

**KING FAHD UNIVERSITY OF PETROLEUM & MINERALS**

**ELECTRICAL ENGINEERING DEPARTMENT**

**EE204 - Fundamentals of Electric Circuits**

**FIRST SEMESTER 2009-2010**

**EE 204 Fundamentals of Electric Circuits**

**2, 3, 3**

Basic laws: Ohm's, KVL, KCL. Resistive networks, mesh and node equations. Network theorems. Inductance and capacitance. Sinusoidal analysis and phasor methods. Power concepts of AC circuits. Polyphase circuits.

**Pre-requisite:** MATH 102 and PHYS 102

**Textbook:**

Clayton R. Paul, *FUNDAMENTALS OF ELECTRIC CIRCUIT ANALYSIS*, 1<sup>st</sup> Edition, Wiley & Sons. Inc. 2001.

**Other reference:**

James Nilsson and Susan Riedel, *Electric Circuits*, 8<sup>th</sup> edition, Prentice Hall, 2008.

**Tentative Schedule:**

Wk	Date	Topics	Text	Laboratory/Tutorial
1	Oct. 03	Voltage, Current, Power, KCL, KVL	1.2 – 1.6	No Meeting
2	Oct. 10	Conservation of power, Series & Parallel Connection of Elements, Ohm's Law	1.7 – 1.8, 2.1 – 2.2	No Meeting
3	Oct. 17	Single loop and single node-pair circuits Resistors in Series and in Parallel, Voltage and Current Division	2.3 – 2.5	<b>Exp #1</b> Resistors and Ohm's Law
4	Oct. 24	Direct Method, Source Transformation	2.6, 2.7	<b>Exp #2</b> Kirchhoff's Laws
5	Oct. 31	Principle of Superposition, Review	3.1	<b>Problem Session # 1</b>
<i>Major Exam I* (1.2 – 3.1), Wed. 4<sup>th</sup> Nov. (7:00-9:00 pm)</i>				
6	Nov. 07	Thevenin Theorem, Norton Theorem, Maximum Power Transfer	3.2 – 3.4	<b>Exp #3a</b> Computer Simulation of DC Circuits
7	Nov. 14	Node Voltage Method, System of Equations	3.5	<b>Exp #3b</b> Experimental Part
<i>Midterm Vacation, Thur, 19<sup>th</sup> Nov. - Fri, 4<sup>th</sup> Dec.</i>				
8	Dec. 05	Mesh Current Method, System of Equations	3.6	<b>Exp #4</b> Current & Voltage Divider
9	Dec. 12	Capacitors, Inductors, Series and Parallel Connections	5.1 – 5.2	<b>Exp#5</b> Superposition, Thevenin & Norton Theorems
10	Dec. 19	Sinusoidal Source, Complex Numbers, review	6.1 – 6.2	<b>Problem Session # 2</b>
<i>Major Exam II* (3.2 – 6.2), Wed, 23<sup>th</sup> Dec (7:00-9:00 pm)</i>				
11	Dec. 26	Frequency Domain Analysis	6.3 – 6.5	No Meeting
12	Jan. 02	Power Concepts, Power Factor	6.6; 6.6.1; 6.6.2	<b>Exp #6</b> Frequency Domain Analysis
13	Jan. 09	Superposition of Average power	6.6.4	<b>Exp #7</b> Max. Power Transfer
14	Jan. 16	Maximum power transfer, RMS Values	6.6.3; 6.6.5	<b>Exp #8</b> Average and RMS Values
15	Jan. 23	Commercial Power Distribution, Three Phase Circuits, Star-Delta Connections, review	6.9; 6.9.1; 6.9.2	<b>Final Lab Exam</b>
<b>Final Exam Saturday 6 Feb. 2010: 7:30 am – 10:00 am</b>				

## Course Outcomes:

Outcome 1: An ability to apply knowledge of mathematics, science, and engineering to the analysis and design of electric circuits

Outcome 2: An ability to identify, formulate, and solve engineering problems in the area of circuits.

Outcome 3: An ability to use the techniques, skills, and modern programming tools such as PSPICE, necessary for engineering practice.

Outcome 4: An ability to function on multi-disciplinary teams

Outcome 5: An ability to design a system, components or process to meet desired needs within realistic constraints

## Grading:

Class work (15 %): 4 homework problems (6 marks), 4 quizzes (6 marks), and one design problem (3 marks).

Two Major Exams (30%): Common exams. Location of major exams will be reserved and posted by each section instructor.

Laboratory (20%): reports (7 marks), prelab (3 marks), performance (2 marks), theoretical final exam (4 marks), experimental final exam (4 marks).

Final Exam (35%): Common and Comprehensive

## Suggested Practice problems:

HW # 1	Ch. 1:	1.3-1, 1.4-5, 1.5-5, 1.6-2, 1.6-6, 1.7-2, 1.8-2
HW # 2	Ch. 2:	2.2-5, 2.2-7, 2.3-2, 2.3-8, 2.4-3, 2.4-10, 2.5-7, 2.5-11
HW # 3	Ch. 2: & Ch. 3:	Ch.2: 2.6-4, 2.7-3, 2.7-5, Ch.3: 3.1-2, 3.1-4, 3.2-2, 3.2-4
HW # 4	Ch. 3:	3.2-6, 3.2-12, 3.3-2, 3.3-4, 3.3-6, 3.3-12
HW # 5	Ch. 3:	3.5-2, 3.5-7, 3.6-2, 3.6-7
HW # 6	Ch. 5:	5.1-3, 5.1-6, 5.1-8, 5.2-3, 5.2-6, 5.2-8, 5.4-2
HW # 7	Ch. 6:	6.1-1(b,f), 6.1-2(a,f,g), 6.2-1(d,f), 6.2-5(b,d)
HW # 8	Ch. 6:	6.3-4, 6.3-7, 6.4-4, 6.4-7, 6.4-12
HW # 9	Ch. 6:	6.4-16, 6.4-17, 6.5-1, 6.5-4, 6.5-8

## Important Points to Remember:

1. **Practice Problems:** Practice problems are to be solved completely by the students. Solutions will be posted in **Blackboard CE8**.
2. **Problem Sessions:** All problem sessions will be held during the lab periods.
3. **Lab. Makeup:** No lab makeup will be allowed without an official excuse from students affairs.
4. **Attendance:** According to the university regulations, any student that exceeds 20% of the scheduled class meeting without an official excuse will receive a grade of DN in the course.
5. **Official excuses:** All official excuses must be submitted to the instructor no later than one week of the date of the official excuse. The instructor may not accept late excuses.

Instructor	Office	Sec	Phone	E-mail	Office Hours
Dr. Ali A. Al-Shaikhi	59/0074	3,4	2610	shaikhi@kfupm.edu.sa	S&M @ 09:00 am – 10:00 am S&M @ 12:15 pm – 01:00 pm Or by appointment

*This information and more will be available on Blackboard CE8*