

The Counseling Center at East Texas A&M, located in the Halladay Building, Room 203, offers counseling services, educational programming, and connection to community resources for students. Students have 24/7 access to the Counseling Center's crisis assessment services by calling 903-886-5145. For more information regarding Counseling Center events and confidential services, please visit <https://www.etamu.edu/counseling-center/>



EE 220 02E CIRCUIT THEORY I

Section 2

3 (2:30, 2:30) [Credit Hours (Lecture, Lab)]

COURSE SYLLABUS: SPRING 2026

INSTRUCTOR INFORMATION

Instructor: Redha M. Radaydeh, PhD
Associate Professor, Electrical Engineering
Department of Engineering and Technology

Office Location: AGIT 208.

Office Hours: **Tuesday & Thursday** 1:00-2:00 pm, 4:30-5:15 pm, **Monday** 2:30-3:30 pm or with appointment. Virtual meetings can be also scheduled.

Office Phone: 903-886-5471

Office Fax: 903-886-5960

University Email Address: Redha.Radaydeh@etamu.edu

Preferred Form of Communication: email.

Communication Response Time: within 24 hours (weekdays) to email.

COURSE INFORMATION

Class Meeting Schedule: Meets 1/12/2025 through 5/8/2025

Class Meeting Dates: Weekly meetings; EE 220 01E Monday & Wednesday 3:30 pm-6:00 pm.

Classroom: Building: AGET, Room: 214. Lectures will be given on campus. Labs will consist of 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

Reference:

- J. W. Nilsson and S. Riedel, *Electric Circuits*, 12th Edition, 2023, Pearson, ISBN-13: 9780137648375 (11th Edition ISBN-13: 978-0134746968).

Laboratory Manual Reference:

- R. L. Boylestad and G. Kousourou, *Laboratory Manual for Introductory Circuit Analysis*, 13th Edition, 2016, Pearson, ISBN-13: 978-0133923780.

Optional References:

- C. Alexander and M. Sadiku, *Fundamentals of Electric Circuits*, 6th Edition, 2106, McGraw-Hill Education, ISBN-13: 978-0078028229.

Software Required:

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

Course Description

This course introduces the theory and principles of DC/AC circuit analysis. Topics include electrical circuit laws, network theorems, operational amplifiers, RLC networks, topology of electrical networks, sinusoidal steady-state analysis, AC power analysis, multiphase circuits, magnetically coupled circuits, transformer, and introduction to frequency domain analysis. The course has an associated Laboratory experiments set, which will require the use of simulation software (e.g. Multisim and PSpice) and hardware equipment.

Prerequisites: PHYS 2426 with a minimum grade of C. **Corequisites:** MATH 2320.

Learning Outcomes of Instruction:

1. Determine parameters such as node voltages, branch currents, and electric power in electric circuits using Ohm's law and Kirchhoff's current and voltage laws.
2. Analyze AC and DC circuit using mesh analysis, nodal analysis, superposition, Thevenin, Norton, and source transformation techniques.
3. Determine natural and step responses of RC, RL, and RLC circuits.
4. Identify appropriate circuit analysis techniques for analyzing DC/AC circuits.
5. Design and analyze op-amp circuits.
6. Analyze AC circuits using the frequency domain approach.

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7. Calculate AC powers in ac circuits.
8. Use appropriate software tools PSpice/ Multisim for AC/DC Circuits analysis.
9. Use Laboratory instruments such as multimeters, oscilloscope, function generators, power supplies, etc.
10. Perform experiments to validate the fundamentals of electric circuit theory.

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, 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 download course material, submit their course works as instructed, and follow up on new announcements. This course covers fundamental topics for EE students, and it requires at least 6 hours of extensive study per week.

Attendance Policy

Class Attendance Requirement (one lateness = 1/2 absence)

# of Absences	0 – 3	4	5	6	7	>7
Point Deduction	0	- 2	- 4	- 10	- 30	F

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.

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

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Assessment	Weight	Due time
Midterm Exam	25%	<p>Week 8-9</p> <ul style="list-style-type: none"> • 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.
Final Exam	25%	<p>Week 16</p> <ul style="list-style-type: none"> • 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 finals week. • Optional course project can be considered to replace final exam with instructor approval.
Assignments	20%	<p>Weeks 3, 6, 10, 13</p> <ul style="list-style-type: none"> • HW submission will be due one week after it is assigned, • Students will work individually on HW assignments. • Submit individual HW solutions.
Lab Work	30%	<ul style="list-style-type: none"> • Weekly Labs • Total of 6 extensive Lab experiments will be performed in hardware and simulation. • Bi-Weekly Lab Reports for the Lab experiments. • Students will work in groups.

