East West University
Department of Computer Science and Engineering
Course Outline
Spring 2024 Semester

Course: CSE209 Electrical Circuits (Section 7 and 8)

Credits and Teaching Scheme

	Theory	Laboratory	Total
Credits	3	1	4
Contact Hours	3 Hours/Week for 13 Weeks + Final Exam in the 14th Week	2 Hours/Week for 13 Weeks	5 Hours/Week for 13 Weeks + Final Exam in the 14th Week

Prerequisite
None

Instructor Information
Instructor: **Dr. Shugata Ahmed**
                Assistant Professor, Department of Robotics and Mechatronics Engineering, University of Dhaka
                Adjunct faculty, CSE, EWU
Office: Room # 446
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Class Routine and Office Hour

	8:30-10:00	10:10-11:40	11:50-1:20	1:30-3:00	3:10-4:40	4:50-6:50
Sunday						
Monday						
Tuesday			Office hour	CSE209(7) FUB-303	CSE209(8) FUB-303	CSE209 Lab (7) Electronics Lab (Room 548)
Wednesday						
Thursday			Office hour	CSE209(7) FUB-303	CSE209(8) FUB-303	CSE209 Lab (7) Electronics Lab (Room 548)

Course Objective

This course provides the students with fundamental knowledge of electrical circuits and various techniques of analyzing them. This course also provides hands-on experience in building and testing electrical circuits. Knowledge of this course will be needed as prerequisite knowledge for future courses such as CSE251 Electronic Circuits, CSE345 Digital Logic Design, CSE350 Data Communications, CSE360 Computer Architecture, CSE442 Microprocessor and Microcontroller, and CSE490 VLSI design.

Knowledge Profile

K1: Theory-based natural sciences
K3: Theory-based engineering fundamentals

Learning Domains

Cognitive - C2: Understanding, C3: Applying, C4: Analyzing
Psychomotor - P2: Manipulation, P3: Precision
Affective - A2: Responding

Program Outcomes (POs)

PO1: Engineering Knowledge
PO2: Problem Analysis

Complex Engineering Problem Solution

EP1: Depth of knowledge required
EP2: Range of conflicting requirements

Complex Engineering Activities

None

Course Outcomes (COs) with Mappings

After completion of this course students will be able to:

CO	CO Description	PO	Learning Domains	Knowledge Profile	Complex Engineering Problem Solving/ Engineering Activities
CO1	**Discuss** and **use** the concepts of electrical circuit elements, circuit variables, circuit laws, and circuit combinations for solving DC and AC circuits.	PO1	C2, C3	K1	-
CO2	**Examine** different circuit analysis techniques for DC circuit solution.	PO2	C4	K3	EP1, EP2
CO3	**Examine** different circuit analysis techniques for AC circuit solution.	PO2	C4	K3	EP1, EP2

CO4	**Use** analytical, software, and hardware tools and techniques; **perform** and **demonstrate** skills; and **write** report for designing, building, and testing electrical circuits.	PO1	C3 P2, P3 A2	K1, K3	EP1, EP2

Course Topics, Teaching-Learning Method, and Assessment Scheme

Course Topic	Teaching-Learning Method	CO	Mark of Cognitive Learning Levels			CO Mark	Exam (Mark)
			C2	C3	C4		
Basic Concepts of DC circuit, charge and current, voltage, power and energy, Circuit elements. Ohm's Law, Kirchhoff's Voltage Law, Kirchhoff's Current Law, Series-Parallel connections, Voltage and Current Division, Wye-delta Transformations.	Lecture, Class Discussion, Discussion outside class with Instructor/TA	CO1	6	8		14	Midterm Exam I (20)
DC Circuit Analysis: Nodal method (including independent and dependent sources, Super-node analysis).	Do	CO2			6	6	
DC Circuit Analysis: Mesh method (including independent and dependent sources, Super-mesh analysis).	Do	CO2			6	6	Midterm Exam II (20)
DC Circuit Analysis: Superposition, Source Transformation, Thevenin and Norton's equivalents, Maximum power transfer.	Do	CO2			14	14	
Basic Concepts of AC circuit, Sinusoids, Phasors, Phasor relationships for Circuit Elements, Impedance and admittance. Kirchhoff's laws in Frequency domain, Impedance Combinations.	Do	CO1	6			6	Final Exam (20)

| AC Circuit Analysis: Superposition, Source Transformation, Thevenin and Norton equivalents, Nodal and Mesh Analysis. Instantaneous and average power; Maximum average power transfer, Effective or RMS value, apparent power and power factor, Complex power. | Do | CO3 | | | 14 | 14 | |

