



Official TCC Course Syllabus

Discipline Prefix: EGR	Course Number: 272	Course Title: Circuit Theory II	
	Course Section: D01B		
Credit Hours: 3	Lecture Hours: 3	Clinical Hours:	Lab Hours: 0
Contact Hours: 3	Studio Hours:	Semester: Fall 2019	
Meeting Days/Time/Location: Mondays & Wednesdays, 9:30 – 10:45 am, Room H-164, Virginia Beach Campus			

Instructor Information

Name: Paul Gordy

Office Location: H-115, Advanced Technology Center, Virginia Beach Campus

Office Hours: See schedule on Blackboard

Email: PGordy@tcc.edu Phone: 822-7175

Course Website: <http://faculty.tcc.edu/pgordy/>

Blackboard site: <http://learn.vccs.edu>

Course Information

Course Description

EGR 272 is a study of time and frequency domain representation of linear systems, analysis of first- and second-order circuits using differential equations, AC circuit analysis, transformers, Laplace transforms and the analysis of circuits using Laplace transforms, transfer functions, frequency response, and filters. A significant use of MATLAB and the PSPICE circuit analysis program is included.

Prerequisites and/or Co-requisites

Pre-requisites: MTH 279 and EGR 271

Co-requisite: none

General Education Core Competencies Supported by this Course

After completion of this course, students will be able to:

Critical Thinking

A competent critical thinker evaluates evidence carefully and applies reasoning to decide what to believe and how to act.

Quantitative Literacy

Quantitative Literacy is the ability to perform accurate calculations, interpret quantitative information, apply and analyze relevant numerical data, and use results to support conclusions. Degree graduates will calculate, interpret, and use numerical and quantitative information in a variety of settings.

Written Communication

A competent written communicator can use writing to communicate with others, resulting in understanding and being understood.

Required Course Texts and Supplementary Materials

1. Lecture Notes/PowerPoint Presentations - This is the primary source of information for this course. Material covered in lecture may not be found in the textbook. Students should print the PowerPoint presentations prior to class and use them to take notes as the presentations leave space for problems solved in class. If any lectures are missed, the student should try to copy the notes from another student.
2. Textbook - The primary textbook required for this course is ***Electric Circuits, 10th Edition***, by Nilsson (ISBN: 9780134209166). This textbook includes a PSPICE supplement and an access code for Mastering Engineering (online homework system). If you took EGR 271 last semester and used Mastering Engineering, your access code may still be valid.
3. Calculator – It is recommended that each student have one of the following calculators: TI-89, TI-nspire CX CAS (be sure that it is the CAS model), or HP Prime. These calculators have many advanced features that are especially useful in the electrical engineering courses. If you choose not to buy one of these calculators, you may be at a disadvantage to other students on a test.

Course Learning Outcomes

1. Analyze first- and second-order circuits using differential equations.
2. Analyze AC circuits using complex numbers and phasor analysis.
3. Perform power calculations in AC circuits.
4. Analyze AC circuits including transformers.
5. Determine Laplace and inverse Laplace transforms of a wide variety of functions
6. Solve differential equations using Laplace transforms
7. Perform frequency domain analysis of circuits using Laplace transforms
8. Determine transfer functions and frequency response for various types of circuits
9. Graph Bode plots for various transfer functions
10. Analyze and characterize filter circuits
11. Use PSPICE to analyze various types of electric circuits
12. Use MATLAB perform calculations and analyses related to electric circuits

Topics Covered in the Course

- AC Circuit Analysis
 - A. Phasor analysis
 - B. AC power calculations
 - C. Power factor correction
 - D. Transformers
- Introduction to Laplace Transforms
 - A. Laplace transform definition
 - B. Transform properties
 - C. Inverse transforms - Partial Fraction Expansion
 - D. Solution of differential equations
- Laplace Transform Analysis of Circuits
 - A. Laplace Transform Solution of Circuit Equations
 - B. The Laplace-transformed circuit
 - C. Network reduction techniques
 - D. Formulation of circuit equations
 - E. Transfer functions
 - F. Impulse response and unit step response
- Frequency Response
 - A. Transfer functions and frequency response
 - B. Magnitude response, log-magnitude response, and phase response
 - C. Filters forms
 - D. Impedance scaling and frequency scaling

Course Schedule

The following course schedule may change due to the progression of the course. The course schedule may change at the discretion of the instructor; however, students will be notified in writing when any changes/additions are made to the schedule.

