

# Bangladesh Polytechnic Institute

Technology: **Computer**

Semester: 2nd

Sub. Name: Electronic Devices & circuits-1 (6821)

T P C: 3 3 4

## Course Outline

Teacher Name: Md. Faruk Azam

Mob.No: 01740 91 87 33 / 01788 92 92 29

Class No.	Discussion and Explanation of Topics/ Titles	Remarks
Class-1	<ul style="list-style-type: none"> <li>❖ <b>Understand the concept of Transistor characteristics.</b></li> <li>➤ State the biasing rule of transistor</li> <li>➤ Explain the characteristics of transistor in CB, CC &amp; CE configuration</li> </ul>	
Class-2	<ul style="list-style-type: none"> <li>➤ Determine the input and output resistance of transistor in CB, CC, CE configuration.</li> <li>➤ Describe the Base width modulation or Early effects.</li> </ul>	
Class-3	<ul style="list-style-type: none"> <li>➤ Mention transistor cut-off, active and saturation region.</li> <li>➤ Discuss transistor ratings.</li> <li>➤ Compare CB, CC, CE configuration</li> </ul>	
Class-4	<ul style="list-style-type: none"> <li>❖ <b>Understand Concept of Transistor Biasing and Stabilization</b></li> <li>➤ Define (i) load line (ii) Operating Point (iii) Stability factor.</li> <li>➤ Describe the methods of drawing load line.</li> <li>➤ Explain the leakage current in CB &amp; CE circuits.</li> </ul>	
Class-5	<ul style="list-style-type: none"> <li>➤ List the factors affecting stability of Q-points.</li> <li>➤ Mention the condition for proper biasing of transistor.</li> <li>➤ Describe various methods of transistor biasing.</li> </ul>	
Class-6	<ul style="list-style-type: none"> <li>➤ Determine the stability factor of various transistor biasing circuits.</li> <li>➤ Describe the Thermal Runway and bias compensation methods.</li> <li>➤ Solve problem related to components values, Q-Points and stability factor.</li> </ul>	
Class-7	<ul style="list-style-type: none"> <li>❖ <b>Understand the Concept of Transistor Model and equivalent circuits.</b></li> <li>➤ Explain the operation of a single stage CE transistor amplifier.</li> <li>➤ Mention the notation for currents and voltages of transistor amplifier.</li> <li>➤ Describe the transistor as a four terminal device.</li> </ul>	
Class-8	<ul style="list-style-type: none"> <li>➤ Describe the low frequency small signal (Shockley relationship <math>r'_{e=}</math>) model of transistor.</li> <li>➤ Solve problem related to amplifier parameters using small signal (<math>r_e</math>) model.</li> <li>➤ Explain the transistor model with h-parameters.</li> </ul>	
Class-9	<ul style="list-style-type: none"> <li>➤ Derive formula for current gain, voltage gain, input impedance, and output impedance of CE, CB and CC transistor amplifier by h-parameters.</li> <li>➤ Mention the effects of source and load resistance.</li> <li>➤ Solve problem for various transistor amplifier using h-parameters.</li> </ul>	
Class-10	<ul style="list-style-type: none"> <li>❖ <b>Understand the Concept of Multistage amplifier.</b></li> <li>➤ Define (i) Multistage amplifier (ii) Cascade amplifier (iii) Cascode amplifier</li> <li>➤ (iv) Decibel gain.</li> </ul>	

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	<ul style="list-style-type: none"> <li>➤ Mention the advantages of expressing the gain in dB.</li> <li>➤ Classify multistage amplifier</li> </ul>	
Class-11	<ul style="list-style-type: none"> <li>➤ Describe the need and types of coupling.</li> <li>➤ Explain the operation of multistage direct coupled, transformer coupled and RC coupled amplifier.</li> <li>➤ Describe frequency response and its dependence on component values and transistor parameters.</li> </ul>	
Class-12	<ul style="list-style-type: none"> <li>➤ Describe the term frequency response, half power point, 3dB point, upper and lower cutoff frequencies, bandwidth and gain bandwidth product related to frequency response.</li> <li>➤ Derive voltage gain of two stage R-C coupled amplifier for low and high frequency equivalent circuit.</li> <li>➤ Describe the advantages, disadvantages &amp; applications for above types of multistage amplifier</li> </ul>	
Class-13	 <b>Feed Back</b>	
Class-14	<ul style="list-style-type: none"> <li>❖ <b>Understand the Concept of Power Amplifier</b></li> <li>➤ Define class A, B, AB and C amplifier.</li> <li>➤ State the difference between voltage and power amplifier.</li> </ul>	
Class-15	<ul style="list-style-type: none"> <li>➤ Explain the circuit operation and efficiency of RC and transformers coupled class-A power amplifier.</li> <li>➤ Explain the operation and efficiency of class - A and class-B push pull amplifier.</li> </ul>	
Class-16	<ul style="list-style-type: none"> <li>➤ Describe the operation of complementary symmetry push pull amplifier.</li> <li>➤ Explain the operation, efficiency and distortion of class-C amplifier.</li> </ul>	
Class-17	<ul style="list-style-type: none"> <li>➤ Explain the operation and frequency response of various tuned amplifier.</li> <li>➤ Explain the operation and frequency response of various tuned amplifier.</li> <li>➤ Describe the advantages, disadvantages &amp; application of the various types power amplifier.</li> </ul>	
Class-18	<ul style="list-style-type: none"> <li>❖ <b>Understand the Concept of Field-Effect Transistor(FET).</b></li> <li>➤ Define field effect transistor(FET).</li> <li>➤ Mention the types of FET</li> <li>➤ Describe the construction and operation Junction Field Effect Transistor (JFET).</li> </ul>	
Class-19	<ul style="list-style-type: none"> <li>➤ Explain characteristics of JFET .</li> <li>➤ Describe the parameters of JFET.</li> <li>➤ Establish the relationship among FET parameters.</li> </ul>	
Class-20	<ul style="list-style-type: none"> <li>➤ Describe the DC biasing of JFET and its load line.</li> <li>➤ Explain the operation of CS, CD and CG JFET amplifiers.</li> <li>➤ Solve problems based on FET parameters</li> </ul>	
Class-21	 <b>Feed Back</b>	

