

**AMERICAN UNIVERSITY OF BEIRUT  
FACULTY OF ENGINEERING AND ARCHITECTURE  
ELECTRICAL AND COMPUTER ENGINEERING DEPARTMENT**

**EECE 210 – Electric Circuits  
Course Syllabus  
Spring 2012**

---

### **1. Instructor**

Name: Dr. Rabih Jabr

Office: Bechtel 513

Extension: 3637

Email: rabih.jabr@aub.edu.lb

Office hours: MW 10:00 am – 12:00 noon and by appointment.

### **2. Catalog Description**

The course topics include: Circuit variables, circuit elements and basic laws, simple resistive circuits, techniques of circuit analysis, operational amplifier, inductance and capacitance, responses of  $RL$ ,  $RC$ , and  $RLC$  circuits, sinusoidal steady-state analysis, sinusoidal steady-state power calculations.

### **3. Time and Place**

- Section 1: MWF 8:00 - 8:50 am, Bechtel 405.
- Section 4: MWF 9:00 - 9:50 am, Bechtel 541.

### **4. Prerequisites**

- High-school calculus including simple differential equations, algebra including complex numbers, and physics.

### **5. Textbook**

- Nilsson J.W. and Riedel S.A.: Electric Circuits. 9<sup>th</sup> Edition. Pearson Prentice Hall, Upper Saddle River, NJ, 07458, 2011 (Chapters 1–10).

### **6. Course Objectives**

The objectives of this course are:

- To introduce students to the general fields of electric circuits
- To highlight the relevance of the study of electric circuits to engineering
- To impart a sound understanding of basic concepts of electric circuits
- To instruct students in techniques for analyzing electric circuits
- To foster problem solving skills

- To promote interaction and communication skills

## 7. Learning Outcomes

At the end of the course, students:

- Become familiar with the scope and general nature of the fields of electric circuits
- Become aware of the relevance of the study of electric circuits to engineering
- Acquire a sound understanding of basic concepts of electric circuits
- Learn techniques for analyzing electric circuits
- Acquire problem solving skills
- Acquire interaction and communication skills

## 8. Course Topics

### (8 lectures)

- Circuit variables: Nature and limitations of circuit analysis, voltage, current, and power.
- Ideal circuit elements: Voltage and current sources, independent and dependent sources, resistance.
- Basic laws: Ohm's law and Kirchhoff's laws.
- Simple resistive circuits: Series and parallel connections, current and voltage dividers and measurement, the Wheatstone bridge, delta-to-wye equivalence.

### (8 lectures)

- Techniques of circuit analysis: Node-voltage, mesh-current, and loop-current methods; Thevenin and Norton equivalents, superposition, and maximum power transfer.

### (4 lectures)

- Operational amplifier terminals, terminal voltages and currents, the inverting and non-inverting amplifier circuit, the summing-amplifier circuit, and the difference-amplifier circuit.

### (4 lectures)

- Inductance, capacitance and mutual inductance: Basic properties of inductors and capacitors, series and parallel combinations, mutual coupling and the concept of mutual inductance, and dot marking convention.

### (8 lectures)

- Response of  $RL$  and  $RC$  circuits: Natural and step responses of  $RL$  and  $RC$  circuits. Sequential switching.
- Natural and step responses of  $RLC$  circuits: Under-damped, critically-damped, and over-damped responses.

### (8 lectures)

- Sinusoidal steady-state analysis: Phasor representation; passive circuit elements in the frequency domain; Y- $\Delta$  transformation; techniques of analysis; ideal transformers.
- Average, reactive and complex power calculations; maximum power transfer.

## 9. Student Assessment and Grading

	Percentage
Quiz 1	25%
Quiz 2	25%
Final Exam	35%
Homework and/or Drop Quizzes	10%
Class Attendance	5%

### 9.1. Examinations for all sections:

- **Quiz 1** will be held on **Friday March 23, 2012 at 6:30 pm.**
- **Quiz 2** will be held on **Monday May 7, 2012 at 6:30 pm.**
- **Final exam** will be held during the final examination period.
- The Quizzes and final exam are of multiple-choice style

## 10. General Rules and Regulations

- All graded work should be based on individual effort *without* external help, unless otherwise indicated. Any suspected misconduct will be handled according to the American University of Beirut rules and regulations. Consult the AUB's website for details of these policies.
- There might be *unannounced drop quizzes* during this course. The quizzes will be based on previously presented material.
- You are required to be in class on time.
- There is no makeup for drop quizzes and exams.
- You are required to check the class website on Moodle or E-Reserve for information and updates.
- As per AUB policy, students who miss more than one fifth of the lectures in the first ten weeks of the semester will be dropped from the course.