Kingsborough Community College
The City University of New York
Department of Physical Sciences

EGR 2200 - Introduction to Electrical Engineering

Syllabus

EGR 2200 – INTRODUCTION TO ELECTRICAL ENGINEERING (3 crs. 4 hrs.)
First course in electrical engineering, includes: circuit elements and their voltage-current relations; Kirchoff's laws; elementary circuit analysis; continuous and discrete signals; differential and difference equations; first and second order systems. Required for Engineering Science Majors. Prerequisites: MAT 2100, PHY 1400. Co-requisite: MAT 5500

Section: SECTION NUMBER
Time: LECTURE AND LABORATORY SCHEDULE FOR SECTION
Room: ROOM (S) FOR SECTION
Instructor: INSTRUCTOR FOR SECTION
Email: EMAIL ADDRESS FOR INSTRUCTOR FOR SECTION
Office Hours: OFFICE HOURS FOR INSTRUCTOR FOR SECTION

Source materials: The textbook is *Electric Circuits, by Nilsson - Latest Edition* . Scientific calculator – You may not use a cell phone as a calculator!

Course Learning Outcomes:
After completing this course, the student will be able to:

- Understand and be able to use SI units and the standard prefixes for powers of 10.
- Know and be able to use the definitions of *voltage* and *current*.
- Know and be able to use the definitions of *power* and *energy*.
- Be able to use the passive sign convention to calculate the power for an ideal basic circuit element given its voltage and current.
- Understand the symbols for and the behavior of the following ideal basic circuit elements: independent voltage and current sources, dependent voltage and current sources, and resistors.
- Be able to state Ohm's law, Kirchhoff's current law, and Kirchhoff's voltage law, and be able to use these laws to analyze simple circuits.
- Know how to calculate the power for each element in a simple circuit and be able to determine whether or not the power balances for the whole circuit.
- Be able to recognize resistors connected in series and in parallel and use the rules for combining series-connected resistors and parallel-connected resistors to yield equivalent resistance.
- Be able to use voltage division and current division appropriately to solve simple circuits.
- Be able to determine the reading of an ammeter when added to a circuit to measure current; be able to determine the reading of a voltmeter when added to a circuit to measure voltage.
- Know when and how to use delta-to-wye equivalent circuits to solve simple circuits.
- Understand and be able to use the node-voltage method to solve a circuit.
- Understand and be able to use the mesh-current method to solve a circuit.
- Be able to decide whether the node-voltage method or the mesh-current method is the preferred approach to solving a particular circuit.
- Understand source transformation and be able to use it to solve a circuit.
- Understand the concept of the Thévenin and Norton equivalent circuits and be able to construct a Thévenin or Norton equivalent for a circuit.
- Know and be able to use the equations for voltage, current, power, and energy in an inductor; understand how an inductor behaves in the presence of constant current, and the requirement that the current be continuous in an inductor.
- Know and be able to use the equations for voltage, current, power, and energy in a capacitor; understand how a capacitor behaves in the presence of constant voltage, and the requirement that the voltage be continuous in a capacitor.
- Be able to combine inductors with initial conditions in series and in parallel to form a single equivalent inductor with an initial condition; be able to combine capacitors with initial conditions in series and in parallel to form a single equivalent capacitor with an initial condition.

- Be able to determine the natural response of both *RL* and *RC* circuits.
- Be able to determine the step response of both *RL* and *RC* circuits.
- Be able to determine the natural response and the step response of parallel *RLC* circuits.
- Be able to determine the natural response and the step response of series *RLC* circuits.

Topical Outline : (Approximate and subject to change upon notification)

Meeting	Topics	Chapter
1	International System of Units Circuit Variables and Circuit Elements.	1
2 & 3	Voltage, Current, Power and Energy	1
4	Voltage and Current Sources	2
5	Electrical Resistance (Ohm's Law)	2
6	Kirchoff's Laws.	2
7	Analysis of a Circuit with Dependent Sources.	2
8 & 9	Combining Resistors in Series, Parallel & Delta-to-Wye	3
10	Techniques of Circuit Analysis.	4
11	***Exam 1 Chapters 1, 2 & 3***	
12	The Node-Voltage Method	4
13	The Mesh-Current Method	4
14	Source Transformations	4
15	Superposition.	4
16 & 17	Thevenin and Norton Equivalents.	4
18	The Operational Amplifier.	5
19	***Exam 2 Chapter 4***	
20	The Inverting-Amplifier Circuit & The Summing-Amplifier Circuit	5
21	The Non-inverting-Amplifier Circuit & The Difference-Amplifier Circuit	5
22 & 23	General Amplifier Circuits	5
24	The Inductor & Capacitor	6
25	***Exam 3 Chapter 5***	
26	Series-Parallel Combinations of Inductance and Capacitance	6
27	Natural Response of RL and RC Circuits.	7
28 & 29	Step Response of RL and RC Circuits.	7
30	Natural Response of a Parallel RLC Circuit	8
31	***Exam 4 Chapter 6& 7***	
32	Step Response of a Parallel RLC Circuit.	8
33	Natural Response of a Series RLC Circuit	8
34	Step Response of a Series RLC Circuit.	8
35	***Exam 5 Chapter 8***	
36	Review	1-8
37	Final Exam – Comprehensive Chapters 1-8	

Grading Evaluation: Grades are calculated from a weighted average of exams.

5 exams	62.5% (12.5% each)	A 88% - 100%
Final Exam	37.5%	B 75% - 87%
		C 63% - 74%
		D 50% - 62%
		F 0% - 49%

Missed Exam Policy

If you miss an opportunity to demonstrate your knowledge of the subject matter by missing a duly scheduled exam, the grading scheme does not apply. Your grade will be determined at the discretion of the instructor. By missing a duly scheduled exam you accept and recognize that the instructor must determine your grade within the context of determining the grade of students who did not miss a duly scheduled exam. Instructor Exam Make-up Policy: SUGGESTED: NO MAKE-UP EXAMS. FINAL EXAM WEIGHTED WITH PENALTY (0-100%) FOR MISSED WORK

Conduct: Students are required to follow *The Student Code of Conduct* as stated in the *Student Handbook*.

Accessibility: Access-Ability Services (AAS) serves as a liaison and resource to the KCC community regarding disability issues, promotes equal access to all KCC programs and activities, and makes every reasonable effort to provide appropriate accommodations and assistance to students with disabilities. Your instructor will make the accommodations you need once you provide documentation from the Access-Ability office (D205). Please contact AAS for assistance.

Suggested Problems

Chapter 1: Textbook Edition Dependent

Chapter 2: Textbook Edition Dependent

Chapter 3: Textbook Edition Dependent

Chapter 4: Textbook Edition Dependent

Chapter 5: Textbook Edition Dependent

Chapter 6: Textbook Edition Dependent

Chapter 7: Textbook Edition Dependent

Chapter 8: Textbook Edition Dependent