

ECE 2004: Electric Circuit Analysis
VIRGINIA TECH
Course Syllabus (CRN 82706)
Fall 2017 MWF 12:20pm-1:10 pm (Room: SURGE 118C)

I. ECE 2004 Electric Circuit Analysis

Instructor: Prof. Mantu Hudait, Dept. of ECE, 626 Whittemore Hall
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Office Hours: Tuesday: 1:30-3:30 and by appointment (e-mail please).

TA Hours 255 Whittemore Hall (2nd floor)

Prerequisites: ENGE 1104/1204/1114/1216 (C- or above). Co-requisite: MATH 2214/2074

Midterm Exam	October 4 th (Midterm-I) and November 8 th	Final Exam	December 15,
Dates:	(Midterm-II), 2017	Date:	2017
Begin Time:	12:20PM	Begin Time:	7:45AM
End Time:	1:10PM	End Time:	9:45AM
Place	SURGE 118C		SURGE 118C

II. Course description

Introduction to the basic laws and techniques for the analysis of electric circuits. Calculation of the response of circuits with resistors, independent sources, controlled sources, and operational amplifiers. The transient analysis of basic circuits with R, L, and C components. An introduction to AC analysis and phasors.

III. Major Measurable Learning Objectives:

Having successfully completed this course, the student will be able to:

- use analytical techniques and an appropriate combination of Ohm's law, Kirchoff's laws, equivalent circuits, node voltage analysis, and mesh current analysis to solve linear circuits containing resistors, capacitors, inductors, independent sources, dependent sources, and operational amplifiers by determining all DC voltages, currents, and powers;
- use differential equations to solve for time-varying voltages, currents, stored energy, and dissipated power in first-order (RL and RC) and second-order (RLC) circuits;
- represent simple sinusoidal voltage and current waveforms as phasors and use the phasors to analyze elementary alternating current circuits operating under steady state conditions;
- use Matlab or a comparable software package to do the calculations required in items 1-2 above;
- use PSpice to analyze the circuits described in items 1-3 above.

IV. TEXTS AND SPECIAL TEACHING AIDS

C. K. Alexander and M. Sadiku, Fundamental of Electric Circuits, 6th Ed., McGraw-Hill.
ISBN: 978-0-07-802822-9

V. COURSE OUTLINE

CONTENT	CHAPTER
Basic Concepts	Chapter 1
Basic Laws	Chapter 2
Methods of Analysis	Chapter 3
Circuit Theorems	Chapter 4
Operational Amplifier	Chapter 5
Capacitors and Inductors	Chapter 6
First-order Circuits	Chapter 7
Second-order Circuits	Chapter 8
Sinusoidal and Phasors	Chapter 9
Sinusoidal Steady-State Analysis	Chapter 10

VI. GRADING POLICY

Homework	10%
Midterm Exam I	30%
Midterm Exam II	30%
Final Exam	30%
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	100%

Home Work

Homework problems will be typically be assigned on a weekly basis and will be due at the end of class one week following its assignment. Grader will try her/his best to correct your homework and in case, any error, please send email to grader. If there are many problems, then grader will correctly few problems in random and will give full points if you have attempted all homework problems. Homework may be turned in one day late with a 25% deduction. **No assignments will be accepted beyond one day late**, except in the case of unforeseen, officially documented absences.

Each problem solution should be **neatly worked out**. If a given assignment requires multiple pages of work, it must be stapled together prior to submission. Use neatly trimmed 8.5" x 11" paper and write on one side only. When possible, sketch illustrative diagrams and label current, voltage, and other relevant quantities on the diagrams. Very rough sketches with no labels will receive no credit. Use industrially accepted notation for units, per discussion on Day 1 of class.

I will collect ALL assigned problems for grading. *However, all problems may not necessarily be graded.* I expect you to have worked ALL the problems and to be prepared to submit the problem solutions in the above format at the end of class on the date due.

You may consult with other students and with your instructor while you are working on assigned problems but your goal in consulting should be limited to exploring options and approaches rather than avoiding work. The ability to solve problems develops through disciplined effort and the exams will require you to be able to solve problems. To obtain full credit for a homework assignment you must submit it to your instructor in class on the due date. Note that if you use open source solution for your homework, you will have a difficulty to answer questions in either midterm or final exam.

In-Class Activities:

There will be regular activities assigned during class, which will require your participation and may result in a submission at the end of the class period. I will grade you on your preparation for these

activities, your level of participation, and the conclusions that you draw from these activities. These activities should help strengthen your understanding of the course materials and assist in preparing you for the exams. I usually ask questions during class and your participation is most important.

