EE 309: Circuit Theory II

Section 01E: Course Syllabus, Fall 2024

Rev 3, 10/28/2024

INSTRUCTOR INFORMATION

Instructor	Gerald L. Fudge, PhD
Office Location	AG/ET 217
Office Hours	Wednesday (9:00 am – 11:30 am) Friday (9:00 – 11:00 am, 1:00 pm – 2:00 pm)
Phone	Office: 903-468-8122
Office Fax	903-886-5960 (Inform instructor if fax is sent)
University Email Address	Gerald.Fudge@tamuc.edu
Preferred Form of Communication	Email, or per class discussion
Communication Response Time	Typically within 48 hours on weekdays for email

COURSE INFORMATION

Class Meeting Schedule	See schedule at end of syllabus
Class Meeting Dates	Monday / Wednesday 12:30 pm – 1:45 pm
Classroom	AG/ET 214
Textbook(s) Required	Electric Circuits, 11th ed., by James W. Nilsson and Susan Riedel, ISBN 9780134746968
Software Required	Matlab or Python (available on student computers)

The syllabus/schedule are subject to change

COURSE DESCRIPTION

This course is the second of two courses that addresses DC and AC circuit analysis. The topics include AC circuit analysis techniques, AC power concepts, polyphaser circuits, magnetically coupled circuits, application of Laplace transform in circuit analysis, bode plots, passive filters, and two-port networks. 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**: EE 220 with a minimum grade of C.

Student Learning Outcomes

Upon successful completion of this course, students will achieve the following learning outcomes:

- Understand Laplace transform, including basic transform rules, derivation of basic transform pairs, inverse transform from s-domain to time-domain using partial fraction expansion.
- Be able to draw s-domain equivalent for RLC circuits and solve using KVL and KCL in the s-domain and transform back to the time domain.
- Know how to draw the s-domain and phasor frequency domain equivalent for sinusoidal steady state analysis of RLC circuits, and solve using KVL and KCL in the phasor frequency domain.
- Know how to analyze magnetically coupled circuits with self and mutual inductance using Laplace.
- Define and calculate RLC circuit transfer functions, and calculate poles & zeros, and understand their significance.
- Understand low pass, high pass, bandpass, and band reject filter concepts.
- Be able to use the Fourier transform to analyze RLC filter circuits and be able to plot the response in Matlab as a function of frequency (i.e., Bode plot, whether log or linear frequency scale).
- Define and calculate instantaneous, average, and reactive power; calculate the power factor for a given load; calculate RMS power.
- Be able to calculate values in decibels (dB).
- Be familiar with two port network analysis.
- Be familiar with balanced three phase circuits.
- Be able to use software tools such as Matlab, Python, LTSpice, etc. to simulate and analyze circuits.

COURSE REQUIREMENTS

Minimal Technical Skills Needed

Students must be able to access the Internet, use the D2L learning management system, and use Microsoft Office tools (PowerPoint). Proficiency with circuit analysis techniques and tools covered in EE 220 is assumed. Student need to have proficiency in using a scientific calculator.

Instructional Methods

The instructional methods in this course include lectures, class discussion and participation, informal quizzes, homework assignments, project, and exams. In addition, some of the principles will be illustrated via Matlab demonstrations and in-class student Matlab exercises.

Student Responsibilities or Tips for Success in the Course

- **Attendance & Participation**: For optimum learning and grades, students need to attend class and participate; note that attendance and participation is a graded component.

- **Homework Assignments**: Working through example problems is a critical component to learning. The homework sets will include review problems in addition to problems illustrating new material. Homework will be due approximately once per week. Late work may be penalized, including a grade of zero, unless student has an acceptable excuse proven by a doctor's note or other legal documentation. Students are encouraged to collaborate on homework, but must turn in their own work.
- **Project**: Design and build a simple RLC filter circuit or simple control system, then analyze using the Fourier and/or Laplace transform, and compare theory to measurements.
- **Soft-Copy Report Formats**: Students shall submit assignments either in class or in the assigned drop boxes on D2L (directions will be provided in class). If problems are encountered using D2L, then email may be used as a backup with instructor permission. PDF is preferred format except for code.
- **Collaboration**: Students may collaborate on homework, but must turn in their own homework.
- **Exams**: The exams, unless otherwise noted, will be closed book & closed notes. Student will need to bring a scientific calculator for quizzes and exams. The use of a personal phone is strictly prohibited during exams. A makeup exam may be offered but an official permit for absence that fulfills University procedures must be provided to the instructor in timely manner.
- **Quizzes**: Quizzes will be used to assess problem solving skills and provide student feedback. Student should bring a scientific calculator to class for quizzes.
- **Use of Artificial Intelligence (AI) Tools**: Except as specified, AI tools, ChatBots, and other software that has the capacity to generate code or closed form solutions is prohibited. Any use of such software must be documented. Any undocumented use of such software constitutes an instance of academic dishonesty (plagiarism).

GRADING

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

A	B	C	D	F
100 - 90	89 - 80	79 - 70	69 - 60	59 – 0

Overall grades will be based on a weighted average as shown below:

Assessment Type	**Percent**
Participation and Attendance	10
Homework	25
Project	15
Quizzes	10
Exams	40
Total	**100**

Note: There may also be opportunities for bonus points; these will be discussed in class.

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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

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.

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

Use email, mobile, and office hours as presented under instructor information.

COURSE AND UNIVERSITY PROCEDURES/POLICIES

Course Specific Procedures/Policies

As described above, student attendance and participation are required for this class.

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

TAMUC Attendance

For more information about the attendance policy please visit the Attendance webpage and Procedure 13.99.99.R0.01, and

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

The Counseling Center at A&M-Commerce, 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 www.tamuc.edu/counsel

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.

COURSE OUTLINE / CALENDAR

Week	Days		Unit/Topic	Notes
	M	W		
1	8/26	8/28	W1: Course overview; Laplace & Fourier Theory	
2	9/2	9/4	W2: Laplace theory & application	**9-2: Holiday**
3	9/9	9/11	W3: Laplace theory & application	**9-11: Census Day**
4	9/16	9/18	W4: Laplace theory & application; phasors & DFT	
5	9/23	9/25	W5: DFT, Convolution & filtering, mutual inductance	
6	9/30	10/2	W6: More FT, filter response, Bode plots, using dB	
7	10/7	10/9	W7: Review; Fourier transform principles	
8	10/14	10/16	W8: Wrap up FT, filter response; **Exam 1**	**Exam 1**
9	10/21	10/23	W9: AC steady state with phasors & complex power	
10	10/28	10/30	W10: Practice review, complex power, filters	
11	11/4	11/6	W11: More practice review, op-amp active filters	
12	11/11	11/13	W12: Source transform, active filters, 3-phase	
13	11/18	11/20	W13: 3-phase, Requirements, NyFR (if time)	**Exam 2 (take-home)**
14	11/25	11/27	W14: Fourier application: Communications	
15	12/2	12/4	W15: Laplace applications: Controls; project demos	**Project demos**
16			Final:	**Final Exam**
Notes: 1. Specific dates are subject to change				

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