

King Fahd University of Petroleum and Minerals

Electrical Engineering Department

EE205: ELECTRIC CIRCUITS II

Coordinator: Dr. Essam Hassan

Second Semester 2007-2008 (072)

Course Description

Analysis of three-phase circuits. Time domain solutions of second order circuits. State equations for linear circuits. Computer-aided circuit analysis. Frequency domain analysis and bode plots. Network analysis in the s-domain. Mutual inductance and transformers. Two port networks.

Prerequisite(s) EE201 (Electrical Circuits I)

Other useful references and material

1. Elementary linear circuit analysis, 2nd Ed., 1987, by Leonard S. Bobrow, Holt, Rinehart & Winston Inc.
2. Introductory Circuit Analysis, 7th Ed., 1994, by R.L. Boylestad, Merrill.

Course objectives:

After successfully completing the course, the students will be able to

- understand basic concepts of DC and AC circuit behavior.
- develop and solve mathematical representations for simple RLC circuits.
- understand the use of circuit analysis theorems and methods.

Class/Laboratory Schedule: 3 lectures per week, 50 minutes each or 2 lectures per week 75 inutes each.

Contribution of course to meeting the professional component

The students will model electrical systems. They build on what was acquired in Electrical Circuits I, and are introduced to higher order systems and complex frequency domain. The course will emphasize the use of computer aided circuit analysis, modifying the circuit and system behaviors to achieve the desired performance. Design projects are assigned and intended to build the students' ability to design a system and its components to meet required specifications.

Relationship of Course to program outcomes

This course supports the following four program outcomes out of thirteen outcomes required by ABET Criterion 5 for accrediting engineering program.

- An ability to apply knowledge of mathematics, science, and engineering to the analysis and design of electrical circuits
- An ability to identify, formulate, and solve engineering problems in the area circuits and systems.
- An ability to use the techniques, skills, and modern engineering tools such as computer aided circuit analysis, necessary for engineering practice.
- An ability to design a system, components or process to meet desired needs within realistic constraints such as economic, environmental, social political, ethical, health and safety, manufacturability and sustainability

Course Information: textbook, instructors, grading & important dates.

Text Book:	James W. Nilsson & Susan A. Riedel, <i>Electric Circuits</i> (7 th Edition), 2005, Prentice Hall. ISBN 0-13-127760-X.				
Course Instructor	Name, Email address	Office	Phone	Office Hours	Sections
	Dr. Jamil Bakhawain <i>jamilb@kfupm.edu.sa</i>	59/2086	3262	UT 11:15 – 12: 00	3
Grading:	Attendance, Assignments and Quizzes	Projects	Two Majors		Final
	Q 10+ Atten 3 + HW & Class work 6=19%	6 %	40%		35%
	First Major	Second Major	Projects Due Dates		Final
Exams Dates:	Mon. Mar. 25, 2008	Mon. May. 6, 2008	TBA		<i>Tuesday June 10 at 7:00 pm</i>
Exams Times:	8:00-9:30 pm	8:00-9:30 pm			
Exams Places:	TBA	TBA			
Important Dates:	Last day to drop the course without a permanent record	Last day to drop the course with “W” grade	Last day to drop all courses with “W” Thru Registrar’s office.		
	Feb. 26, 2008	April 1, 2008	April 29, 2008		

Tentative Course Outline and Schedule

Week	Date	Topics	Text Section	Homework Problems (Tentative)
1	16 Feb.	Introduction to 3- ϕ circuits	11.1-11.3	
2	23 Feb.	Balanced three-phase circuits	11.4-11.6	<u>HW1:</u> Ch11: 7,11,20,21 Ch11: 24,27,28,38
3	1 March	Natural and step responses of RLC circuits	8.1-8.2	
4	8 March	Natural and step responses of RLC circuits	8.3-8.4	
5	15 March	Natural and step responses of RLC circuits. State equations and computer aided circuit analysis.	8.5 Handout*	<u>HW2:</u> Ch8: 3,4,10,12 Ch8: 25, 28, 32, 37, 45
Major I Tue. Mar. 25, 2008, 8:00-9.30 pm, Up to sec. 8.5				
6	22 March	State equations and computer aided circuit analysis	Handout	<u>HW3:</u> Ch. 7 Bobrow: 6,9,21,25,38,40
7	29 March	Resonant circuits	Handout	<u>HW4:</u>
8	5 April	Resonant circuits, Circuit analysis in s-domain	Handout	Ch 10 Bobrow 23,26,27,33
Midterm Vacation April. 12-16				
9	19 April	Circuit analysis in s-domain	Handout	
10	26 April	Circuit analysis in s-domain Mutual inductance and transformers	Handout 6.4-6.5	<u>HW5:</u> Ch 10 Bobrow 40,42,50,53,54
11	3 May	Mutual inductance and transformers	9.10, 9.11	<u>HW6:</u> Ch.6: 6:35,36,37,39,40 Ch.9: 60, 61, 63, 68
Major II Tue. May. 6, 2008, 8:00-9.30 pm; Up to Transformers 9.11				
12	10 May	Filters and Bode plot	14.1-14.5	
13	17 May	Filters and Bode plot	Appendix E	<u>HW7:</u> Ch.14: 2,4,7,8,12 31,32,33(c),34
14	24 May	Two-port networks	18.1-18.2	
15	31 May	Two-port networks and Review	18.3-18.4	<u>HW8:</u> Ch.18: 2,3,10,11 19,20,30,38

- **Handouts can be downloaded from your WebCT course pages.**

Additional Notes

- Note #1:** Final Exam is comprehensive (i.e. covers all chapters as described in the syllabus). Final and major exams are common to all sections.
- Note #2:** According to the rules and regulations of KFUPM, attendance is **MANDATORY**. More than **8** unexcused absences) will be reported to the registrar office and result in a **GRADE of DN** regardless of the student's grade. Every unexcused absence results in -0.5 , 8 absences results in 0 out of 4 in the attendance and class performance, Two late arrival= One absence. (for 50 minutes classes, scale accordingly for 75 minute classes)
- Note #3:** It is your responsibility to solve the homework as soon as the material is covered in the class. Homework solution will be published on WebCT. Quizzes will be given regularly based on the homework problems.
- Note #4:** You are urged to use **your instructor's** office hours whenever possible.
- Note #5:** You can access the homework solutions and any other supplement material, communication items, and any **course information** at your instructor's WebCT course page.