Electrical Engineering Workshop (ইলেকিট্রিকাল ইঞ্জিনিয়ারিং) 3 hours/day

Week 1: From Electrons to Circuits (ইলেক্ট্রন থেকে সার্কিট)

Lesson 1.3: Fundamentals of Electricity: Diodes, How to Use a Breadboard, and Designing Simple Circuits (ইলেক্ট্রিসিটির মূলসূত্র)

 RECAP: R, L, C in series and parallel; R, L, C behavior with AC and DC Any questions?? Better ask now because I'll soon be testing your understanding! MINI-QUIZI Erase everything on the board and give them a mini quiz to test understanding from first two classes. RECALL: Remember we talked about AC signals? DRAW: Groph of AC signal with voltage going positive and negative. DRAW: Groph of AC signal with voltage going positive and negative. DRAW: Groph with AC voltage connected to resistor. POSE QUESTION: What does the voltage look like across the resistor? Same as the graph I just drew right? What if I don't want any negative voltage across my resistor? What if I want just positive? (Draw desired output) I need another component right? Con I make that happen with R, L, and Cs? GUIDE THROUGH: what happens if we put an R, L, or C between the VAC and the R? Do any of these work? DRAW graphs of voltage across R for each inserted R, L, or C. WORKSHEET: Explain why we might want to only allow current to flow one way. Also students drow graphs as we go through the examples on the board. NEW CONCEPT: None of those components worked, so we need a new component! This component is called a diode. A diode only allows current to flow one way, and it blocks negative voltage. It only allows current to flow one way, and it blocks negative voltage. It only allows current to flow one way, and it blocks negative voltage. It only allows current to flow one way, and it blocks negative voltage. It only allows current to flow one way, and it blocks negative voltage. It only allows current to flow what happens (open circuit) when the voltage across the resistor with the diode in between put to show what the voltage across the resistor with the diode in between but in the opposite direction? GUIDE who				
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flowing through R and 7.		·		
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	0	WORKSHEET: Explain what a Zener diode does in your own words.		
•	NEW	CONCEPT: Breadboards! Explain importance of breadboards.		
	0	DRAW: Connections in breadboards.		
	0	PASS AROUND: A breadboard with the backing open to show evidence of		
		connections		
	0	GUIDE STUDENTS THROUGH: Converting simple circuits to layout on breadboard.		
		3 examples. Method: Circle nodes, check off as you place each component on the		
		breadboard.	•	20 m
	0	GUIDE STUDENTS THROUGH: Example with op-amp on breadboard – hooking up		
		8 pins to things.		
	0	WORKSHEET: 2 conversions of circuits to breadboard layouts		
•	USE \	VEB APP: Students independently go through 5-10 breadboard layout challenges		
	from	assigned circuits. (Have 15 prepared) Be there to answer questions as students		
	comp	lete exercises.		
•	DESIG	GN TIME: Design a circuit that can power one LED.		
	0	CHALLENGE: Now design a circuit that can power 5 LED's at once from one		
		battery.		
	0	GROUP THINKING: A third of the class does the LED's in series circuits. A third of	•	40 m
		the class does the LED's in parallel circuits. A third of the class does the LED-resistor		
		combos in parallel circuits.		
	0	ORDER: Make a hypothesis about what you think will happen for the circuit that	•	30 m
		you build. Then build it. Then record your results/observations.		
	0	DISCUSS: Reconvene and ask each group to report their results from their		
		explorations. Why did certain circuits work and certain other circuits didn't work?		
•	EXIT:	Yay that's it! Everyone's exit ticket is a piece of paper with their (1) rating of the		
		(2) list of up to three things they liked a lot, and (3) list of up to three things they		
	didn'	like and what they would like instead.		
			•	5 m
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