Laboratory Experiments and Assessment Scheme

Experiment	Teaching-Learning Method	CO	Mark of Cognitive Learning Level	Mark of Psychomotor Learning Levels		Mark of Affective Learning Level	CO Mark
			C3	P2	P3	A2	
Introduction to Circuit Elements and Variables	Preparing Pre-Lab Report, Lab Experiment, and Result Analysis	CO4					
Series DC Circuit and Verification of Kirchhoff's Voltage Laws	Do	CO4					
Parallel DC Circuit and Verification of Kirchhoff's Current Laws	DO	CO4					
Bias Point Detail Analysis of DC Circuit with Independent and Dependent Sources Using PSpice Schematics.	Do	CO4					

Verification of Superposition Theorem	Do	CO4					
Verification of Thevenin's theorem	Do	CO4					
DC Circuit Analysis in PSpice using Source and Resistance Sweep	Do	CO4					
Experimental Study of Sinusoids and Their Characteristics	Do	CO4					
AC Circuit Analysis using PSpice Schematics	Do	CO4					
Total Lab Performance		CO4	7	1	1	1	10
Lab Exam		CO4	4	1	0	0	5
Total			**11**	**2**	**1**	**1**	**15**

Mini Project

Mini Project	Teaching-Learning Method	**CO**	**Mark of Cognitive Learning Level**	**Mark of Psychomotor Learning Levels**		**Mark of Affective Learning Level**	**CO Mark**
			C3	**P2**	**P3**	**A2**	
Mini Project including Report and Presentation	Group-based, moderately complex electrical circuit building for practical application with report writing and presentation	CO4	7	1	1	1	10

Overall Assessment Scheme

Assessment Area	CO				Other	PO Marks	
	CO1	CO2	CO3	CO4		PO1	PO2
Class Participation					5		
Class Test/Quiz					10		
Midterm-I Exam	14	6	0	0		14	6
Midterm-II Exam	0	20					20
Final Exam	6		14			6	14
Laboratory Performance and Lab Exam	0	0	0	15		15	
Mini Project	0	0	0	10		10	
Total	**20**	**26**	**14**	**25**	**15**	**45**	**40**

Teaching Materials/Equipment

Text book:

1. Boylestad, Robert L. *Introductory circuit analysis*. Pearson Education India, 2003.
2. Charles K. Alexander and Matthew N. O. Sadiku, *Fundamentals of Electric Circuits*, 5th Edition, Tata McGraw-Hill Publishing Company Limited, New Delhi, 2008.

Teaching-Learning Method:
Lectures, Discussions, Lab Exercises, and post-lab assignments

Lab Manual:
Lab manual will be provided.

Mini Project Description:
Mini Project description will be provided.

Equipment/Software:
Circuit trainer board, Power supply and PSpice Software.

Grading System

Marks (%)	Letter Grade	Grade Point	Marks (%)	Letter Grade	Grade Point
80 % and above	A+	4.00	50% to less than 55%	C+	2.50
75% to less than 80%	A	3.75	45% to less than 50%	C	2.25
70% to less than 75%	A-	3.50	40% to less than 45%	D	2.00
65% to less than 70%	B+	3.25	Less than 40%	F	0.00
60% to less than 65%	B	3.00			
55% to less than 60%	B-	2.75			

Exam Dates

Section	Mid 1	Mid 2	Final
1	Go to the link: https://www.ewubd.edu/academic-calendar		

Academic Code of Conduct

Academic Integrity:
Any form of cheating, plagiarism, personification, falsification of a document as well as any other form of dishonest behavior related to obtaining academic gain or the avoidance of evaluative exercises committed by a student is an academic offence under the Academic Code of Conduct and **may lead to severe penalties as decided by the Disciplinary Committee of the university.**

Special Instructions:
- Students are expected to attend all classes and examinations. A student MUST have at least 80% class attendance to sit for the final exam.
- Students will not be allowed to enter into the classroom after 20 minutes of the starting time.
- For plagiarism, the grade will automatically become zero for that exam/assignment.
- Normally there will be **NO make-up exam**. However, in case of **severe illness, death of any family member, any family emergency, or any humanitarian ground**, if a student misses any exam, the student MUST get approval of makeup exam by written application to the Chairperson through the Course Instructor **within 48hours**of the exam time. Proper supporting documents in favor of the reason of missing the exam have to be presented with the application.
- For **final exam**, there will be NO makeup exam. However, in case of **severe illness, death of any family member, any family emergency, or any humanitarian ground**, if a student misses the final exam, the student MUST get approval of **Incomplete Grade** by written application to the Chairperson through the Course Instructor **within 48 hours** of the final exam

time. Proper supporting documents in favor of the reason of missing the final exam have to be presented with the application. **It is the responsibility of the student to arrange an Incomplete Exam within the deadline mentioned in the Academic Calendar in consultation with the Course Instructor**.

- All mobile phones MUST be turned to silent mode during class and exam period.
- There is **zero tolerance for cheating** in exam. Students caught with cheat sheets in their possession, whether used or not writing on the palm of hand, back of calculators, chairs or nearby walls; copying from cheat sheets or other cheat sources; copying from other examinee, etc. would be treated as cheating in the exam hall. The only penalty for cheating is **expulsion for several semesters as decided by the Disciplinary Committee of the university**.