

16EC207 ELECTRONIC CIRCUIT ANALYSIS

Hours Per Week :

L	T	P	C
3	-	2	4

Course Description and Objectives:

The course provides an overview of the principles, operations and applications of the analog building blocks like diodes, BJT, FET etc for performing various functions. The objective of the course is to apply this knowledge to do the analysis and design of basic electronic circuits.

Course Outcome:

Upon successful completion of this course, students should be able to:

- CO1: Analyze and demonstrate negative feedback amplifier circuits and positive feedback oscillators.
- CO2: Understand the working of tuned amplifiers.
- CO3: Understand and analyze the different multistage amplifiers.
- CO4: Investigate the frequency response of amplifiers.
- CO5: Analyze the efficiency of power amplifiers like class-A, B, C, AB.
- CO6: Design and verify some common electronic circuits.

SKILLS:

- ✓ *Design an amplifier for Public address system.*
- ✓ *Construct an oscillator at audio and Radio frequency applications.*
- ✓ *Design and construct a tuned amplifier in radio receiver.*

UNIT - 1**L-12**

FEEDBACK AMPLIFIERS AND OSCILLATORS: Concept and types of feedback, Effects of negative feedback, Different topologies with their parameter analysis, Oscillators - Barkhausen's criterion for oscillations, Frequency of oscillations for Hartley, Colpitts, RC phase shift, Wein bridge and crystal oscillators.

UNIT - 2**L-10**

MULTI STAGE AMPLIFIERS: Methods of inter stage coupling, N-stage cascaded amplifier, Miller's theorem, Frequency effects, Multistage amplifier analysis - Cascade, Cascode, CE-CC amplifiers, Two stage RC coupled JFET amplifier (CS), High input impedance transistor circuits.

UNIT - 3**L-8**

FREQUENCY RESPONSE OF AN AMPLIFIER: Transistor at high frequencies, Hybrid-Pi common emitter transistor model, Determination of Hybrid- Pi conductances and capacitances in terms of low frequency h-parameters, Frequency response of BJT amplifiers and FET amplifiers.

UNIT - 4**L-8**

POWER AMPLIFIERS: Classification of power amplifiers, Operation and efficiency of class A, Class B, Class C and class D amplifiers.

UNIT - 5**L-7**

TUNED AMPLIFIERS: Concept and types of tuned amplifiers, Single tuned capacitive coupled amplifier, Double tuned amplifier, Stagger tuning, Application of tuned amplifiers, Stability considerations.

LABORATORY EXPERIMENTS**LIST OF EXPERIMENTS**

Total hours-30

1. Verify negative feedback effects by using voltage shunt feedback topologies.
2. Design Colpitts Oscillator.
3. Verify the cascading Effects on amplifier.
4. Find the frequency response of CE and CS amplifiers.
5. Find the power efficiency of Class-A, B, AB and C amplifiers.
6. Design Single Tuned Amplifier.

TEXT BOOKS:

1. J. Millman and C.C. Halkias, "Integrated Electronics", 1st edition, Tata McGraw-Hill, 2009.
2. Donald A. Neaman, "Electronic Circuit Analysis and Design", 3rd edition, Tata McGraw-Hill, 2009.

REFERENCE BOOKS:

1. Robert L. Boylestad and Louis Nashelsky, "Electronic Devices and Circuits Theory", 9th edition, Pearson/Prentice Hall, 2006.
2. Sedra A.S. and K.C. Smith, "Micro Electronic Circuits", 5th edition, Oxford University Press, 2006.
3. M.H. Rashid, "Micro Electronic Circuits: Analysis and Design", 1st edition, Thomson PWS Publ, 1999.

ACTIVITIES:

- *Bandwidth improvement using negative feedback.*
- *Designing 1 Hz frequency oscillator for digital clock.*
- *calculating overall gain in multi stage amplifier.*
- *Design Music Operated Dancing LEDs.*
- *To determine overall bandwidth of multistage amplifiers.*
- *Design Microphone amplifier.*
- *To observe the crossover distortion and its elimination.*
- *Designing Water Tank Overflow alarm circuit using Darlington pair.*
- *Designing Rain Detector and Alarm Circuit using Darlington pair.*
- *Designing 25W audio power amplifier.*