

KING SAUD UNIVERSITY  
COLLEGE OF ENGINEERING  
ELECTRICAL ENGINEERING DEPARTMENT

**EE 201 FUNDAMENTALS OF ELECTRIC CIRCUITS**  
**FALL 2021**

**Instructor:** Dr. Anas Al-Hussayen  
**Room:** 2C27 Engineering Building  
**Phone:**  
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**Office Hours:** TBA, also by email/appointment  
**Prerequisites:** Math 106  
**Class Home Page:** Check Blackboard for the latest information  
**TA:** Eng. Ibrahim Al-Turki  
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**Office Hours:** TBA  
**Text:** R. L. Boylestad, Introductory Circuit Analysis, 12<sup>th</sup> (or 11<sup>th</sup> or 10<sup>th</sup>) Edition, Prentice Hall, 2001.

**Catalog Description:** The concepts of independent and dependent voltage and current sources. Circuit theorems: Superposition principle. Thevenin and Norton theorems. Maximum power transfer theorem. Analysis techniques of circuit containing independent and dependent voltage and current sources: Nodal and mesh analysis. Sinusoidal sources and the concept of phasors in circuit analysis. Introduction to the concept of average, reactive and complex power, power factor.

**Grading:**

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|------------|-----|--|
| Exam 1     | 20% |  |
| Exam 2     | 20% |  |
| Final Exam | 40% | Mon, Dec. 27 <sup>th</sup> , 1:00 pm – 3:00 pm |
| Homework   | 20% |  |

**Homework:** Problem sets will be assigned weekly on Tuesday and collected the following Tuesday. Check the class website for the latest information on

assignment problems. Four to six problems will be assigned, but only two will be graded carefully for 70% of the credit. The remaining credit will be given based on “reasonable effort” on the homework as a whole. **It is important that you read and understand the solutions of all problems. Your score on the homework may not reflect the correctness of your approach.**

**You are encouraged to discuss your solution strategies with other students taking the class. However, copying homework solutions provided by others is considered cheating and will not be tolerated.**

**Exams:** The only allowed calculators during Mid-term and Final exams are “Casio FX-991ES” or “Casio FX-991ES Plus”. **Any unauthorized sharing of information with others during any of the exams will be treated as cheating and may result in a grade of “F” in this class.**

**Course Outline:**

| WEEK OF | TOPIC  | SOURCE      |
|---------|--|-------------|
| Aug 29  | Definitions and Laws: Current, voltage, DC supplies, Ohm’s law, and power.   | Ch. 1 - 4   |
| Sept 5  | Series Circuits: Series circuits, voltage sources in series, Kirchhoff’s voltage law, voltage divider rule.<br>Parallel Circuits: Parallel elements, total conductance and resistance, parallel networks, Kirchhoff’s current law, current divider rule, voltage sources in parallel, and open and short circuits. | Ch. 5 & 6   |
| Sept 12 | Series- Parallel Networks: Series-parallel networks, ladder networks.  | Ch. 7       |
| Sept 19 | Methods of Analysis and Selected Topics (dc): Current sources, source conversions, current sources in parallel, current sources in series, and mesh analysis.  | Ch. 8       |
| Sept 26 | Methods of Analysis and Selected Topics (dc): Nodal analysis, bridge network, and Star- Delta conversions.   | Ch. 8       |
| Oct 3   | Network Theorems: Superposition theorem, and Thevenin’s theorem.   | Ch. 9       |
| Oct 10  | Network Theorems: Norton’s theorem, and maximum power transfer theorem.  | Ch. 9       |
| Oct 17  | Sinusoidal Alternating Waveforms: AC voltage definition, general format for the sinusoidal V or I, phase relation, and effective value.  | Ch. 13      |
| Oct 24  | The basic Elements and Phasors: Response of basic R, L, and C elements to a sinusoidal V or I, average power and power factor, complex numbers, rectangular form and polar form, and phasors.  | Ch. 14      |
| Oct 31  | Series and Parallel ac Circuits and Networks: Impedance and the phasor diagram, series configuration, voltage divider rule, admittance and susceptance, basic elements in parallel ac  | Ch. 15 & 16 |

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|        | networks, current divider rule, equivalent circuits, and ladder networks   |        |
| Nov 7  | Methods of Analysis and Selected Topics (ac): Independent vs. dependent (controlled) sources, source conversions, and mesh analysis. | Ch. 17 |
| Nov 14 | Methods of Analysis and Selected Topics (ac): Nodal analysis, bridge network, and Star- Delta conversions.                           | Ch. 17 |
| Nov 21 | Network Theorems,  | Ch. 18 |
| Dec 5  | Power (ac): Resistive circuits, apparent power, inductive circuits and reactive power (Q), and capacitive circuits.                  | Ch. 19 |
| Dec 12 | Power (ac): The power triangle, the total P, Q, and S, and power factor correction.  | Ch. 19 |