



# GANDHISCHOOL OF ENGINEERING

**BHABANDHA, BERHAMPUR**

**BRANCH:-ELECTRONICS & TELECOMMUNICATION ENGINEERING**

**SEMESTER:-4<sup>TH</sup>**

**SUBJECT:-ANALOG ELECTRONICS & LINEAR IC**

**Name of the Faculty- ER. NIHAR RANJAN JENA**

Sl. No	Topic/Module	No. of period	Detail of the topics	Date	Topic No.	Topic Name	Date	Remarks
1	DIODE, TRANSISTORS AND CIRCUITS.	10	1.1 Working principle, of Diode & its current equation, Specification and use of p-n junction diode. 1.2 Breakdown of diode (Avance & Zener Breakdown) and Construction, working, Characteristics 1.3 Classification of Rectifiers and working of different types of Rectifiers- Half-Wave Rectifier, Full-Wave Rectifier (CT & BRIDGE type) 1.4 Working principle of p-n-p and n-p-n transistor, different types of transistor connection (CB, CE and CC) & input and output characteristics of transistor in different connections. 1.5 Define ALPHA, BETA and GAMMA of transistors in various modes. Establish the Mathematical relationship between them. 1.6 Basic concept of Biasing, Types of Biasing, h-parameter model of BJT, load line (AC & DC) and determine the Q-point. 1.7 Types of Coupling, working principle and use of R-C Coupled Amplifier & Frequency Responses of R-C coupled Amplifier & draw the curve.	13/02/2023 TO 24/02/2023	1.1 1.2 1.3 1.4	Working principle, of Diode & its current equation, Specification and use of p-n junction diode. Breakdown of diode (Avance & Zener Breakdown) and Construction, working, Characteristics Classification of Rectifiers and working of different types of Rectifiers- Half-Wave Rectifier, Full-Wave Rectifier (CT & BRIDGE type) Working principle of p-n-p and n-p-n transistor, different types of transistor connection (CB, CE and CC) & input and output characteristics of transistor in different connections.	13/02/2023 & 14/02/2023 15/02/2023 16/02/2023 & 17/02/2023 20/02/2023 & 21/02/2023 & 22/02/2023	

					1.5	Define ALPHA, BETA and GAMMA of transistors in various modes. Establish the Mathematical relationship between them.	23/02/2023	
					1.6	Basic concept of Biasing, Types of Biasing, h-parameter model of BJT, load line (AC & DC) and determine the Q-point.	23/02/2023	
					1.7	Types of Coupling, working principle and use of R-C Coupled Amplifier & Frequency Responses of R-C coupled Amplifier & draw the curve.	24/02/2023	
2	AUDIO POWER AMPLIFIERS.	08	2.1 Classify Power Amplifier & Differentiate between Voltage and Power Amplifier. 2.2 Working principle of different types of Power Amplifier (Class-A, Class-AB, Class-B and Class-C & Class D amplifier). 2.3 Construction and working principle and advantages of Push Pull (Class-B) Amplifiers	25/02/2023 TO 06/03/2023	2.1	Classify Power Amplifier & Differentiate between Voltage and Power Amplifier.	25/02/2023	
					2.2	Working principle of different types of Power Amplifier (Class-A, Class-AB, Class-B and Class-C & Class D amplifier).	27/02/2023 & 28/02/2023 & 01/03/2023 & 02/03/2023 & 03/03/2023	
					2.3	Construction and working principle and advantages of Push Pull (Class-B) Amplifiers	04/03/2023 & 06/03/2023	