Tentative Course Outline/Schedule

Date	Topic(s)	Text and PowerPoint	Homework
			<ul style="list-style-type: none"> All Mastering Engineering assignments (HW) due by midnight All PSPICE and MATLAB due at start of class
M, 8-19	First-order circuits	Ch. 7	
W, 8-21	First-order circuits	Ch. 7	
M, 8-26	First-order circuits. Unit step functions. Unit step response.	Ch. 7	Intro to Mastering Engineering due
W, 8-28	Second-order circuits	Ch. 8	EGR 271 Review Assignment due (Mastering Engineering)
M, 9-2	TCC Closed (Labor Day)		
W, 9-4	Second-order circuits	Ch. 8	HW #1 (Ch. 7) due
M, 9-9	Second-order circuits MATLAB Lecture – Differential equations	MATLAB Lecture #1	
W, 9-11	Review of complex numbers and sinusoids. PSPICE Lecture #1 – Transient analysis Test #1 (Chapters 7-8) – Take-home test due in one week	Ch. 9	HW #2 (Ch. 8) due
M, 9-16	AC circuit analysis using phasors	Ch. 9	
W, 9-18	Application of DC analysis techniques to AC circuits	Ch. 9	Test #1 due
M, 9-23	Application of DC analysis techniques to AC circuits	Ch. 9	MATLAB Assignment #1 due
W, 9-25	Transformers.	Ch. 9	PSPICE Assignment #1 due
M, 9-30	MATLAB Lecture – Complex Numbers Power calculations in AC circuits (instantaneous, complex, real, and reactive power). Power factor.	Ch. 10	HW #3 (Ch. 9) due
W, 10-2	PSPICE Lecture #2 – AC Sweep Power calculations in AC circuits (instantaneous, complex, real, and reactive power). Power factor.	Ch. 12	Extra Ch. 9 problems due (turn in during class)
M, 10-7	Power factor correction.	Ch. 12	
W, 10-9	Laplace transforms. Integral definition. Convergence. Laplace transform properties.		
M, 10-14	Laplace transform properties. Impulse (dirac delta) function. Laplace transforms of graphical functions.	Ch. 12	MATLAB Assignment #2 due
W, 10-16	Inverse Laplace transforms. Partial Fraction Expansion (PFE).	Ch. 12	HW #4 (Ch. 10) due
M, 10-21	Inverse Laplace transforms. Complex roots using quadratic factors and complex linear roots.	Ch. 13	PSPICE Assignment #2 due
W, 10-23	Test #2 (Chapters 9-10)		

M, 10-28	Using Laplace transforms to solve differential equations. Development of s-domain models.	Ch. 13	HW #5 (Ch. 12A) due
W, 10-30	Analysis of circuits using Laplace transforms.	Ch. 13	
M, 11-4	Analysis of circuits using Laplace transforms. Transfer functions. Unit step response and impulse response. MATLAB Lectures – Laplace transforms, inverse Laplace transforms, circuit analysis using Laplace transforms	Ch. 13	HW #6 (Ch. 12B) due
W, 11-6	Frequency response. Determining magnitude, phase, and log-magnitude responses for circuits.	Ch. 14	
M, 11-11	Frequency response	Ch. 14	HW #7 (Ch. 13) due
W, 11-13	Frequency response. Bode plots	Ch-15 Appendix E	MATLAB Assignment #3 due
M, 11-18	Test #3 (Chapters 12-13)		
W, 11-20	Bode plots. Frequency response using Excel/MATLAB	Ch-15 Appendix E	HW #8 (Ch. 14) due
M, 11-25	Bode plots PSPICE Lecture #3 – Frequency response. MATLAB Lecture – Frequency response.	Ch-15 Appendix E	
W, 11-27	TCC Closed (Thanksgiving break)		
M, 12-2	Bode plots. Test #4 (Chapters 14-15) – Take-home test due in one week.	Ch. 15	HW #9 (Ch. 15) due Extra Ch.14-15 problems due (turn in during class)
W, 12-4	Active filters. Frequency- and impedance-scaling.	Ch. 15	PSPICE Assignment #3 due MATLAB #4 due
M, 12-9	Final Exam Test #4 due at beginning of class		Test #4 due