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	 <b>Class Test</b>	
Class-22	<p>❖ <b>Understand the concept of Metal Oxide Semiconductor FET (MOSFET).</b></p> <ul style="list-style-type: none"> <li>➤ Define MOSFET.</li> <li>➤ Mention the Types of MOSFET</li> </ul>	
Class-23	<ul style="list-style-type: none"> <li>➤ Describe the Construction and operation of DE and E-Only MOSFET.</li> <li>➤ Explain the characteristics of DE and E-Only MOSFET.</li> <li>➤ Compare BJT and JFET.</li> </ul>	
Class-24	<ul style="list-style-type: none"> <li>➤ Compare MOSFET and JFET.</li> <li>➤ Mention the application of JFET and MOSFET in analog and digital circuits.</li> </ul>	
Class-25	<p>❖ <b>Understand the Concept of Feedback Amplifier</b></p> <ul style="list-style-type: none"> <li>➤ Define feedback</li> <li>➤ List the types of feedback</li> </ul>	
Class-26	<ul style="list-style-type: none"> <li>➤ Describe different types of feedback with block diagram.</li> <li>➤ Calculate the gain of amplifier with feedback (positive and negative).</li> </ul>	
Class-27	<ul style="list-style-type: none"> <li>➤ Describe the effect of positive and negative feedback in oscillator and amplifier.</li> <li>➤ Mention the advantages and disadvantages of negative feedback in amplifier.</li> </ul>	
Class-28	<p>❖ <b>Understand The concept of Sinusoidal Oscillators.</b></p> <ul style="list-style-type: none"> <li>➤ Define Oscillator.</li> <li>➤ List the types of Oscillator</li> </ul>	
Class-29	<ul style="list-style-type: none"> <li>➤ Explain the principle of operation of a oscillatory tank circuit.</li> <li>➤ Describe the essentials of feedback LC oscillators.</li> <li>➤ State the Barkhausen criterion</li> </ul>	
Class-30	<ul style="list-style-type: none"> <li>➤ Explain the principle of operation of tuned collector, tuned base and Tuned Drain oscillators.</li> <li>➤ Explain the principle of operation of Hartly, Colpitt and Wein-bridge oscillators</li> </ul>	
Class-31	<ul style="list-style-type: none"> <li>➤ Explain the principle of operation phase shift &amp; crystal oscillators.</li> <li>➤ Solve problem related to the frequency of various oscillators.</li> </ul>	
Class-32	 <b>Class Test</b>	
Class-33	<p>❖ <b>Understand the operation of time base circuit</b></p> <ul style="list-style-type: none"> <li>➤ Define time base circuit.</li> <li>➤ Describe the need for time base wave forms.</li> </ul>	

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	➤ Mention the methods of generating time base waveform	
Class-34	➤ Explain the generation of saw-tooth wave using charging and discharging of a capacitor. ➤ Describe the operation of transistor as a switch	
Class-35	➤ Describe the operation of sweep circuit using transistor switch. ➤ Explain the operation of Miller sweep circuit and Bootstrap sweep circuit.	
Class-36	❖ <b>Understand the features of multivibrator circuits (square wave generator)</b> ➤ State what is meant by multivibrator. ➤ Identify the types of multivibrator.	
Class-37	➤ Explain the operation of astable, monostable and bistable multivibrator circuits with wave shapes. ➤ Explain triggering techniques for bistable multivibrator circuit.	
Class-38	➤ Mention the principle of operation of Schmitt trigger circuit. ➤ Mention the operating principle of transistorized voltage controlled oscillator.	
Class-39	🚦 Feed Back	
Class-40	🚦 Class Test	
Class-41	🚦 Model Test	

### Reference Book:-

V.K.Metha