

## ELECTRONIC DEVICES AND AMPLIFIER CIRCUITS

<b>Course Code</b>	19EC3302	<b>Year</b>	II	<b>Semester</b>	I
<b>Course Category</b>	Program Core	<b>Branch</b>	ECE	<b>Course Type</b>	Theory
<b>Credits</b>	3	<b>L-T-P</b>	3-0-0	<b>Prerequisites</b>	BEEE
<b>Continuous Internal Evaluation</b>	30	<b>Semester End Evaluation</b>	70	<b>Total Marks</b>	100

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<b>Course Outcomes</b>	
Upon successful completion of the course, the student will be able to	
<b>CO1</b>	Characterize and analyze BJT amplifiers at low and high frequencies
<b>CO2</b>	Determine MOSFET amplifier performance at low and high frequencies.
<b>CO3</b>	Adapt different models of BJT and MOSFET circuits for improving the IC performance
<b>CO4</b>	Design single stage and multistage differential amplifiers using MOSFET.

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<b>Contribution of Course Outcomes towards achievement of Program Outcomes &amp; Strength of correlations (3-High, 2: Medium, 1:Low)</b>														
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	2	2			1	1	1		2	2	1
CO2	3	3	2	2	2			1	1	1		2	2	1
CO3	3	3	2	2	2			1	1	1		2	2	1
CO4	3	3	2	2	2			1	1	1		2	2	1

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<b>Syllabus</b>		
Unit No.	Contents	Mapped CO
I	<b>Bipolar Junction Transistors:</b> Device structure and physical operation, current-voltage characteristics, the BJT as an amplifier and as a switch, BJT circuits at dc, biasing in BJT amplifier circuits, small signal operation and models.	CO1
II	<b>MOS Field-Effect Transistors:</b> Device structure and physical operation, current-voltage characteristics, MOSFET circuits at dc, the MOSFET as an amplifier and as a switch, biasing in MOS amplifier circuits, small signal operation and models.	CO2
III	IC Design Philosophy, Comparison of the MOSFET and the BJT, IC biasing-current sources, current mirrors and current-steering circuits, current-mirror circuits with improved performance.	CO3
IV	<b>Single Stage MOSFET Amplifiers:</b> Estimating 3dB frequency of amplifiers, Basic MOSFET amplifier configurations, MOSFET internal capacitances and high frequency model. Low Frequency and High Frequency Response of Common Source, Common Gate and Common Drain Amplifiers.	CO2
V	<b>Differential Amplifiers:</b> The MOS differential pair, small-signal operation of the MOS differential pair, other non-ideal	CO4

	characteristics of MOS differential amplifier, the MOS differential amplifier with active load, multistage MOS amplifiers.	
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<b>Learning Resources</b>	
<b>Text Books</b>	
1. Adel S. Sedra, Kenneth C. Smith, Arun N. Chandorkar, Microelectronic Circuits, 6/e, Oxford University Press, 2013.	
<b>Reference Books</b>	
1. Behzad Razavi, Fundamentals of Microelectronics, 2/e, Wiley Student Edition, 2013.	
2. Robert L. Boylestad, Louis Nashelsky, Electronic Devices and Circuits Theory, 10/e, Pearson Education, 2009.	
3. Dharma Raj Cheruku, B T Krishna, Electronic Devices and Circuits, 2/e, Pearson Education, 2008.	
<b>e- Resources &amp; other digital material</b>	
<a href="http://www.faadooengineers.com/threads/4615-Electronic-Devices-and-Circuit-Theory-Boylestad-and-Nashelsky">http://www.faadooengineers.com/threads/4615-Electronic-Devices-and-Circuit-Theory-Boylestad-and-Nashelsky</a>	
<a href="https://docplayer.net/53934331-J-b-gupta-electronic-devices-and-circuits.html">https://docplayer.net/53934331-J-b-gupta-electronic-devices-and-circuits.html</a>	