

ACADEMIC PLAN & UNITIZATION OF SYLLABUS

Department of PHYSICS

Bankura Christian College

ACADEMIC YEAR 2023-24 (Semester -IV)

4th Semester (March to June)

Core T10 - Analog Systems and Applications

5. Amplifiers

Amplifiers: Transistor Biasing and Stabilization Circuits. Fixed Bias and Voltage Divider Bias. Transistor as 2-port Network. h-parameter Equivalent Circuit. Analysis of a single-stage CE amplifier using Hybrid Model. Input and Output Impedance. Current, Voltage and Power Gains. Classification of Class A, B & C Amplifiers. Frequency response of a CE amplifier.

Coupled Amplifier: Two stage RC-coupled amplifier.

Feedback in Amplifiers: Effects of Positive and Negative Feedback on Input Impedance, Output Impedance, Gain, Stability, Distortion and Noise.

Sinusoidal Oscillators: Barkhausen's Criterion for self-sustained oscillations. RC Phase shift oscillator, determination of Frequency. Hartley & Colpitts oscillators.

Operational Amplifiers (Black Box approach): Characteristics of an Ideal and Practical Op-Amp. (IC 741) Open-loop and Closed-loop Gain. Frequency Response. CMRR. Slew Rate and concept of Virtual ground.

Applications of Op-Amps: Linear - (1) Inverting and non-inverting amplifiers, (2) Adder, (3) Subtractor, (4) Differentiator, (5) Integrator, (6) Log amplifier, (7) Zero crossing detector (8) Wein bridge oscillator. Non-linear – (1) inverting and non-inverting comparators, (2)

Schmidt triggers.

Conversion: Resistive network (Weighted and R-2R Ladder). Accuracy and Resolution. A/D Conversion (successive approximation)

MONTH/YEAR	WEEK	PORTIONS
March 23	3	Introduction, Transistor Biasing and Stabilization Circuits. Fixed Bias and Voltage Divider Bias.
	4	Transistor as 2-port Network. h-parameter Equivalent Circuit. Analysis of a single-stage CE amplifier using Hybrid Model. Input and Output Impedance. Current, Voltage and Power Gains.
	5	Classification of Class A, B & C Amplifiers. Frequency response of a CE amplifier. Coupled Amplifier: Two stage RC-coupled amplifier.
MONTH/YEAR	WEEK	PORTIONS
April 23	1	Feedback in Amplifiers: Effects of Positive and Negative Feedback on Input Impedance, Output Impedance, Gain, Stability, Distortion and Noise.
	2	Feedback in Amplifiers: Effects of Positive and Negative Feedback on Input Impedance, Output Impedance, Gain, Stability, Distortion and Noise.
	3	Sinusoidal Oscillators: Barkhausen's Criterion for self-sustained oscillations. RC Phase shift oscillator, determination of Frequency.
	4	Hartley & Colpitts oscillators.

	5	Revision with Previous year question discussion
MONTH/YEAR	WEEK	PORTIONS
May 23	1	Unit Test
	2	Characteristics of an Ideal and Practical Op-Amp. (IC 741) Open-loop and Closed-loop Gain. Frequency Response.
	3	CMRR. Slew Rate and concept of Virtual ground.
	4	Applications of Op-Amps: Linear - (1) Inverting and non-inverting amplifiers, (2) Adder, (3) Subtractor, (4) Differentiator
	5	Applications of Op-Amps: Linear - (5) Integrator, (6) Log amplifier, (7) Zero crossing detector (8) Wein bridge oscillator.
MONTH/YEAR	WEEK	PORTIONS
June 23	1	Non-linear – (1) inverting and non-inverting comparators, (2) Schmidt triggers.
	2	Conversion: Resistive network (Weighted and R-2R Ladder). Accuracy and Resolution.
	3	A/D Conversion (successive approximation)
	4	Revision with Previous year question discussion
	5	Unit Test



06.03.2023