Course Profile

Summer 2020

Course Code: VE215

Course Name: Introduction to Circuits

Course Credits: 4.0

Course Category: Required

Degree Program: General Courses for Both ECE & ME Degree Programs

Classroom: Online using Zoom

Prerequisites:Vv156 or Vv186, Vg 101, Co-requisite Vp 240 (or Vp260)

Lecture time: Tuesday 4:00 – 5:40 pm, Thursday 4:00 – 5:40 pm, Friday 4:00 – 5:40 pm (odd weeks)

Instructor:

Rui Yang (杨睿)
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Office Hours: Tue. & Thur. 2:30 - 3:30 pm, Online

Teaching Assistants:

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LIU Zuheng（刘祖衡）, liuzuheng@sjtu.edu.cn

Textbook:

- Required:“Fundamentals of Electric Circuits”, 5/e, Charles K. Alexander and Matthew N. O. Sadiku
- Lab Manual: *Circuits Make Sense –A New Lab Book for Introductory Courses in Electric Circuits*, 5/e, by Alexander Ganago (Department of Electrical Engineering and Computer Science, University of Michigan), John Wiley & Sons, 2007, 9780470106792

Course Description:

Introduction to electronic circuits. Basic Concepts of voltage and current; Kirchhoff's voltage and current laws; Ohm's law; voltage and current sources; Thevenin and Norton equivalent circuits; DC and low frequency active circuits using operational amplifiers, diodes, and transistors; small signal analysis; energy and power. Time- and frequency-domain analysis of RLC circuits. Basic passive and active electronic filters. Laboratory experience with electrical signals and circuits.

Grading Policy:

Ve215 has 9 problem sets (homework assignments), 5 labs, and 3 exams:
In-class Quizzes: 10%
Problem Sets: 10%
Labs: 10%
Exam 1 (Midterm Exam 1): 20%
Exam 2 (Midterm Exam 2): 25%
Exam 3 (Final Exam): 25%

Academic Integrity: (Any types of honor code regulations like class rules, homework policy, exam rules or project collaboration policy could be defined here)

- Check “Addendum to the Honor Code for Online Courses in Spring 2020” for Honor Code issue related to online courses.
- Problem sets (homework assignments) may be done with partners, but I believe that you do not fully understand the technical material unless you work on enough problems by yourself.
- Exams will be given under the JI’s Honor Code and will require individual efforts. The exams will be closed book, even though you can take one, two, and three pieces of cheating paper for your Midterm Exam 1, Midterm Exam 2, and Final, respectively. Scientific calculators can be used for the exams. The use of other electronic devices such as electronic dictionary and cell phone during exams will constitute an Honor Code violation. If you miss an exam, real documentation is required stating why you could not attend (severe disease, for example).
- The labs will help you develop engineering skills. Unexcused absence will result in a grade of zero for the missed and the student has the responsibility of contacting the instructor or teaching assistant to make up the missed lab. Skipping lab activities will result in an “F” or “Fail” for this course.
- Homework will be assigned online at Canvas as scheduled. They are usually due one week later or specified otherwise. One day automatic grace period. Second day late penalty -25%, later no credit.

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Course Outline: (Tentative and subject to change)

Week	Date	Lecture Topics	Homework	Labs: TBD
1	May 12	Inroduction to Ve215, Basic concepts (Sections 1.3-1.7)		
	May 14	Basic laws (2.1-2.8)	HW1	
	May 15	Methods of analysis (3.1-3.6)		
2	May 19	Methods of analysis (3.7-3.9), Circuit theorems (4.1-4.4)		
	May 21	Circuit theorems (4.5-4.8, 4.10)	HW2	
3	May 26	Operational amplifiers (5.1-5.5)		
	May 28	Operational amplifiers (5.6-5.8, 5.10)	HW3	
	May 29	Capacitors and inductors (6.1-6.6)		
4	Jun. 2	First-order circuits (7.1-7.4)		
	Jun. 4	No Lecture, Midterm Exam 1		
5	Jun. 9	First-order circuits (7.5-7.7,7.9)	HW4	
	Jun. 11	Second-order circuits (8.1-8.5)		
	Jun. 12	Second-order circuits (8.6-8.8)		
6	Jun. 16	Second-order circuits (8.10-8.11)		
	Jun. 18	Sinusoids and phasors (9.1-9.4)	HW5	
7	Jun. 23	Sinusoids and phasors (9.5-9.8)		
	Jun. 25	No Lecture, National Holiday		
	Jun. 26	No Lecture, National Holiday		
	Jun. 28	Sinusoidal steady-state analysis (10.1-10.5)		
8	Jun. 30	Sinusoidal steady-state analysis (10.6-10.7, 10.9)	HW6	
	Jul. 2	AC power analysis (11.1-11.5）		
9	Jul. 7	No Lecture, Midterm Exam 2		
	Jul. 9	AC power analysis (11.6-11.9）		
	Jul. 10	Three-phase circuits (12.1-12.4）	HW7	
10	Jul. 14	Three-phase circuits (12.5-12.7）		
	Jul. 16	Three-phase circuits (12.8, 12.10）		
11	Jul. 21	Magnetically coupled circuits (13.1-13.5)		
	Jul. 23	Magnetically coupled circuits (13.6-13.7, 13.9)	HW8	
	Jul. 24	Frequency response (14.1-14.3)		
12	Jul. 28	Frequency response (14.4-14.6)	HW9	
	Jul. 30	Frequency response (14.7-14.8)		
13	Aug. 4	No Lecture, Final Exam		

Course Objectives:

1. To acquaint students with the basic concepts, laws, and theorems for electric circuits.
2. To teach students how to analyze dc circuits.
3. To teach students how to analyze ac circuits.
4. To introduce students to, and stimulate interest in, electrical, electronics, and computer engineering.
5. To prepare students for follow-up courses of the Electrical and Computer Engineering program.

Course Outcomes:

1. Classify circuit elements.
2. Use Ohm’s law and Kirchhoff’s laws to analyze simple circuits.
3. Use nodal and mesh analysis methods to analyze circuits systematically.
4. Use circuit transformation techniques and circuit theorems to simplify circuit analysis.
5. Analyze and design operational amplifier circuits.
6. Use singularity functions to represent switching operations.
7. Build and solve linear constant-coefficient differential equations describing dc circuits.
8. Analyze ac circuits, including single- and three- phase circuits, in the phasor domain.
9. Analyze and design frequency-selective filters.
10. Understand the principles and applications of circuits to engineering.