Lectures will be conducted on Mondays and Lab sessions will be on Wednesdays.

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Materials – Textbooks, Readings, Supplementary Readings

Textbook Required:

- R. L. Boylestad and L. Nashelsky, Electronic devices and circuit theory, 11th Edition, Pearson Education, 2013. ISBN: 9780132622264

Laboratory Manual:

- R. L. Boylestad, L. Nashelsky, and F. J. Monssen, Lab Manual for Electronic Devices and Circuit Theory, 11th Edition, Pearson Education, 2013. ISBN: 9780132622455

Optional References:

- S. Sedra and K. C. Smith, Microelectronic Circuits, 7th Edition, Oxford University Press, 2014. ISBN: 9780199339136
- D. A. Neamen, Electronic Circuit Analysis and Design, 4th Edition, McGraw-Hill, 2010. ISBN: 9780073380643

Software Required:

- Microsoft Office - MS Word, Excel, PowerPoint
- Multisim (electronic circuits simulation program)

Course Description

This course is the second of two courses that cope with electronic devices in analog and digital circuits. The topics include FET biasing and FET amplifiers, frequency response analysis of BJT and FET, and the characteristics and applications of operational amplifiers (Op-Amps). The course also discusses the design features and operation principles of special-purpose amplifiers, in addition to selected topics on linear digital integrated circuits as well as feedback and oscillator circuits. The course has an associated Laboratory experiments set, which will require the use of simulation software (e.g. Multisim or PSpice) and hardware equipment.

Prerequisites: EE 320 with a minimum grade of C.

Learning Outcomes of Instruction:

1. Explain the structure and the mechanism of operation of FET and its use in amplifiers.
2. Acquire knowledge on DC and AC analysis of operational amplifiers and switching transistors.
3. Practice on the design and operation of feedback and oscillator electronic circuit configurations.
4. Validate equivalent circuit models of electronic devices for various applications.
5. Understand the basic principles of frequency response analysis of electronic devices.

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6. Design, analyze and interpret experiments on electronic amplifiers and integrated circuits.
7. Demonstrate the capacity to function in multi-disciplinary teams in Lab and class discussions.
8. Demonstrate oral and written communication skills through work discussions and class participations.
9. Use software and numerical techniques to solve assignments and Lab exercises.

COURSE REQUIREMENTS

Minimal Technical Skills Needed

- Microsoft Office - MS Word, Excel, PowerPoint
- Multisim (electronic circuits simulation program) and/or Spice (simulation program for integrated circuits emphasis).

Instructional Methods

The instructional methods will include lectures, discussions, assignments, problem solving, Lab reports and exercises, and simulations using software. Instructions will be based on the course textbook and on the Lab manual. Course materials, announcements, and lecture notes will be posted on the course website.

Student Responsibilities or Tips for Success in the Course

Student must attend classes, participate in class work and discussions, and perform required course assessments supporting the anticipated learning objectives, such as Lab experimentations. Students are expected to regularly log into the course website to downloads course material, submit their course works as instructed, and follow up on new announcements. This course covers advanced contents that requires at least 6 hours of study per week.

Lab Safety Training
Students registered for this course must complete required Lab safety training prior to entering the Lab and undertaking any activities. There are no exceptions to this University policy. Failure to complete the required training will preclude participation in Lab activities and assessments.

" *Texas A&M University-Commerce acknowledges that there are legitimate uses of Artificial Intelligence, ChatBots, or other software that has the capacity to generate text,*

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or suggest replacements for text beyond individual words, as determined by the instructor of the course.

Any use of such software must be documented. Any undocumented use of such software constitutes an instance of academic dishonesty (plagiarism).

Individual instructors may disallow entirely the use of such software for individual assignments or for the entire course. Students should be aware of such requirements and follow their instructors 'guidelines. If no instructions are provided the student should assume that the use of such software is disallowed.

In any case, students are fully responsible for the content of any assignment they submit, regardless of whether they used an AI, in any way. This specifically includes cases in which the AI plagiarized another text or misrepresented sources.

