MARRI LAXMAN REDDY
INSTITUTE OF TECHNOLOGY AND MANAGEMENT
(AN AUTONOMOUS INSTITUTION)
(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)
Accredited by NAAC with 'A' Grade & Recognized Under Section 2(f) & 12(B) of the UGC act,1956

COURSE CONTENT

ELECTRONIC CIRCUIT ANALYSIS								
IV Semester: ECE								
Course Code	**Category**	**Hours/ Week**			**Credits**	**Maximum Marks**		
2540408	**Core**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**40**	**60**	**100**
Contact Classes: 36	**Tutorial Classes: Nil**	**Practical Classe: Nil**				**Total Classes:36**		
Prerequisites: knowledge on electronic circuit analysis								

Couse Overview:

This course provides an in-depth study of analog electronic circuits, focusing on multistage amplifiers, feedback systems, oscillators, power amplifiers, and waveform generators. Students will analyze, design, and evaluate transistor-based circuits for signal amplification and waveform generation. Practical applications, frequency response, distortion control, and stability techniques are emphasized throughout.

Course Objectives:

The students will try to learn

- Design and analysis of multistage transistor amplifiers and their frequency response
- Various feedback amplifier topologies and their impact on amplifier performance
- Design sinusoidal and non-sinusoidal oscillators using both LC and RC feedback principles
- Different classes of power amplifiers in terms of efficiency, distortion, and configuration
- Design and implement multivibrators and time base generators using transistor circuits

Course Outcomes:

After successful completion of the course, students shall be able to

- Analyze and classify multistage amplifier configurations and determine the impact of coupling
  schemes on amplifier performance and frequency response
- Apply the hybrid-π transistor model to evaluate high-frequency behavior of common-emitter amplifiers and calculate gain-bandwidth product
- Examine feedback amplifier types and assess the influence of negative feedback on gain stability, bandwidth, and distortion
- Design and analyze LC, RC, and crystal oscillators based on the Barkhausen criterion to generate sinusoidal waveforms
- Design power amplifiers and multivibrator circuits, and evaluate their performance in terms of efficiency, distortion, and waveform generation

Module – I: Multistage Amplifiers   **9L**

Classification of Amplifiers, Distortion in Amplifiers, Coupling schemes: RC, Transformer, Direct coupling, Frequency response of multistage amplifiers, Transistor configuration choice in cascade amplifiers, Cascade and Cascade amplifiers, Darlington pair amplifier. High-Frequency Transistor Model: Hybrid-π model, Hybrid-π parameters: Conductance's and capacitances, CE short-circuit current gain, Gain with resistive load and gain-bandwidth product.

Module – II: Feedback Amplifiers   **7L**

Concept and need for feedback in amplifiers, Types and classification of feedback amplifiers, Characteristics of negative feedback: Gain stability, bandwidth, noise, distortion, Voltage series, Voltage shunt, Current series, Current shunt configurations.

Module – III: Oscillators   **7L**

Principle of positive feedback, Barkhausen Criterion for oscillations, LC Oscillators: Generalized analysis, Hartley, Colpitts.
RC Oscillators: RC phase shift, Wien bridge, Crystal oscillator: Working and advantages.

Module – IV: Power Amplifier   **7L**

Classification: Class A, B, AB, C, Series-fed Class A amplifier, Transformer coupled Class A amplifier, Class B amplifier: Push-pull, Complementary symmetry, Efficiency calculations and Crossover distortion.

Module – V: Multivibrators, Time Base Generators   **6L**

Analysis and design of Bistable, Monostable and Astable multivibrators and Schmitt Trigger using transistors.
Time Base Generators: General features of a time base signal, methods of generating time base waveform, Miller and Bootstrap time base generators, Linearity improvement techniques

TEXT BOOKS:
1. Millman, Jacob, and Christos C. Halkias. Electronic Devices and Circuits. McGraw-Hill Education, 2008.
2. Bell, David A. Electronic Devices and Circuits. Oxford University Press, 2008.

REFERENCES:
1. Boylestad, Robert L., and Louis Nashelsky. Electronic Devices and Circuit Theory. 11th ed., Pearson Education, 2013.
2. Millman, Jacob, and Arvin Grabel. Microelectronics. 2nd ed., McGraw-Hill, 1987.
3. Malvino, Albert Paul. Electronic Principles. 7th ed., McGraw-Hill Education, 2007.

REFERENCE LINKS:
1. **https://www.youtube.com/watch?v=XpxzG5vhwjU&list=PLH7IrPt5tRVCgzvuD8uvqQ**

       mHUWBv3Y8u

2. **https://www.youtube.com/watch?v=grTtBHK1GcM&list=PLH7IrPt5tRVCgzvuD8uvqQ**
   mHUWBv3Y8u&index=2

3. **https://www.youtube.com/watch?v=zescaEKd9nM&list=PLH7IrPt5tRVCgzvuD8uvqQ**
   mHUWBv3Y8u&index=3

4. **https://www.youtube.com/watch?v=U4tVgwS_nIE&list=PLH7IrPt5tRVCgzvuD8uvqQm**
   HUWBv3Y8u&index=4

MATERIALS ONLINE:

1. Course template
2. Tutorial question bank
3. Tech Talk and Concept Video topics
4. Open-ended experiments
5. Definitions and terminology
6. Assignments
7. Model question paper–I
8. Model question paper–II
9. Lecture notes
10. Drshya Siksha Sangrah Videos(DSSV)