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

Course Information

Course: CSE251/ICE213 Electronic Circuits (Sections: 3 & 4)

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
CSE209 Electrical Circuits

Instructor Information
Instructor: **Dr. Sarwar Jahan**
Associate Professor, Department of Computer Science and Engineering,
East West University, Bangladesh.
Office: Room # 444
Tel. No.: 165 (ext.)
E-mail: sjahan@ewubd.edu

Class Routine and Office Hour

Day/Time	08:00-09:15	09:25-10:40	10:50-12:05	12:15-01:30	01:40-02:55	03:05-04:20
Sunday		CSE251/ICE213 SEC: 3 ROOM: 432	**OFFICE HOUR**	CSE251/ICE213 SEC: 4 ROOM: 107	**OFFICE HOUR**	
Monday		ICE/ETE446 SEC: 1 ROOM: 432	**OFFICE HOUR**	CSE209 SEC: 1 ROOM: 429	CSE251/ICE213 SEC: 4 ROOM: 547 **01:40-03:40**	**OFFICE HOUR**
Tuesday		CSE251/ICE213 SEC: 3 ROOM: 432	**OFFICE HOUR**	CSE251/ICE213 SEC: 4 ROOM: 107	CSE209/ICE109 [LAB] SEC: 1 ROOM: 548 **01:40-03:40**	**OFFICE HOUR**
Wednesday		ICE/ETE446 SEC: 1 ROOM: 432	**OFFICE HOUR**	CSE209 SEC: 1 ROOM: 429	**OFFICE HOUR**	
Thursday			CSE251/ICE213 [LAB]; SEC:3 ROOM: 547 **10:10-12:50**			

Course Objective

The subject aims to provide students with the ability to use basic electrical and electronic abstractions to analyze and design 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), and bipolar and field effect transistors are modeled and used to design and analyze useful practical circuits. Besides, this course also emphasizes the 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 amplifiers for designing electronic circuits.	PO2	C3, C4	K2	

CO		PO1	C3 P2, P3 A2	K1, K2	EP1, EP2
CO4	**Use** analytical, software, and hardware techniques, **perform** and **demonstrate** skills, and **write** reports to design, build and test electronic circuits.				

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 amplifiers and switch.	Do	CO1	3			3	
BJT circuits at DC, Biasing in BJT amplifier circuits.	Do	CO2			5	5	
Characteristics of the ideal Op-amp, Basic Comparator circuits, Inverting and non-inverting amplifiers, Voltage follower.	Do	CO1	3	3		6	
Applications such as Adder and Difference amplifiers, Integrator and Differentiator, and Instrumentation amplifiers.	Do	CO3		4	9	13	Final Exam (30)

Topic	Teaching-Learning Method	CO				
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					

			Mark of Cognitive Learning Level	Mark of Psychomotor Learning Levels		Mark of Affective Learning Level	
Signal Integration and Differentiation Using Op-Amp	Do	CO4					
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.
3. Robert Boylestad, and Louis Nashelsky, Electronic devices, and circuit theory, Pearson, 2012.

Lab Manual: Lab manuals will be provided.

Project Description: Project descriptions will be provided.

Equipment/Software: Digital trainer board, and Computer & 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
3&4	ST	Sunday (08 December 2024)	https://www.ewubd.edu/academic-calendar-details/Fall-2024-exam-schedule

Academic Code of Conduct

Academic Integrity:
Any form of cheating, plagiarism, personification, or 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 offense 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 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 for a 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 for missing the exam have to be presented with the application.
- For the **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 the 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 for 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 periods.
- There is **zero tolerance for cheating** in exams. Students caught with cheat sheets in their possession, whether used or not; writing on the palm of the hand, back of calculators, chairs, or nearby walls; copying from cheat sheets or other cheat sources; copying from other examinees, 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**.

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Course Instructor