Description of Assignments/Assessments

Homework Assignments – Most homework assignments in this course will be done through Mastering Engineering (www.masteringengineering.com). You must purchase a textbook that includes an online access code for Mastering Engineering or else you can purchase an online access code separately. No homework will be accepted other than through Mastering Engineering unless otherwise indicated by the instructor.

Mastering Engineering Course Number for Fall 2019: MEGORDYEGR272FA19

PSPICE Assignments – PSPICE is powerful circuit analysis software developed by Cadence. It can be freely downloaded for use at home and is available in several engineering computer labs. PSPICE lectures and classroom demonstrations will be provided.

MATLAB Assignments – MATLAB is widely-used math/engineering software developed by MathWorks. Student versions can be purchased online and it is available in several engineering computer labs. MATLAB lectures and classroom demonstrations will be provided.

Grade Policy

Course grades will be computed based on the following percentages:

Tests (4 @ 13.5% each)	54%
Homework Assignments (mainly via Mastering Engineering (12))	10%
Extra Homework Problems	2%
PSPICE Assignments (3)	8%
MATLAB Assignments (3)	8%
Final Exam (comprehensive)	18%

Grades will be based on the following scale:

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

Blackboard and Course Communication

Course Policies

Course Communication

Students should check Canvas and their VCCS student email accounts regularly (at least every 24 hours). The best way to reach the instructor is by email. The instructor will respond to email and voicemail within 2 business days, although typically much sooner.

Attendance Policy

All students are expected to be present and on time at all scheduled class and laboratory meetings. Instructors are not required to admit a student who arrives late to the classroom. A student who adds a class or registers after the first day of classes is counted absent from all class meetings missed.

If a student is absent more than 15 percent of scheduled instructional time, attendance may be defined as unsatisfactory. This calculation includes absences occurring during the add/drop period. See also the Withdrawal Policy in this syllabus for more information. Per the college's attendance policy, faculty have the right to develop a more stringent policy as well. Students who do not attend or participate in class by the deadline to drop for tuition refund may be deleted from the course.

Late Work/Make-up Exam Policy:

- A 20% penalty per calendar day is assigned through Mastering Engineering.
- PSPICE and MATLAB assignments will be accepted up to 2 weeks late with a 10-point penalty, but no late PSPICE or MATLAB assignments will be accepted after the final exam.
- No make-up tests are allowed. Missing a test will result in a grade of 0 for the test unless the student gets approval before the tests or notifies the instructor within 24 hours of the test in case of emergency.

Classroom Behavior

- TCC is committed to maintaining a social and physical environment conducive to carrying out its education mission. Therefore, all members of the TCC community are expected to demonstrate standards for civility.
- Be moderate in speaking. Loud, obscene, argumentative, or threatening speech is disruptive to teaching and learning and is offensive to others. It has no place in an academic setting
- Resolve any disagreements in a positive, non-combative manner. Request the assistance of college authorities if needed.
- Show respect for the comfort of others in an educational setting by observing acceptable standards for personal cleanliness and dress.

Electronic Devices

Cell phones, pagers, and other communication devices are prohibited from use in classrooms, laboratories, and libraries, unless authorized by the appropriate faculty or staff. Although soundless

communication devices such as cell phones and pagers are permissible in classrooms, college offices, and/or meeting rooms, they must not be answered during class.

