

**SREENIVASA INSTITUTE of TECHNOLOGY and MANAGEMENT STUDIES  
(AUTONOMOUS): CHITTOOR  
DEPARTMENT of ELECTRONICS and COMMUNICATION ENGINEERING**

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**II Year B.Tech. II semester**

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**16ECE221 ELECTRONIC CIRCUIT ANALYSIS**

**Course Educational Objectives:**

- The course intends to provide an overview of the principles, operation and application of the analog building blocks like diodes, BJT, FET etc for performing various functions.
- The course relies on elementary treatment and qualitative analysis and makes use of simple models and equation to illustrate the concepts involved.
- To provide an overview of amplifiers, feedback amplifiers and oscillators..

**UNIT-1**

**SMALL SIGNAL ANALYSIS OF AMPLIFIERS (BJT & FET):**

BJT Modeling using h-parameters, Determination of h-Parameters from Transistor Characteristics, Measurement of h-Parameters, Analysis of CE, CB and CC configurations using h-Parameters, Comparison of CB, CE and CC configurations, Simplified Hybrid Model, Millers Theorem, Dual of Millers Theorem. Small Signal Model of JFET & MOSFET, Small signal analysis of Common Source, and Common Drain Amplifiers using FET.

**UNIT-2**

**MULTISTAGE AMPLIFIERS.**

Classification of Amplifiers- Distortion in amplifiers, Analysis of CE amplifier with Emitter Resistance and Emitter follower, Different Coupling Schemes used in Amplifiers- RC Coupled Amplifier, Direct and Transformer Coupled Amplifiers, Design of Single stage RC Coupled Amplifier Using BJT, Analysis of Cascaded RC Coupled BJT Amplifiers, Darlington Pair, Cascode Amplifier, Illustrative design problems.

**UNIT -3**

**FREQUENCY RESPONSE**

Logarithms, Decibels, General Frequency considerations, Frequency Response of BJT Amplifier, Analysis at Low and High Frequencies, Effect of Coupling and bypass Capacitors, The Hybrid- $\pi$  ( $\pi$ )-Common Emitter Transistor Model, CE short Circuit Current Gain, Current gain with Resistive Load, Single Stage CE Transistor Amplifier response, Gain-Bandwidth Product, Emitter follower at higher frequencies, Illustrative design problems.

**UNIT -4**

**ANALYSIS AND DESIGN OF FEEDBACK AMPLIFIERS AND OSCILLATORS**

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, Illustrative design Problems.

Conditions for Oscillations, RC and LC type Oscillators, RC-Phase shift and Wien-Bridge Oscillators, Generalized Analysis of LC Oscillators, Hartley and Colpitts Oscillators, Crystal Oscillators, Frequency and Amplitude Stability of Oscillators, Illustrative design problems.

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**UNIT-5**

**POWER AND TUNED AMPLIFIERS**

Classification, Series fed Class A Power Amplifier, Transformer Coupled Class A Amplifier, Efficiency, Push Pull Amplifier- Complementary Symmetry Class-B Power Amplifier, Amplifier Distortion, Power Transistor Heat sinking, Class C and Class D Power amplifiers, Illustrative design problems.

Tuned Amplifier: Introduction, Q-Factor, Small Signal Tuned Amplifiers, Effect of Cascading Single Tuned Amplifiers on Bandwidth, Effect of Cascading Double Tuned Amplifiers on Bandwidth, Stagger Tuned Amplifiers, Stability of Tuned Amplifiers , Illustrative design problems.

**Course Outcomes:**

- ✓ Acquire knowledge on design and testing of analog circuits, its characteristics like gain, bandwidth, and gain bandwidth product.
- ✓ To understand the concept of multistage amplifiers, analysis of multistage amplifier and its frequency response.
- ✓ Can acquire the sound knowledge of tuned amplifiers, such as single tuned, double tuned and power amplifiers.
- ✓ Can acquire the knowledge on positive and negative feedback amplifiers

**Text Books:**

1. Robert L.Boylestad, Louis Nashelsky, "Electronic Devices and Circuit Theory",Pearson Education, 9<sup>th</sup> edition, 2008
2. K.Lal Kishore, "Electronic Circuit Analysis", BSP,Second Edition.

**Reference Books:**

1. Jacob Millman, Christos C Halkias, "Integrated Electronics", Mc Grawhill.
3. sedra, Kenneth, Smith, "Microelectric circuits", Oxford University Press, 5<sup>th</sup> edition, 2011.