Course Objectives

- Understand the ideal building blocks of circuit theory.
- Understand the key ideas in circuits, such as impedance, power and resonance.
- Analyze resistive circuits and determine currents and voltages.
- Understand the electrical properties of inductors and capacitors and the concept of mutual inductance.
- Analyze the transient behavior of RC and RL circuits.
- Determine the transient response of second-order systems and understand the concepts of underdamped, over damped, and critically-damped circuits.
- Use phasors and complex impedances to analyze steady-state response.
- Analyze magnetic circuits.
- Analyze the circuits including ideal and real transformers.
Syllabus

• Principle of physics: electric charge, electric fields, voltage, magnetic fields, current, power, energy.

• Basic circuit laws: Kirchhoff’s voltage and current laws

• Ideal circuit elements: resistors, inductors and capacitors, voltage and current sources, Mutual inductance.

• Nodal analysis, Loop or mesh analysis

• Superposition theorem, Thevenin and Norton theorems

• Transient RL and RC circuits.

• Complex impedance and frequency response.

• Steady-state sinusoidal analysis

• Magnetics circuits.

• Transformers.
Assessment

• Quizzes: 30%
• Midterm Exam: 35%
• Final Exam: 35%
References

- Lecture notes
Course Website

• Course Materials (Text books, lecture notes and ....) are available in the course website:

http://webpages.iust.ac.ir/nayyeri/courses/BEE
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