Inclement Weather/Emergent Hazardous Conditions

Tidewater Community College uses TCC Alerts to immediately contact and inform faculty, staff and students of a major crisis or emergency. TCC Alerts delivers important emergency alerts, notifications, and updates via:

- Email (work, home, other)
- Text Message via Cell phone
- Pager

When an incident or emergency occurs, authorized senders will be instantly notified via TCC Alerts. TCC Alerts is a personal connection to real-time updates, instructions on where to go, what to do, or what not to do, who to contact, and other important information. New users may register via the link on the College's [Closings & Emergencies](https://www.tcc.edu/closings-emergencies) webpage (<https://www.tcc.edu/closings-emergencies>).

All students are encouraged to sign up for TCC Alerts as soon as possible. If you have already subscribed, please verify your contact information is up-to-date in TCC Alerts.

Disposition of Classes for Emergency Shutdown of the College

In the event of an emergency shutdown of the college, the president and the executive staff may elect to conclude the term in session if eighty-five percent or more of that term has been completed. If the term in session is concluded, faculty shall compute final grades of students based on coursework completed at that point.

Academic Policies & Procedures

Students are responsible for being aware of the policies, procedures, and student responsibilities contained within the current edition of the TCC Catalog and Student Handbook.

Withdrawal Policy

Students who wish to withdraw without academic penalty should contact a counselor to determine the appropriate procedure. Withdrawals through completion of 60 percent of a session will result in a W grade. After 60 percent of a session is completed, a withdrawal will result in a grade of F in a credit course or a grade of U in a developmental course, except under mitigating circumstances that must be documented by the instructor and approved by the academic dean. Dynamic session classes have unique refund and withdrawal dates. Contact a campus Enrollment Services Office for more information, or visit the Academic Calendar website (URL provided in Important Websites section).

A student who drops after the last day to withdraw does not receive a 'W'. He/she receives an 'F', in which case there is both an academic and financial penalty. A student who withdraws by the deadline faces a financial penalty, but not an academic penalty.

09/04/2019	Deadline to drop for tuition refund
10/24/2019	Deadline to withdraw without academic penalty and to receive a grade of W for the course

Academic Integrity

TCC will expect students to demonstrate personal and academic integrity, to be open to new ideas, and to share in a community where individuals from diverse backgrounds and cultures help one another grow intellectually, socially, and personally.

TCC expects students to achieve, not just to get by. And while many caring and talented faculty and staff are here to help, students must take responsibility for their own learning. Students should strive for a high

level of academic performance and to be responsible, contributing citizens within the college and in outside communities. Above all, TCC wants students to develop a love of learning that will last a lifetime, along with a life-long interest in maintaining emotional and physical wellness.

Student Outcomes Assessment Requirement

Work products submitted by students to fulfill course requirements may be used by the college to evaluate its academic programs and general education requirements.

Plagiarism and Academic Misconduct

Academic misconduct includes, but is not limited to, the following actions: cheating on an examination or quiz—either giving or receiving information; copying information from another person for graded assignments; using unauthorized materials during tests; collaboration during examinations; buying, selling or stealing examinations; arranging a substitute for oneself during examinations; substituting for another person, or arranging such a substitution; plagiarism—the intentional or accidental presentation of another’s words or ideas; collusion with another person or persons in submitting work for credit in class or lab, unless such collaboration is approved in advance by the instructor.

Faculty members who have reliable evidence of academic misconduct will (1) investigate the matter, and (2) review the facts of the matter and the proposed penalty with the appropriate academic dean. They may then take one or more of the following actions:

Require the work to be accomplished again

Give no credit for the test, paper, or exercise

Assign a grade of **F**, **U**, or **W** for the course

Refer the matter to the campus Dean for Student Services or designee for possible disciplinary sanction through the college’s disciplinary procedure

If the faculty member chooses to refer the matter to the campus Dean for Student Services or designee for disposition, the Plenary Disciplinary Procedure shall be followed, and the student’s dismissal from the college is a possibility.