13.99.99.R0.03 Undergraduate Academic Dishonesty

13.99.99.R0.10 Graduate Student Academic Dishonesty "

GRADING

Final grades in this course will be based on the following scale:

A = 90%-100%
B = 80%-89%
C = 70%-79%
D = 60%-69%
F = 59% or Below

Assessments

The following assessments will be performed during this course to assess individual progress towards learning outcomes:

Assessment	Weight	Due time
HW Assignments	20 %	• Four assignments will be given each of 10% weight. • Extra credit may be given.
Midterm Exam	25 %	Week 9 • Closed book closed notes exam. • You can have one A4 paper sheet notes and write on both sides during the exam.

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		• Exam will be given during finals week. Optional course project can be considered to replace final exam upon instructor approval.
Final Exam (or course project)	25 %	Week 16 • Closed book closed notes exam. • You can have one A4 paper sheet notes and write on both sides during the exam. Exam will be given during class time.
Lab Work and Reports	30 %	• Weekly Labs and Biweekly reports • Students work in groups • Lab report will be due one week after finishing the Lab experiment

Relationship between Assessments and Course/Student Learning Outcomes

Learning Outcomes of Instruction	Assessment
1. Explain the structure and the mechanism of operation of FET and its use in amplifiers.	Homework
2. Acquire knowledge on DC and AC analysis of operational amplifiers and switching transistors.	Homework, Exams
3. Practice on the design and operation of feedback and oscillator electronic circuit configurations.	Lab Work
4. Validate equivalent circuit models of electronic devices for various applications.	Exams, Lab Work
5. Understand the basic principles of frequency response analysis of electronic devices.	Homework, Exams
6. Design, analyze and interpret experiments on electronic amplifiers and integrated circuits.	Exams, Lab Work
7. Demonstrate the capacity to function in multi-disciplinary teams in Lab and class discussions.	Lab Work
8. Demonstrate oral and written communication skills through work discussions and class participations.	Homework, Lab Work
9. Use software and numerical techniques to solve assignments and Lab exercises.	Homework, Lab Work

Exams

The two exams will be closed book & closed notes. Relevant scientific formulas will

be provided in supplementary sheet. The use of personal phone is strictly prohibited during exams. Student will need to bring a scientific calculator for exam. Makeup exam may be offered but an official permit for absence that fulfills University procedures should be available in a timely manner.

Assignments

Solutions should be submitted on the due date. Student will need to submit one solutions report per homework assignment. Solutions of an assignment will be due one week from the day it assigned. Unless prior arrangements are made with the instructor, no late submission of assignment solutions will be permitted. Some homework assignments may require the submission of simulation files created in Multisim. Any file that is flagged as infected with malware or viruses will not receive a grade.

Lab Work

Students will perform simulations and experiments of electronic circuits to study the main characteristics and practical applications of semiconductor electronic devices. They will learn about the JFETs and MOSFETS, and their characteristics and biasing conditions. They will also learn about the design and interpretation of electronic circuits, such as amplifiers, that use JFETs and MOSFETs in their design. Students will conduct experimental work to assess the frequency response analysis of BJT and FET amplifiers, and practice various applications of operational amplifiers as well as feedback electronic circuits. The hardware work will be supported by software simulation using Multisim or PSpice.

Additional guidelines for Lab work:

- Perform 6 extensive Lab experiments, where each of which will require 2 weeks of work to be performed in each lab. Experiments are listed in course outline below.
- Divide class into groups to do Lab work, with 3-4 students/group. Groups Lab management plan will follow the one shown below.
- Students are required to perform extensive simulations for each Lab experiment.
- Students will perform hardware work in the Lab.
- Each group will need to submit full report for each experiment.

Grading Policy for Lab Work:

Assessment	Weight	Due time
Lab Work & Reports	30%	Bi-Weekly 6 Lab reports

Lab circuits must be built during Lab on an empty breadboard. They may not be built prior to the Lab period. Each student will be provided with Breadboard and tools and will be responsible for maintaining and returning the supplies at the end of the

course. At the end of each Lab, you will be asked to demonstrate your functioning circuit to the Instructor.

