

Approval: 1st Convocation Adhoc Meeting

Course Title : Analog Electronics
Course No. : EE 202
Credits : 3-0-0-3
Students intended for : B.Tech.
Semester : Odd/Even

Course contents:

Unit 1: Review of Transistor Characteristics, DC Biasing, Small Signal Models: Review of working of BJT, MOSFET and their small signal equivalent Circuit; Biasing of BJT and MOSFET circuits, Small Signal Models

Unit 2: Basic Amplifier stages:

Common Emitter, Common Base and Common Collector BJT amplifier stages; Common Source, Common Gate and Common Drain MOSFET stages. Differential Amplifiers

Unit 3: Differential Amplifiers:

Cascode stage and Current mirrors; BJT Differential pair , The MOSFET differential pair, Large and Small signal Analysis of BJT Differential pair and MOSFET differential pair, Common mode rejection, Differential pair with active load

Unit 4: Frequency response of Amplifiers:

Relationship between Transfer function and frequency response. General expressions for the low-frequency and high frequency responses. Miller's theorem. Frequency response of BJT amplifiers and MOSFET amplifiers.

Unit 5: Operational Amplifier:

General configuration and basic stages of an operational amplifier (Opamp). Analysis of simple BJT and CMOS opamps. Opamp parameters – ideal and practical. Examples of commercial BJT and CMOS opamps. Compensated and un-compensated opamps.

Unit 6: Feedback in analog circuits:

Advantages of negative feedback, Loop gain, feedback factor, Closed-loop gain. Basic feedback topologies: Series- Shunt, Series-Series, Shunt-Shunt and Shunt-Series configurations. Derivation of input resistance, output resistance and closed-loop gain of the above for both the ideal and practical amplifiers. Stability of feedback amplifiers, Gain and Phase-margins. Frequency compensation.

Unit 7: Amplifier Applications:

Signal generators and waveform shaping circuits; Tuned amplifiers

Textbook

1. Adel S. Sedra, Kenneth Carless Smith, "Microelectronic Circuits", Oxford University Press
2. Behzad Razavi, "Fundamentals of Microelectronics", Wiley

Other Text Books

1. Donald Neamen, "Electronic Circuit Analysis and Design", McGraw-Hill
2. Roger T. Howe, Charles G. Sodini, "Microelectronics: An Integrated Approach", Prentice Hall
3. Paul R. Gray, Paul J. Hurst, Robert G. Meyer, Stephen H. Lewis, "Analysis And Design Of Analog Integrated Circuits", Wiley-India, 2008