PVP-19

ANALOG IC DESIGN

Course Code	19EC4702C	**Year**	IV	**Semester**	I
Course Category	Program Elective V	**Branch**	ECE	**Course Type**	Theory
Credits	3	**L-T-P**	3-0-0	**Prerequisites**	VLSI Design
Continuous Internal Evaluation	30	**Semester End Evaluation**	70	**Total Marks**	100

Course Outcomes		
Upon successful completion of the course, the student will be able to		
CO1	Contrast MOS devices, its models and differential amplifiers.	L4
CO2	Build single stage and differential amplifiers using MOSFET	L3
CO3	Analyze OP-AMP based Circuits.	L4
CO4	Learn layout and packaging processes	L2

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3-High, 2: Medium, 1:Low)

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	2	1								2	1
CO2	3	2	2	2	1								2	1
CO3	3	2	2	2	1								2	1
CO4	3	2	2	2	1								2	1
Average* (Rounded to nearest integer)														

Syllabus		
Unit No.	**Contents**	**Mapped CO**
I	**Basic MOS Device Physics:** General Considerations, MOS I/V Characteristics, Second-Order Effects, MOS Device Models.	CO1, CO2
II	**Single Stage and Differential Amplifiers:** Common-Source Stage, Source Follower, Common- Gate Stage, Cascode Stage, Basic Differential Pair, Common-Mode Response, Differential Pair with MOS Loads.	CO1, CO2
III	**Operational Amplifiers:** General Considerations, One-Stage Op Amps, Two-Stage Op Amps, Gain Boosting, Common-Mode Feedback, Input Range Limitations, High-Slew-Rate Op Amps, Power Supply Rejection.	CO3
IV	**Nanometer Design Studies:** Transistor Design Considerations, Deep-Submicron Effects, Transconductance Scaling, Transistor Design, Op Amp Design Examples, High-Speed Amplifier.	CO3
V	**Layout and Packaging:** General Layout Considerations, Analog Layout Techniques, Substrate Coupling, Packaging.	CO4

Learning Resources
Text Books
1. Behzad Razavi, Design of Analog CMOS Integrated Circuits, 2/e, Mc-Graw Hill Education, 2017
Reference Books
1. Adel S. Sedra, Kenneth C. Smith, Microelectronic Circuits, 7/e, Oxford University Press. 2. R. Jacob Baker, CMOS Circuit Design, Layout and Simulations, 3/e, IEEE press, 2010. 3. David A. Johns, Ken Martin, Analog Integrated Circuit Design, 2/e, John Wiley & Sons. 4. Robert L. Boylestad, Louis Nashelsky, Electronic Devices and Circuits Theory, 10/e,Pearson Education, 2009.