Formal Lab reports should follow the same approach used in the Lab, which is a Hypothesis/Test sequence. In Pre-Lab, you will be asked to design a circuit to perform a specific function. During the Lab time you will build the circuit and collect test data to show how the circuit performance. The report, then, should be constructed as follows:

1. **Cover page**: Your Lab report cover page should include the following information:
    - Course name and title
    - Experiment number and title
    - Names of team members and their IDs
    - Instructor's name.
    - Date
2. **Objectives**: State clearly the objectives of the xperiment.
3. **Equipment required**: List all the equipment and components used in the experiments.
4. **Introduction:** Provide the necessary background to the problem that you are trying to solve in the Lab and the approach to solve it.
5. **Procedure:** Each part of the Lab experiment should explain the following**:**
    - Basic measurements and calculation
    - Explanation of the derived solution
    - Schematics developed that demonstrate the solution
6. **Results and Analysis**: Each part of Lab experiment should have the following:
    - Include tests used to prove the solution worked. One of the tests should be a Multisim simulation of your work. Include in your report a copy of the Multisim schematic.
    - Include drawing of the solution you built in Lab.
    - Analyze the measured data and produce necessary plots by using graphing program such as Excel and MATLAB.
    - State the observations made while performing the Lab and an explanation of your results.
7. **Conclusions:**
    - Describe what you did and learned from the Lab.
    - Explain at what degree the objectives of the Lab were achieved.
    - Describe possible real time applications from the work done in the Lab.

A Formal Lab report should enable someone else to duplicate your work and obtain the same results without reference to any other documents. This does not mean that you should append data sheets to your report but that the schematics and parts layout should be clear and accurate.

Submit the files containing the circuit simulation, a schematic, and data which explain

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the Lab results you obtained. Graphics must be created using a graphics program. Acceptable programs are Multisim, Visio, or similar graphics programs. Graphics in your Lab reports may not be hand-drawn.

Lab reports are due before Lab time one week after the Lab was performed. 10% per day will be deducted from the final Lab grade for each 24 hours or portion thereof that a Lab is late. Hardcopy of Lab reports are to be submitted to the instructor.

TECHNOLOGY REQUIREMENTS

LMS

All course sections offered by Texas A&M University-Commerce have a corresponding course shell in the myLeo Online Learning Management System (LMS). Below are technical requirements

LMS Requirements:
https://community.brightspace.com/s/article/Brightspace-Platform-Requirements

LMS Browser Support:
https://documentation.brightspace.com/EN/brightspace/requirements/all/browser_support.htm

YouSeeU Virtual Classroom Requirements:
https://support.youseeu.com/hc/en-us/articles/115007031107-Basic-System-Requirements

ACCESS AND NAVIGATION

You will need your campus-wide ID (CWID) and password to log into the course. If you do not know your CWID or have forgotten your password, contact the Center for IT Excellence (CITE) at 903.468.6000 or helpdesk@tamuc.edu**.**

Note: Personal computer and internet connection problems do not excuse the requirement to complete all course work in a timely and satisfactory manner. Each student needs to have a backup method to deal with these inevitable problems. These methods might include the availability of a backup PC at home or work, the temporary use of a computer at a friend's home, the local library, office service companies, Starbucks, a TAMUC campus open computer lab, etc.

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COMMUNICATION AND SUPPORT

If you have any questions or are having difficulties with the course material, please contact your Instructor.

Technical Support

If you are having technical difficulty with any part of Brightspace, please contact Brightspace Technical Support at 1-877-325-7778. Other support options can be found here:

https://community.brightspace.com/support/s/contactsupport

Interaction with Instructor Statement

Students are highly encouraged to participate in class activities, ask questions, and solve technical problems in class. They are also highly encouraged to work in groups during the Lab sessions, prepare full documentations of their Lab work, gain experience on software simulations and hardware work, and gain experience on team work, communication skills, and technical writing.

COURSE AND UNIVERSITY PROCEDURES/POLICIES

Course Specific Procedures/Policies

Syllabus Change Policy

The syllabus is a guide. Circumstances and events, such as student progress, may make it necessary for the instructor to modify the syllabus during the semester. Any changes made to the syllabus will be announced in advance.