Relationship between Assessments and Course/Student Learning Outcomes

Learning Outcomes of Instruction	Assessment
1. Determine parameters such as node voltages, branch currents, and electric power in electric circuit using Ohm's law, Kirchhoff's current and voltage laws.	Exams
2. Analyze AC and DC circuit using mesh analysis, nodal analysis, superposition, Thevenin, Norton, and source transformation techniques.	Exams

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3. Determine natural and step responses of RC, RL, and RLC circuits.	Lab Work
4. Identify the most appropriate circuit analysis techniques for analyzing DC/AC circuits.	Exams
5. Design and analyze op-amp circuits.	Lab Work
6. Analyze AC circuits using frequency domain approach.	Exams, Lab Work
7. Calculate AC powers in ac circuits.	Lab Work
8. Use appropriate software tools PSpice/ Multisim for AC/DC Circuits analysis.	Lab Work
9. Use Laboratory instruments such as multimeters, oscilloscope, function generators, power supplies, etc.	Lab Work
10. Perform experiments to validate the fundamentals of electric circuit theory.	Lab Work

Exams

The 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 solution 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 experiments to verify practically the theories and fundamental concepts of DC and AC electric circuits. They will analyze various electric circuit networks to measure circuit parameters such as AC and DC voltages, currents, power, energy, etc. They will acquire the practical skills in building electric circuits that contain discrete

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components such as resistors, capacitors, inductors, etc. This lab will also provide students with experience in using basic measurement devices and equipment available in the electric circuit laboratory and software simulation using Multisim and/or PSpice. There will be 6 Lab exercises distributed over the semester and Lab exams. Students will work in teams.

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. This a compulsory requirement.
- Students can voluntarily come to the Labs to perform hardware if they want to do so. This is a voluntarily work.
- 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 Reports

Pre-Labs must be completed prior to coming to Lab. Students will be turned away from the Lab if the Pre-Lab is not complete.

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 experiment.

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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 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 as hardcopy 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.

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TECHNOLOGY REQUIREMENTS

LMS

All course sections offered by East Texas A&M 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@etamu.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 ETAMU campus open computer lab, etc.

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>

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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.etamu.edu/Admissions/oneStopShop/undergraduateAdmissions/studentGuidebook.aspx).
<http://www.etamu.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>

ETAMU Attendance

For more information about the attendance policy please visit the [Attendance](#) webpage and [Procedure 13.99.99.R0.01](#).
<http://www.etamu.edu/admissions/registrar/generalInformation/attendance.aspx>

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

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Academic Integrity

Students at East Texas A&M 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.etamu.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/documents/13.99.99.R0.03UndergraduateStudentAcademicDishonestyForm.pdf>

[Graduate Student Academic Dishonesty Form](#)

<http://www.etamu.edu/academics/graduateschool/faculty/GraduateStudentAcademicDishonestyFormold.pdf>

<http://www.etamu.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

East Texas A&M

Velma K. Waters Library Rm 162

Phone (903) 886-5150 or (903) 886-5835

Fax (903) 468-8148

Email: studentdisabilityservices@etamu.edu

Website: [Office of Student Disability Resources and Services](#)

<http://www.etamu.edu/campusLife/campusServices/studentDisabilityResourcesAndServices/>

Nondiscrimination Notice

East Texas A&M 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.

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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 East Texas A&M 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 East Texas A&M 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.etamu.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/34SafetyOfEmployeesAndStudents/34.06.02.R1.pdf>

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

East Texas A&M 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.

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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	Circuit Variables	1
2	Circuit Elements	2
3	Simple Resistive Circuits	3
3	HW 1	-
4-6	Techniques of Circuit Analysis	4
6	HW 2	-
7	The Operational Amplifier	5
8-9	Inductance, Capacitance, and Mutual Inductance	6
8-9	Midterm Exam	-
10-11	Response of First-Order RL and RC Circuits	7
10	HW 3	-
12-13	RLC Circuits	8
13	HW 4	
14-15	AC Sinusoidal Steady-State Analysis	9
16	Final Exam	-

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

Lab Exercises	Week
Circuit Theory Laws	2-3
Series-Parallel DC Circuits	4-5
Superposition Theorem (DC)	6-7
Thevenin's Theorem and Maximum Power Transfer	8-9
<i>R-C, R-L and R-L-C</i> Circuits with a DC Source Voltage	10-11
AC Sinusoidal Circuits Analysis	12-13

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