3	FIELD EFFECT TRANSISTOR (FET).	10	3.1 FET & its classifications & Differentiate between JFET & BJT. 3.2 Construction, working principle & characteristics of JFET & Explain JFET as an amplifier, parameters of JFET & Establish relation among JFET parameters. 3.3 Construction & working principle MOSFET & its classification & characteristics (Drain & Transfer) 3.4 Explain the operation of CMOS, VMOS & LDMOS.	09/03/2023 TO 20/03/2023	3.1	FET & its classifications & Differentiate between JFET & BJT.	09/03/2023	
					3.2	Construction, working principle & characteristics of JFET & Explain JFET as an amplifier, parameters of JFET & Establish relation among JFET parameters.	10/03/2023 & 11/03/2023 & 13/03/2023 & 14/03/2023	
					3.3	Construction & working principle MOSFET & its classification & characteristics (Drain & Transfer)	15/03/2023 & 16/03/2023 & 17/03/2023	
					3.4	Explain the operation of CMOS, VMOS & LDMOS.	18/03/2023 & 20/03/2023	
4	FEED BACK AMPLIFIER & OSCILLATOR	08	4.1 Define & classify Feedback Amplifier, principle of negative feedback with the help of block diagram, Types of feedback – negative & positive feedback. 4.2 Types of negative feedback – voltage shunt, voltage series, current shunt & current series and characteristics voltage gain, bandwidth, input Impedance output impedance, stability, noise, distortion in amplifiers. 4.3 Oscillator -block diagram of sine wave oscillator, Types Requirement of oscillation Barkhausen criterion 4.4 RC oscillators – RC phase shift, Crystal, LC oscillators – Colpitts, Hartley & Wien Bridge Oscillators: Circuit operation, circuit diagram, equation for frequency of oscillation & frequency stability	21/03/2023 TO 29/03/2023	4.1	Define & classify Feedback Amplifier, principle of negative feedback with the help of block diagram, Types of feedback – negative & positive feedback.	21/03/2023	
					4.2	Types of negative feedback – voltage shunt, voltage series, current shunt & current series and characteristics voltage gain, bandwidth, input Impedance output impedance, stability, noise, distortion in amplifiers.	22/03/2023 & 23/03/2023 & 24/03/2023	
					4.3	Oscillator -block diagram of sine wave oscillator, Types Requirement of oscillation, Barkhausen criterion	25/03/2023	

					4.4	RC oscillators – RC phase shift ,Crystal, LC oscillators – Colpitts , Hartley & Wien Bridge Oscillators :Circuit operation, circuit diagram, equation for frequency of oscillation & frequency stability	27/03/2023 & 28/03/2023 & 29/03/2023	
5	TUNED AMPLIFIER & WAVE SHAPING CIRCUIT	12	5.1 Defined and classify Tuned amplifier, Explain parallel Resonant circuit, Resonance Curve & sharpness of Resonance. 5.2 working principle of Single tuned Voltage& Double tuned Amplifier & its limitation 5.3 Different type of Non-linear circuits - Clipper, diode series &shunt, positive& negative biased & unbiased and combinational clipper clippers circuit & its application. 5.4 Different type of Clamper circuit (positive & negative clampers) & its application. 5.5 Working of Astable, Monostable&BistableMultivibrator with circuit diagram. 5.6 Working& use of Integrator and Differentiator circuit using R- C circuit(Linear), input / output waveforms & frequency response.	31/03/2023 TO 17/04/2023	5.1	Defined and classify Tuned amplifier, Explain parallel Resonant circuit, Resonance Curve & sharpness of Resonance.	31/03/2023 & 03/04/2023	
					5.2	working principle of Single tuned Voltage& Double tuned Amplifier & its limitation	04/04/2023 & 05/04/2023	
					5.3	Different type of Non-linear circuits - Clipper, diode series &shunt, positive& negative biased & unbiased and combinational clipper clippers circuit & its application.	06/04/2023 & 08/04/2023	
					5.4	Different type of Clamper circuit (positive & negative clampers) & its application.	10/04/2023 & 11/04/2023	
					5.5	Working of Astable, Monostable & Bistable Multivibrator with circuit diagram.	12/04/2023 & 13/04/2023	
					5.6	Working& use of Integrator and Differentiator circuit using R- C circuit(Linear), input / output waveforms & frequency response.	15/04/2023 & 17/04/2023	
6	OPERATIONAL AMPLIFIER CIRCUITS & FEEDBACK CONFIGURATIONS	14	6.1 Differential amplifier & explain its configuration &significance. 6.2 Block diagram representation of a typical Op- Amp, its equivalent circuits and draw the schematic symbol 6.3 Discuss the types of integrated circuits manufacturer's	18/04/2023 TO 04/05/2023	6.1	Differential amplifier & explain its configuration &significance.	18/04/2023	
					6.2	Block diagram representation of a typical Op- Amp, its equivalent circuits and draw the schematic	19/04/2023	

