ANALOG AND PULSE CIRCUITS

IV SEMESTER: ECE

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
AECB11	Core	3	1	-	4	30	70	100
Contact Classes: 45	Tutorial Classes: 15	Practical Classes: Nil				Total Classes: 60		

OBJECTIVES:

The course should enable the students to:

I. The analysis of transistor amplifiers using low frequency and high frequency signals
II. The response of a linear wave shaping circuits of low pass and high pass filters.
III. The generation of nonlinear oscillations by using regenerative feedback circuit for multivibrators.

COURSE OUTCOMES:

CO 1: **Demonstrate** the concept of single stage amplifiers using frequency response of transistor in CE configuration.
CO 2: Interpret the behavior of transistor at high frequency using hybrid-Π model for common emitter transistor.
CO 3: **Apply** hybrid-Π model on various configurations of transistor to calculate gain, bandwidth and gain-bandwidth product.
CO 4: **Summarize** the concept of feedback in amplifiers for the differentiation between negative and positive feedback.
CO 5: **Solve** gain, input resistance output resistance for cascading individual negative feedback amplifiers stages.
CO6 : **Obtain** the expression for frequency and amplitude stability for different oscillators
CO 7: **Relate** types of power amplifiers for practical applications with given specifications.
CO 8: **Interpret** linear wave shaping circuits for inputs like step and square wave..
CO 9: **Illustrate** types of sampling gates with operating principles using diodes and transistors.
CO 10: **Interpret** the working of bistable, monostable, astable multivibrators and schmitt trigger using cross coupled Transistors.
CO 11:**Analyze** different Multivibrators circuits using transistors and employ their design for real time use.
CO 12:**Apply** basic principles of analog electronics for real time applications in radio and audio equipment.

MODULE-I	MULTISTAGE AMPLIFIERS	Classes: 08

Classification of Amplifiers, Distortion in amplifiers, Different coupling schemes used in amplifiers, Frequency response and Analysis of multistage amplifiers, Cascade amplifier, Darlington pair.
Transistor at High Frequency: Hybrid - model of Common Emitter transistor model, f_α, β and unity gain bandwidth, Gain band width product.

MODULE-II	FEEDBACK AMPLIFIERS	Classes: 10

Concepts of feedback – Classification of feedback amplifiers – General characteristics of Negative feedback amplifiers – Effect of Feedback on Amplifier characteristics – Voltage series, Voltage shunt, Current series and Current shunt Feedback configurations.

MODULE-III	OSCILLATORS AND LARGE SIGNAL AMPLIFIERS	Classes: 08
Condition for Oscillations, RC type Oscillators-RC phase shift and Wien-bridge Oscillators, LC type Oscillators –Generalized analysis of LC Oscillators, Hartley and Colpitts Oscillators, Frequency and amplitude stability of Oscillators, Crystal Oscillator. Class A Power Amplifier- Series fed and Transformer coupled, Conversion Efficiency, Class B Power Amplifier- Push Pull and Complimentary Symmetry configurations, Conversion Efficiency, Principle of operation of Class AB and Class C Amplifiers. Tuned Amplifiers: Single Tuned Amplifiers – Q-factor, frequency response of tuned amplifiers, Concept of stagger tuning and synchronous tuning.		
MODULE-IV	**LINEAR WAVE SHAPING AND SAMPLING GATES**	**Classes: 10**
Linear wave shaping circuits: High pass RC and low pass RC circuits, response to step and square inputs with different time constants, high pass RC circuit as a differentiator, low pass RC circuit as an integrator. Sampling gates: basic operating principle of sampling gate, uni and bi directional sampling gates.		
MODULE-V	**MULTIVIBRATORS**	**Classes: 09**
Multivibrators: Bistable multivibrator, unsymmetrical triggering, symmetrical triggering; Schmitt trigger; Monostable multivibrator, Astable multivibrator.		

Text Books:

1. Jacob Millman, Christos C Halkias, "Integrated Electronics" McGraw Hill Education, 2nd Edition, 2010.
2. B.N.Yoganarasimhan, "Pulse and Digital Circuits", 2nd Edition, 2011.
3. A. Anand Kumar, "Pulse and Digital Circuits", PHI learning, 2nd Edition, 2005.

Reference Books:

1. David A. Bell, "Electronic Devices and Circuits", Oxford, 5th Edition, 1986.
2. Robert L. Boylestead, Louis Nashelsky, "Electronic Devices and Circuits Theory", Pearson Education, 11th Edition, 2009.

Web References:

1. www.nptel.ac.in
2. notes.specworld.in/pdc-pulse-and-digital-circuits
3. http:// www.introni.it/pdf/Millman-Taub- Pulse and Digital Switching Waveforms 1965.pdf
4. https://www.jntubook.com/pulse-digital-circuits-textbook-free-download/

E-Text Books:

1. https://www.jntubook.com/electronic-circuit-analysis-textbook
2. http://tradownload.com/results/neamen-electronic-circuit-analysis-and-design-.htm
3. http://www.igniteengineers.com
4. http://www.ocw.nthu.edu.tw