University Specific Procedures

Student Conduct

All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment. The Code of Student Conduct is described in detail in the Student Guidebook.
http://www.tamuc.edu/Admissions/oneStopShop/undergraduateAdmissions/studentGuidebook.aspx

Students should also consult the Rules of Netiquette for more information regarding how to interact with students in an online forum:
https://www.britannica.com/topic/netiquette

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TAMUC Attendance

For more information about the attendance policy please visit the Attendance webpage and Procedure 13.99.99.R0.01.
http://www.tamuc.edu/admissions/registrar/generalInformation/attendance.aspx

http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/academic/13.99.99.R0.01.pdf

Academic Integrity

Students at Texas A&M University-Commerce are expected to maintain high standards of integrity and honesty in all of their scholastic work. For more details and the definition of academic dishonesty see the following procedures:

Undergraduate Academic Dishonesty 13.99.99.R0.03
Undergraduate Student Academic Dishonesty Form

http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/documents/13.99.99.R0.03UndergraduateStudentAcademicDishonestyForm.pdf

Graduate Student Academic Dishonesty Form

http://www.tamuc.edu/academics/graduateschool/faculty/GraduateStudentAcademicDishonestyFormold.pdf

http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/undergraduates/13.99.99.R0.03UndergraduateAcademicDishonesty.pdf

Students with Disabilities-- ADA Statement

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 have a disability requiring an accommodation, please contact:

Office of Student Disability Resources and Services
Texas A&M University-Commerce
Velma K. Waters Library Rm 162
Phone (903) 886-5150 or (903) 886-5835
Fax (903) 468-8148
Email: studentdisabilityservices@tamuc.edu
Website: Office of Student Disability Resources and Services

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http://www.tamuc.edu/campusLife/campusServices/studentDisabilityResourcesAndServices/

Nondiscrimination Notice

Texas A&M University-Commerce will comply in the classroom, and in online courses, with all federal and state laws prohibiting discrimination and related retaliation on the basis of race, color, religion, sex, national origin, disability, age, genetic information or veteran status. Further, an environment free from discrimination on the basis of sexual orientation, gender identity, or gender expression will be maintained.

Campus Concealed Carry Statement

Texas Senate Bill - 11 (Government Code 411.2031, et al.) authorizes the carrying of a concealed handgun in Texas A&M University-Commerce buildings only by persons who have been issued and are in possession of a Texas License to Carry a Handgun. Qualified law enforcement officers or those who are otherwise authorized to carry a concealed handgun in the State of Texas are also permitted to do so. Pursuant to Penal Code (PC) 46.035 and A&M-Commerce Rule 34.06.02.R1, license holders may not carry a concealed handgun in restricted locations.

For a list of locations, please refer to the Carrying Concealed Handguns On Campus document and/or consult your event organizer.

Web url:
http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/34SafetyOfEmployeesAndStudents/34.06.02.R1.pdf

Pursuant to PC 46.035, the open carrying of handguns is prohibited on all A&M-Commerce campuses. Report violations to the University Police Department at 903-886-5868 or 9-1-1.

A&M-Commerce Supports Students' Mental Health

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Department or Accrediting Agency Required Content

The Electrical Engineering program is in the process to obtain ABET accreditation. The course material, its expected deliverables, grading policy, organization, and expected learning outcomes are designed to meet the ABET requirements.

COURSE OUTLINE / CALENDAR

The instructor reserves the right to adjust the schedule to serve the needs of the class and any changes will be communicated in a timely manner.

Course schedule: The sequence of chapters follows the textbook.

Week	Topic	Chapter
1-3	Field-Effect Transistors	6
4-6	FET Biasing	7
7-9	FET Amplifiers	8
9	Midterm Exam	-
9-12	BJT and JFET Frequency Response	9
13-14	Operational Amplifiers	10
15	Op-Amp Applications	11
	Extra Study for Students May 1, 2, and 3	
16	Final Exam (during Finals week)	-

Lab schedule: The sequence of experiments follows the Lab manual.

Lab Experiments	Week
FET Characteristics (Meas. + Sim.)	2-3
FET DC Biasing (Meas. + Sim.)	4-5
FET Amplifiers (Meas. + Sim.)	6-7

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Frequency Response of Analog Amplifiers (Meas. + Sim.)	8-9
Operational Amplifiers (Meas. + Sim.)	10-11
Active Filers (Meas. + Sim.)	12-13