			designations of ICs, Package types, pin identification and temperature and ordering information. 6.4 Define the following electrical characteristics input offset voltage, input offset current, CMMR, Large signal voltage gain, Slew rate . 6.5 Draw and explain the Open Loop configuration (inverting, non-inverting Amplifier) 6.6 Draw the circuit diagram of the voltage series feedback amplifier and derive the close loop Voltage gain, gain of feedback circuits input resistance, and output resistance, bandwidth and total output offset voltage with feedback. 6.7 Draw the circuit diagram of the voltage shunt feedback amplifier and derive the close loop, Voltage gain, gain of feedback circuits and input resistance, and output resistance, bandwidth and total output offset voltage with feedback.		symbol		
				6.3	Discuss the types of integrated circuits manufacturer's designations of ICs, Package types, pin identification and temperature and ordering information.	20/04/2023	
				6.4	Define the following electrical characteristics input offset voltage, input offset current, CMMR, Large signal voltage gain, Slew rate .	21/04/2023	
				6.5	Draw and explain the Open Loop configuration (inverting, non-inverting Amplifier)	24/04/2023 & 25/04/2023	
				6.6	Draw the circuit diagram of the voltage series feedback amplifier and derive the close loop Voltage gain, gain of feedback circuits input resistance, and output resistance, bandwidth and total output offset voltage with feedback.	26/04/2023 & 27/04/2023 & 28/04/2023 & 29/04/2023	
				6.7	Draw the circuit diagram of the voltage shunt feedback amplifier and derive the close loop, Voltage gain, gain of feedback circuits and input resistance, and output resistance, bandwidth and total output offset voltage with feedback.	01/05/2023 & 02/05/2023 & 03/05/2023 & 04/05/2023	

7	APPLICATION OF OPERATIONAL AMPLIFIER, TIMER CIRCUITS& IC voltage regulator	13	7.1 Discuss the summing scaling and averaging of inverting and non-inverting amplifiers 7.2 DC & AC Amplifies using OP-AMP. 7.3 Integrator and differentiator using op-amp. 7.4 Active filter and describe the filter design of fast order low Pass Butterworth 7.5 Concept of Zero-Crossing Detector using Op-Amp 7.6 Block diagram and operation of IC 555 timer &IC 565 PLL& its applications. 7.7 Working of Current to voltage Convertor using Operational Amplifier 7.8 Working of the Voltage to Frequency Convertor using Operational Amplifier. 7.9 Working of the Frequency to Voltage Conversion using Operational Amplifier. 7.10 Operation of power supply using 78XX and 79XX,LM 317 Series with their PIN configuration 7.11 Functional block diagram & Working of IC regulator LM 723 & LM 317.	06/05/2023 TO 22/05/2023	7.1	Discuss the summing scaling and averaging of inverting and non-inverting amplifiers	06/05/2023
					7.2	DC & AC Amplifies using OP-AMP.	08/05/2023
					7.3	Integrator and differentiator using op-amp.	09/05/2023
					7.4	Active filter and describe the filter design of fast order low Pass Butterworth	10/05/2023
					7.5	Concept of Zero-Crossing Detector using Op-Amp	11/05/2023
					7.6	Block diagram and operation of IC 555 timer &IC 565 PLL& its applications.	12/05/2023
					7.7	Working of Current to voltage Convertor using Operational Amplifier	13/05/2023
					7.8	Working of the Voltage to Frequency Convertor using Operational Amplifier.	15/05/2023
					7.9	Working of the Frequency to Voltage Conversion using Operational Amplifier.	16/05/2023
					7.10	Operation of power supply using 78XX and 79XX,LM 317 Series with their PIN configuration	17/05/2023 & 18/05/2023
					7.11	Functional block diagram & Working of IC regulator LM 723 & LM 317.	20/05/2023 & 22/05/2023

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