

## ELECTRONIC CIRCUIT ANALYSIS

<b>IV Semester: ECE</b>								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
AEC004	Core	L	T	P	C	CIA	SEE	Total
		3	1	-	3	30	70	100
<b>Contact Classes: 45</b>		<b>Tutorial Classes: 15</b>		<b>Practical Classes: Nil</b>			<b>Total Classes: 60</b>	
<b>I. COURSE OVERVIEWS:</b>								
<p>This course provides design and analysis of small signal low frequency, high frequency, and large signal amplifier circuits. The course covers multistage amplifiers, power amplifiers, and feedback amplifiers. Analog electronics are widely used in radio and audio equipment and in many applications where signals are derived from analog sensors and transducers.</p>								
<b>II. OBJECTIVES:</b>								
<b>The course should enable the students to:</b>								
<ul style="list-style-type: none"> <li>I Design and analyse single stage and multi stage Amplifiers.</li> <li>II Analyse the frequency response of different types of Amplifiers.</li> <li>III Interpret the concept of feedback and classify various types of feedback amplifiers.</li> <li>IV Understand the principle of oscillation and design different types of oscillators.</li> </ul>								
<b>III. COURSE OUTCOMES:</b>								
<b>After successful completion of the course, students should be able to:</b>								
CO 1		List the effects of resistance, coupling and bypass capacitors for frequency response of single stage amplifiers.					Remember	
CO 2		Explain the concept of transistor amplifiers at high frequency for determining gain and bandwidth.					Understand	
CO 3		Develop RC, transformer and direct coupled multi stage amplifiers to find the effect of cascading on gain and bandwidth.					Apply	
CO 4		Summarize the concept of tuned amplifiers for determining the resonant frequency and gain.					Understand	
CO 5		Demonstrate the conditions required by an amplifier to generate positive and negative feedback amplifiers.					Apply	
CO 6		Describe different types of power amplifiers based on position of quiescent point for determining efficiency and power dissipation of class A, class B power amplifiers.					Understand	
<b>IV. SYLLABUS:</b>								
<b>UNIT-I</b>	<b>SINGLE STAGE AMPLIFIERS AND FREQUENCY RESPONSE</b>						<b>Classes: 10</b>	
<p>Classification of amplifiers, overview of analysis of a transistor amplifier circuit using h-parameter, Millers theorem and its dual, design of Single stage RC coupled amplifier using bipolar junction transistor, low frequency response of bipolar junction transistor amplifier, analysis at low frequency, effect of coupling and bypass capacitor.</p>								
<b>UNIT-II</b>	<b>HIGH FREQUENCY RESPONSE OF AMPLIFIER</b>						<b>Classes: 08</b>	
<p>The hybrid-<math>\pi</math> common emitter transistor model, hybrid <math>\pi</math> conductance and capacitance, effect of coupling and bypass capacitors, common emitter short circuit current gain, current gain with resistive load, alpha, beta cut-off frequencies, gain bandwidth product, emitter follower at high frequencies</p>								

<b>UNIT-III</b>	<b>MULTI STAGE AMPLIFIERS AND TUNED AMPLIFIERS</b>	<b>Classes: 10</b>
<p>Multistage amplifier: Different coupling schemes used in amplifiers, RC coupled amplifiers, transformer coupled amplifiers and direct coupled amplifiers, analysis of cascaded RC coupled bipolar junction transistor amplifiers, cascode amplifiers, Darlington pair.</p> <p>Tuned amplifiers: introduction, Q - factor, small signal tuned amplifier, effect of cascading single tuned amplifiers on bandwidth, stagger tuned amplifiers, stability of tuned amplifiers.</p>		
<b>UNIT-IV</b>	<b>FEEDBACK AMPLIFIERS AND OSCILLATORS</b>	<b>Classes: 09</b>
<p>Feedback amplifiers: Concept of feedback, classification of feedback amplifiers, general characteristics of negative feedback amplifiers, analysis of voltage series, voltage shunt, current series and current shunt feedback configurations, problems; Oscillators: Classification of oscillator, conditions for oscillations, RC phase shift oscillator, generalized analysis of LC oscillations, Hartley and Colpitts oscillators, Wien - bridge and crystal oscillators, stability of oscillators.</p>		
<b>UNIT-V</b>	<b>LARGE SIGNAL AMPLIFIERS</b>	<b>Classes: 08</b>
<p>Classification, class A large signal amplifiers, transformer coupled class A audio power amplifiers, efficiency of class A amplifier, class B amplifier, efficiency of class B amplifier, class B push-pull amplifier, complementary symmetry class B push-pull amplifier, distortion in power amplifiers, thermal stability and heat sinks</p>		
<b>Text Books:</b>		
<ol style="list-style-type: none"> <li>1. Jacob Millman, Christor C Halkias, "Integrated Electronics", Tata McGraw Hill, 1<sup>st</sup> Edition, 2008.</li> <li>2. Sedra A.S., K.C. Smith, "Micro Electronic Circuits", Oxford University Press, 6<sup>th</sup> Edition, 2013.</li> <li>3. Donald A Neamen, "Electronic Circuits Analysis and Design", Tata McGraw Hill, 3<sup>rd</sup> Edition, 2007.</li> </ol>		
<b>Reference Books:</b>		
<ol style="list-style-type: none"> <li>1. David A. Bell "Electronic Devices &amp; Circuits" 5<sup>th</sup> Edition,. Oxford university press, 7<sup>th</sup> Edition, 2009.</li> <li>2. Robert L. Boylestad, Louis Nashelsky, "Electronic Devices and Circuits Theory", Pearson education, 9<sup>th</sup> Edition, 2008.</li> <li>3. S.Salivahana, N. Suresh kumar, "Electronic circuit analysis", McGraw-Hill Education, 1<sup>st</sup> Edition, 2011.</li> <li>4. K. Lal Kishore, "Electronic Circuit Analysis", BS Publications,1<sup>st</sup> Edition, 2004.</li> </ol>		
<b>Web References:</b>		
<ol style="list-style-type: none"> <li>1. <a href="http://www.igniteengineers.com">http://www.igniteengineers.com</a></li> <li>2. <a href="http://www.ocw.nthu.edu.tw">http://www.ocw.nthu.edu.tw</a></li> <li>3. <a href="http://www.uotechnology.edu.iq">http://www.uotechnology.edu.iq</a></li> <li>4. <a href="http://www.iare.ac.in">http://www.iare.ac.in</a></li> </ol>		
<b>E-Text Books:</b>		
<ol style="list-style-type: none"> <li>1. <a href="https://www.jntubook.com/electronic-circuit-analysis-textbook">https://www.jntubook.com/electronic-circuit-analysis-textbook</a></li> <li>2. <a href="http://trdownload.com/results/neamen-electronic-circuit-analysis-and-design-.html">http://trdownload.com/results/neamen-electronic-circuit-analysis-and-design-.html</a></li> <li>3. <a href="http://www.allaboutcircuits.com">http://www.allaboutcircuits.com</a></li> <li>4. <a href="http://www.te.kmutnb.ac.th/~msn/225301reports156-2.pdf">http://www.te.kmutnb.ac.th/~msn/225301reports156-2.pdf</a></li> </ol>		
<b>Course Home Page:</b>		