



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

Course: CSE251/ ICE213 Electronic Circuits (Section 1)

Credits and Teaching Scheme

	Theory	Laboratory	Total
Credits	3	1	4
Contact Hours	5 Hours/Week for 7 Weeks + Final Exam in the 8 th Week	4 Hours/ Week for 7 Weeks	9 Hours/Week for 7 Weeks + Final Exam in the 8 th Week

Prerequisite

CSE209/ICE109 Electrical Circuits

Instructor Information

Instructor: Dr. Md. Habibur Rahman

Professor, Department of Electrical and Electronic Engineering,
University of Dhaka, Bangladesh.

Office: Room #

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TA: Shuva Kumer (01831839121)

Class Routine and Office Hour

	8:00-10:30		10:40-12:40	12:40-1:40		
Sunday						
Monday	CSE251(1) Room-111		CSE251(1)-Lab Room-547	Office time		
Wednesday	CSE251(1) Room-111		CSE251(1)-Lab Room-547	Office time		
Thursday						

Course Objective

The subject aims to provide student with an understanding and capability to use the basic electrical and electronic abstractions to analysis and design of circuits and systems built with lumped and electronic circuit elements. This course provides fundamental knowledge of how complex devices such as semiconductor diodes, operational amplifiers (op-amp), bipolar and field effect transistors are modeled and used in the design and analysis of useful practical circuits. Besides, this course also emphasizes practical implementation of building, testing and performance analysis of electronic circuits. Knowledge of this course will be needed as prerequisite knowledge for future courses such as CSE345 Digital Logic Design, CSE350 Data Communications, CSE360 Computer Architecture, CSE442 Microprocessor and Microcontrollers 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	EP/EA
CO1	Understand and use the fundamental concepts of Diode, Bipolar Junction Transistor (BJT), MOSFET and Operational amplifier (Op amp) for solving electronic circuits.	PO1	C2, C3	K1	
CO2	Use and justify Diode, BJT and MOSFET for designing electronic circuits.	PO2	C3, C4	K2	
CO3	Use and justify Operational amplifier for designing electronic circuits.	PO2	C3, C4	K2	

CO4	Use analytical, software, and hardware techniques, perform and demonstrate skills, and write report to design, build and test electronic circuits.	PO1	C3 P2, P3 A2	K1, K2	EP1, EP2
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Course Topics, Teaching-Learning Method, and Assessment Scheme

Topic	Teaching-Learning Method	CO	Mark of Cognitive Learning Levels			Mark of COs	Exam Mark
			C2	C3	C4		
Operation and characteristics of semiconductor diode, Load-line analysis.	Lecture, Slides, Class Discussion, Discussion with Instructor/TA	CO1	3	4		7	Mid Semester Exam (30)
Applications of Diode: Rectifier circuits, Clipper and Clamper, Zener Diode.	Do	CO2		4	5	9	
Device Structure and Physical Operation of BJT, Modes of Operation, Current-Voltage Characteristics, BJT as an amplifiers and switch.	Do	CO1	3			3	
BJT circuits at DC, Biasing in BJT amplifier circuits.	Do	CO2			5	5	
Characteristics of ideal Op amp, Basic Comparator circuits, Inverting and non-inverting amplifiers, Voltage follower.	Do	CO1	3	3		6	
Applications such as: Adder and Difference amplifier, Integrator and Differentiator, Instrumentation amplifiers.	Do	CO3		4	9	13	Final Exam (30)

Device Structure and Physical Operation of MOSFET, Modes of Operation, Current-Voltage Characteristics, MOSFET as an Amplifier and Switch.	Do	CO1	3	4		7	
DC biasing and small signal operations of MOSFET, Small signal equivalent models of MOSFET, Logic circuit using n-MOS and p-MOS.	Do	CO2		3	7	10	

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	
I-V Characteristics and Modeling of Forward Conduction of a Diode	Preparing Pre-Lab Report, Lab Experiment, and Result Analysis	CO4					
Diode Rectifier Circuits	Do	CO4					
Study of clipper and clamper circuits	DO	CO4					
Biasing of BJT Common-Emitter Circuit	Do	CO4					
Adder and Amplifier Circuits Using Op Amp	Do	CO4					
Signal Integration and	Do	CO4					

Differentiation Using Op-Amp							
Measurement of Parameters and I-V characteristics of an N-channel MOSFET	Do	CO4					
Biasing of a Common-Source Voltage Amplifier	Do	CO4					
Total Lab Performance		CO4	4	1	0	0	5
Lab Exam		CO4	7	1	1	1	10
Total			11	2	1	1	15

Mini Project

Mini Project	Teaching-Learning Method	CO	EP/EA	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 electronic circuit building for practical application with report writing and presentation	CO4	EP1,EP2	7	1	1	1	10

Overall Assessment Scheme

Assessment Area	CO				Total	PO Marks	
	CO1	CO2	CO3	CO4		PO1	PO2
Class Test/Quiz	5	5	5		15	5	10
Mid Semester Exam	16	14			30	16	14
Final Exam	7	10	13		30	7	23
Laboratory Performance and Lab Exam				15	15	15	
Mini Project				10	10	10	
Total	28	29	18	25	100	53	47

Teaching Materials

Textbook:

1. Adel S. Sedra and Kenneth C. Smith, *Microelectronic Circuits*, New Delhi, Oxford University Press, 2010.
2. Charles K. Alexander and Matthew N. O. Sadiku, *Fundamental of Electrical Circuits*. New Delhi, McGraw Hill Education, 2013.

Teaching-Learning Method:

Lectures, Discussions, Lab Exercises, and post-lab assignments

Lab Manual:

Lab manual will be provided.

Project Description:

Project description will be provided.

Equipment/Software:

Function Generator, Oscilloscope, DC power supply, Digital trainer board & PSpice Software.

Grading System

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

Exam Dates

Section	Class Slot	Mid Semester	Final
1			August 25-29
2			

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 miss 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 miss 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.**