NOC:Analog Circuits - Video course

COURSE OUTLINE

This course is an introduction to amplifiers using transistors. Students will be introduced to MOS transistors, their characteristics, techniques for biasing them, and amplifiers using them. The basic transistor amplifier stages are seen as realizations of different controlled sources using negative feedback. Small- and large-signal characteristics of each amplifier will be discussed. At the end of this course, students should be able to recognize and analyze the basic amplifiers and biasing arrangements using MOS or bipolar transistors.

COURSE DETAIL

Week. No	Unit	Unit Contents
1.	1	Course introduction; Need for nonlinear circuits; Incremental gain of a two port nonlinear circuit
	2	Constraints on y-parameters and large signal characteristics to obtain a high gain; MOS transistor and its characteristics
2.	3	AC coupling network to add signal to bias; AC coupling at input and output; Common source amplifier
	4	Output conductance of a MOS transistor; Inherent gain limitation of a transistor
3.	5	Sensitivity of gm to transistor parameters; Biasing a transistor at a constant current; Drain feedback

NP-TEL

NPTEL

http://nptel.ac.in

Electrical Engineering

Pre-requisites:

Typical 1st and 2nd year EE curriculum. Specific pre-requisite courses are:

1. Basic Electrical Circuits

(e.g., http://nptel.ac.in/courses/117106108/ or https://onlinecourses.nptel.ac.in/iitm_ec_1010/)

2. Networks and Systems

(e.g., http://nptel.ac.in/courses/108106075/)

Coordinators:

Dr. Nagendra Krishnapura
Department of Electrical EngineeringIIT Madras

		configuration; Current mirror
	6	Common source amplifier using drain feedback
4.	7	Common source amplifier using current mirror bias
	8	Common source amplifier using source feedback bias; Using a resistor instead of a current source for biasing; Further biasing techniques
5.	9	VCVS using a transistor; Source follower biasing
	10	CCVS using a transistor; CCVS using an opamp
6.	11	Biasing a CCVS; Emitter degenrated amplifier
	12	Common gate amplifier and its biasing
7.	13	VCCS using a transistor and its biasing
	14	pMOS transistor and its small signal model
8.	15	Biasing a pMOS transistor; Converting nMOS circuits to pMOS;
	16	Amplifiers using a pMOS transistor
9.	17	Bipolar junction transistor- large and small signal models
	18	BJT circuits- Biasing; Common source amplifier; Emitter follower
10.	19	BJT Common base amplifier, Transimpedance amplifier
	20	Swing limits of amplifiers

11.	21	Two transistors in feedback
	22	Two transistors in feedback