Educational Accessibility

Students who have documented, diagnosed disabilities, and who need special accommodations for tests, etc., are advised to see the Educational Accessibility Disabilities Services staff in Student Services so that the instructor may be notified of what accommodations are appropriate in each case. Requests for accommodations should be made to the designated campus Educational Accessibility counselor at least 45 days before classes begin. Documentation must be provided to support the need for accommodations. Students who have been hospitalized (for medical or psychiatric reasons) **unexpectedly** during the semester shall contact the Office of Educational Accessibility Counselor for support and connection to college resources. If the student is incapacitated, a designee may make contact on their behalf.

For assistance with disabilities, contact the campus Educational Accessibility Counselor/Provider or the Coordinator of Educational Accessibility Services: call 822-7752, visit Student Services/Development, or visit the Educational Accessibility webpage (URL provided in Important Websites section).

Emergency Procedures

In the event of a bomb threat, tornado, or fire, students and staff may be directed to evacuate the building or move to an internal assembly area within the building. Evacuation routes are posted in each classroom. The map indicates the route to the nearest exit. Students should review the map to make sure that the exit routes for the building are clearly understood. The information regarding locations of the Emergency Assembly Areas and Internal Assembly Areas for all classrooms or spaces used on the various campuses is available on the Crisis and Emergency Management Plan (CEMP) webpage

(<https://web.tcc.edu/emergency/cemp.htm>). If you require assistance during an evacuation, let your instructor know at the end of the first class.

Student Success Resources

The following resources are available to TCC students. Visit the Student Handbook webpage for more information about student services and locations.

Library

A library is located at each TCC campus and at the Visual Arts Center. These libraries are intended for research and study, and they contain materials in print and digital format to support the courses, curricula, and mission of the college. The research materials include books, newspapers, magazines, journals, DVDs, streaming media and an extensive collection of indexes, abstracts and full-text databases. Faculty members may place materials on reserve in the libraries for their students. Visit the Library webpage for more information: <http://libguides.tcc.edu/LibraryPage>

Academic Support Services

Each campus provides various kinds of academic assistance. One-on-one tutoring, math and computer labs, and other forms of individual and group assistance may be available. Students can also find free help for writing, from short questions about commas and comma splices to a comprehensive review of research papers in progress, in the Writing Centers.

{ If possible, provide additional specifics. Services and hours may vary by campus. Consult the academic dean for additional information. List any other academic support services available on campus that will help or enhance student success. }

Online Learning Help Desk

Visit the following website for Canvas support: <https://www.tcc.edu/student-services/canvas-support>
Canvas offers 24/7 support for students via phone (877-875-8359) and live chat. Live chat support can be accessed from the Help menu once you log into Canvas.
TCC provides Canvas support Monday to Friday, 8:30 a.m. to 5 p.m., by phone (757-822-1470), email (canvas@tcc.edu), and [online request form](#).

Important Websites

- College Website: <https://www.tcc.edu>
- Closings and Emergencies: <https://www.tcc.edu/closings-emergencies>
- Student E-mail: <https://tcc.my.vccs.edu>
- Educational Accessibility: <https://www.tcc.edu/student-services/personal-support/students-disabilities>
- Student Handbook: <https://www.tcc.edu/studenthandbook>
- TCC Catalog: <https://www.tcc.edu/academics/catalog/>
- Class Schedule: <https://m.sis.vccs.edu/index.php/app/catalog/classSearch?institution=TC295>(or log-in to SIS for current course offerings)
- Academic Calendar: <https://www.tcc.edu/academics/calendars/>
- For current financial aid information and assistance, visit <https://www.tcc.edu/paying-for-tcc/financial-aid/> or <https://studentaid.ed.gov/>
- Library: <https://libguides.tcc.edu/LibraryPage>.