Electronic Circuit Analysis

Course Code	23EC3402	Year	II	Semester	II
Course Category	PC	Branch	ECE	Course Type	Theory
Credits	3	L-T-P	3-0-0	Pre requisites	EDC
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		BL
CO1	Describe the basic concepts of amplifiers and oscillators.	L2
CO2	Apply the analysis methods to solve the problems on amplifiers and oscillators.	L3
CO3	Analyze the different BJT and FET based amplifier circuits.	L4
CO4	Analyze the different BJT and FET based oscillators circuits.	L4

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength ofCorrelations (3:High, 2:Medium, 1:Low)													
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	2								2	2	2	1	1
CO2	3								2	2	2	1	1
CO3		3							2	2	2	1	1
CO4		3							2	2	2	1	1
Avg.	3	3							2	2	2	1	1

Syllabus		
Unit No.	Contents	Mapped CO
1	**Small Signal High Frequency Transistor Amplifier (BJT):** Transistor at high frequencies, hybrid-π common emitter transistor model, hybrid-π conductance, hybrid-π capacitances, validity of hybrid- π model, determination of high-frequency parameters in terms of low-frequency parameters, CE short-circuit current gain, current gain with resistive load. **FET:** Common source FET model at high frequencies, analysis of common source and common drain amplifier circuits at high frequencies.	CO1- CO3
2	**Multistage Amplifiers:** Classification of amplifiers, methods of coupling**, c**ascaded transistor amplifier and its analysis, analysis of two-stage RC coupled amplifier, Darlington pair amplifier, Boot-strap emitter follower, cascode amplifier.	CO1- CO3
3	**Feedback Amplifiers:** Feedback principle and concept, types of feedback, classification of amplifiers, feedback topologies, characteristics of negative feedback amplifiers, method of analysis of feedback amplifiers, analysis of four types feedback amplifiers, performance comparison of feedback amplifiers.	CO1- CO3

4	**Oscillators:** Oscillator principle, condition for oscillations, types of oscillators, RC phase shift and Wien bridge oscillators with BJT and FET and their analysis, generalized analysis of LC Oscillators, Hartley and Colpitt's oscillators using BJT, Frequency and amplitude stability of oscillators.	CO1, CO2, CO4
5	**Power Amplifiers:** Classification of amplifiers, single-stage class A power amplifier, transformer-coupled class A power amplifier, push-pull amplifiers, class B push-pull amplifiers, complementary symmetry push pull amplifier, cross-over distortion, class AB power amplifier.	CO1-CO3

Learning Resources
Text Books
1. J. Millman, C. Halkias, and Ch. D. Parikh, Millman's Integrated Electronics, Mc-Graw Hill Education, 2nd Ed., 2009. 2. Robert L. Boylestad and Louis Nashelsky, Electronic Devices and Circuits Theory Pearson/Prentice Hall, 10th Ed., 2009.
Reference Books
1. Behzad Razavi, Fundamentals of Microelectronics, Wiley, 3rd edition, 2021. 2. Sedra A.S. and K.C. Smith, Microelectronic Circuits, Oxford University Press, 6th Edition, 2011. 3. Mottershead Allen, Electronic Devices and Circuits; An introduction, PHI, 1979
e-Resources & other Digital Material
1. https://onlinecourses.nptel.ac.in/noc24_ee106/preview 2. https://ocw.mit.edu/courses/6-002-circuits-and-electronics-spring-2007/