

SUBJECT DESCRIPTION AND OBJECTIVES**DESCRIPTION:**

The aim of this course is to familiarize the student with the analysis and design of basic transistor Amplifier circuits and power supplies.

OBJECTIVES:

The student should be made to

- Learn about biasing of BJTs and MOSFETs
- Design and construct amplifiers
- Construct amplifiers with active loads
- Study high frequency response of all amplifiers

OUTCOMES:

Upon Completion of the course, the students will be able to:

- Design circuits with transistor biasing.
- Design simple amplifier circuits.
- Analyze the small signal equivalent circuits of transistors.
- Design and analyze large signal amplifiers.

UNIT I BIASING OF DISCRETE BJT AND MOSFET 9

DC Load line, operating point, various biasing methods for BJT-Design-Stability - Bias compensation, Thermal stability, Design of biasing for JFET, Design of biasing for MOSFET

UNIT II BJT AMPLIFIERS 9

Small signal Analysis of Common Emitter-AC Loadline, Voltage swing limitations, Common collector and common base amplifiers – Differential amplifiers- CMRR- Darlington Amplifier- Bootstrap technique - Cascaded stages - Cascode Amplifier,

UNIT III JFET AND MOSFET AMPLIFIERS 9

Small signal analysis of JFT amplifiers- Small signal Analysis of MOSFET and JFET, Common source amplifier, Voltage swing limitations, Small signal analysis of MOSFET and JFET Source follower and Common Gate amplifiers, - BiMOS Cascode amplifier

UNIT IV FREQUENCY ANALYSIS OF BJT AND MOSFET AMPLIFIERS 9

Low frequency and Miller effect, High frequency analysis of CE and MOSFET CS amplifier, Short circuit current gain, cut off frequency – f_{α} and f_{β} unity gain and Determination of bandwidth of single stage and multistage amplifiers

UNIT V IC MOSFET AMPLIFIERS 9

IC Amplifiers- IC biasing Current steering circuit using MOSFET- MOSFET current sources- PMOS and NMOS current sources. Amplifier with active loads - enhancement load, Depletion load and PMOS and NMOS current sources load- CMOS common source and source follower- CMOS differential amplifier- CMRR.

TOTAL (L: 45+T:15): 60 PERIODS

TEXT BOOK:

1. Donald .A. Neamen, Electronic Circuit Analysis and Design –2nd Edition, Tata Mc Graw Hill, 2009.

REFERENCES:

1. Adel .S. Sedra, Kenneth C. Smith, “Micro Electronic Circuits”, 6th Edition, Oxford University Press, 2010.
2. David A., “Bell Electronic Devices and Circuits”, Oxford Higher Education Press, 5th Editon, 2010
3. Behzad Razavi, “Design of Analog CMOS Integrated Circuits”, Tata Mc Graw Hill, 2007.
4. Paul Gray, Hurst, Lewis, Meyer “Analysis and Design of Analog Integrated Circuits”, 4th Edition , John Willey & Sons 2005
5. Millman.J. and Halkias C.C, “Integrated Electronics”, Mc Graw Hill, 2001.
6. D.Schilling and C.Belove, “Electronic Circuits”, 3rd Edition, Mc Graw Hill, 1989.

MICRO LESSON PLAN

week	Hours	LECTURE TOPICS	BOOK
UNIT I BIASING OF DISCRETE BJT AND MOSFET			
I	1.	Introduction about subject	T1
	2.	DC Load line, operating point	
	3.	Various biasing methods for BJT(AV Class)	
	4.		
	5.	Design-Stability	
	6.		
II	7.	Bias compensation	
	8.		
	9.	Thermal stability	
	10.	Design of biasing for JFET	
	11.	Design of biasing for MOSFET	
	12.		
UNIT II BJT AMPLIFIERS			
III	13.	Small signal Analysis of Common Emitter-AC Loadline	T1
	14.	Voltage swing limitations	
	15.	Common collector and common base amplifiers	
	16.		
	17.	Differential amplifiers- CMRR	
	18.	Darlington Amplifier(AV Class)	
IV	19.	Bootstrap technique	
	20.		
	21.	Cascaded stages	
	22.		
	23.	Cascode Amplifier	
	24.		
UNIT III JFET AND MOSFET AMPLIFIERS			
V	25.	Small signal analysis of JFT amplifiers(AV Class)	T1
	26.		
	27.	Small signal Analysis of MOSFET and JFET	
	28.		

V	29.	Common source amplifier	T1
	30.	Voltage swing limitations	
VI	31.	Small signal analysis of MOSFET and JFET	T1
	32.		
	33.	Source follower and Common Gate amplifiers	
	34.		
	35.	BiMOS Cascode amplifier	
36.			
UNIT IV FREQUENCY ANALYSIS OF BJT AND MOSFET AMPLIFIERS			
VII	37.	Low frequency and Miller effect(AV Class)	T1
	38.		
	39,40,41	High frequency analysis of CE and MOSFET CS amplifier	
VIII	42.	Short circuit current gain	
	43.		
	44.	Cut off frequency – f_{α} and f_{β}	
	45.		
	46.	Unity gain	
	47.	Determination of bandwidth of single stage and multistage amplifiers	
48.			
UNIT V IC MOSFET AMPLIFIERS			
IX	49.	IC Amplifiers	T1
	50.	IC biasing Current steering circuit using MOSFET(AV Class)	
	51.		
	52.	MOSFET current sources	
	53.	PMOS and NMOS current sources	
	54.	Amplifier with active loads	
X	55.	Enhancement load, Depletion load	
	56.	PMOS and NMOS current sources load	
	57.	CMOS common source and source follower	
	58.		
	59.	CMOS differential amplifier- CMRR	
	60.		