

1.	Title of the course	Analog Circuits
2.	Course number	EE207L
3.	Structure of credits (L-T-P-C)	3-1-0-4
4.	New course/modification to	Modified with EE301L/ANALOG CIRCUITS
5.	To be offered by	Electrical Engineering
6.	Prerequisite	None
7.	Course Objective(s): To discuss the principles of analog circuit design using transistors. To design amplifiers, controlled sources and operational amplifier.	
8.	Course Content: Introduction: linear and nonlinear networks, small-signal analysis of nonlinear networks, incremental gain; MOSFET and its characteristics; MOSFET as an amplifier: small-signal model, DC biasing and AC coupling, common source amplifier, swing limits, role of output conductance in saturation; Introduction to robust biasing: negative/positive feedback, common source amplifier with DC drain feedback, current mirror, source feedback, source degeneration, drain to source feedback, source to gate feedback; Realization of controlled sources using MOSFET: common drain and common gate amplifiers; PMOS transistor and active load; CMOS inverter; Differential pair; Design of single stage and two stage operational amplifier (OpAmp); Bias current generation; Bandgap reference; MOSFET capacitances; Frequency response of common source, common drain and common gate amplifiers; Stability of negative feedback systems: gain and phase margin, dominant pole compensation, Miller compensated two stage OpAmp design; OpAmp based circuits; Active filters; Overview of BJT based amplifier design.	
9.	Textbook(s): 1. Sedra A S and Smith K C, Microelectronic Circuits: Theory and Applications, 7th Edition, Oxford (2017). 2. Razavi B, Fundamentals of Microelectronics, 3rd Edition, Wiley (2021).	
10.	Reference(s): 1. Razavi B, Design of Analog CMOS Integrated Circuits, 2nd Edition, McGraw Hill (2017).	