Exams:

There will be only 2 mid-term exams and one final exam (October 4th for Midterm-I; November 8th Midterm-II; December 19th Final). No make-up exams will be given except for unforeseen, officially documented absences. If such a circumstance arises on a test date, it is your responsibility to contact me as soon as possible. If you expect to be absent on a test date for any legitimate reason (conferences, job interviews, project team competitions, etc.), it is your responsibility to give me sufficient prior notice so that we can make other arrangements. There will be a **FINAL exam** at the end of this course (no cumulative).

VII. ACADEMIC INTEGRITY

The Virginia Tech Honor Code establishes the standard for **ACADEMIC INTEGRITY** in this course, and will be strictly enforced. *Discussion* of class material with your classmates or the instructor is encouraged; however, ALL submitted work, must represent your own efforts, and you must pledge to this effect on all work. For more details on the relevant honor codes, consult the websites listed below:

- [Undergraduate Honor System, http://www.honorsystem.vt.edu/index.html](http://www.honorsystem.vt.edu/index.html)

Honor Code Pledge for Assignments:

The Undergraduate Honor Code pledge that each member of the university community agrees to abide by states:

“As a Hokie, I will conduct myself with honor and integrity at all times. I will not lie, cheat, or steal, nor will I accept the actions of those who do.”

Students enrolled in this course are responsible for abiding by the Honor Code. A student who has doubts about how the Honor Code applies to any assignment is responsible for obtaining specific guidance from the course instructor before submitting the assignment for evaluation. Ignorance of the rules does not exclude any member of the University community from the requirements and expectations of the Honor Code. For additional information about the Honor Code, please visit:

- <https://www.honorsystem.vt.edu/>
1. All assignments submitted shall be considered "graded work" and all aspects of your coursework are covered by the Honor Code. All projects and homework assignments are to be completed individually unless otherwise specified.
 2. Commission of any of the following acts shall constitute academic misconduct. This listing is not, however, exclusive of other acts that may reasonably be said to constitute academic misconduct. Clarification is provided for each definition with some examples of prohibited behaviors in the Undergraduate Honor Code Manual located at <https://www.honorsystem.vt.edu/>

A. CHEATING

- Cheating includes the intentional use of unauthorized materials, information, notes, study aids or other devices or materials in any academic exercise, or attempts thereof.

B. PLAGIARISM

- Plagiarism includes the copying of the language, structure, programming, computer code, ideas, and/or thoughts of another and passing off the same as one's own original work, or attempts thereof.

C. FALSIFICATION

- Falsification includes the statement of any untruth, either verbally or in writing, with respect to any element of one's academic work, or attempts thereof.

D. FABRICATION

- Fabrication includes making up data and results, and recording or reporting them, or submitting fabricated documents, or attempts thereof.

E. MULTIPLE SUBMISSION

- Multiple submission involves the submission for credit—without authorization of the instructor receiving the work—of substantial portions of any work (including oral reports) previously submitted for credit at any academic institution, or attempts thereof.

F. COMPLICITY

- Complicity includes intentionally helping another to engage in an act of academic misconduct, or attempts thereof.

G. VIOLATION OF UNIVERSITY, COLLEGE, DEPARTMENTAL, PROGRAM, COURSE, OR FACULTY RULES

- The violation of any University, College, Departmental, Program, Course, or Faculty Rules relating to academic matters that may lead to an unfair academic advantage by the student violating the rule(s).

Academic Misconduct Sanctions:

“If you have questions or are unclear about what constitutes academic misconduct on an assignment, please speak with me. I take the Honor Code very seriously in this course. The normal sanction I will recommend for a violation of the Honor Code is an **F*** sanction as your final course grade. The **F** represents failure in the course. The “*” is intended to identify a student who has failed to uphold the values of academic integrity at Virginia Tech. A student who receives a sanction of **F*** as their final course grade shall have it documented on their transcript with the notation “FAILURE DUE TO ACADEMIC HONOR CODE VIOLATION.” You would be required to complete an education program administered by the Honor System in order to have the “*” and notation “FAILURE DUE TO ACADEMIC HONOR CODE VIOLATION” removed from your transcript. The “F” however would be permanently on your transcript.”

VIII. ANNOUNCEMENTS

I will use Canvas to post homework assignments, homework solutions, and other information pertaining to the course materials. You should check your email and the Canvas on a regular basis. In case, I use any teaching materials not from the text book, I will post **only those lecture notes** in Canvas. Lecture notes I prepared for enhancement you participation in class. You need to read the text book prior to class or after the class, please!

Attendance:

Attendance all lecture classes is expected and critical to your successfully completing the requirements of this course. While I may periodically check attendance against the class roll, I have no *explicit* penalties for your missing class. However, chronic absenteeism will be noted, and I will not be inclined to give such individuals the benefit of the doubt in judgment situations such as borderline final grades. In the event that you miss a lecture, it is your responsibility to ask one of your classmates or read text book. If you have a conflict with a scheduled exam or with the submission of any in-class assignments, you must make arrangements with your instructor well in advance so that alternate times can be scheduled.