EC3T4   **Analog Electronic Circuits**   **Credits: 4**

Lecture : 4 periods/week   **Internal assessment: 30 marks**
Tutorial: 1 period /week   **Semester end examination: 70 marks -------**
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Course Objectives:

* To analyse and design single stage and multistage amplifiers at low and high frequencies in different configurations of BJTs and FETs in depth for small signals.
* To study the working of power amplifiers in different modes of operation.
* To study the principles of working of different types of tuned amplifiers for narrow, broad and wideband applications.

Learning Outcomes:

The Students will attain the

* Ability to perform both large-signal DC circuit analysis and small- signal AC circuit analysis including Hybrid-Pi models.
* Ability to perform the detailed design and analysis of the amplifiers using BJT and FET
* Ability to design desired oscillators (RC,LC)

UNIT- I
Small Signal Amplifiers: Small signal low frequency transistor models: h-parameter representation of a transistor, Conversion of h-parameter for different transistor configuration

UNIT- II
Feedback Amplifiers : Concept of feedback, Classification of feedback amplifiers, General characteristics of negative feedback amplifiers, Effect of Feedback on input and output characteristics, Voltage series, voltage shunt, current series, and current shunt feedback amplifiers with discrete components and their analysis.

UNIT- III
Single Stage BJT Amplifiers: Small Signal Analysis of BJT, Frequency response & characteristics of Common Emitter Amplifier, Frequency response & characteristics of Common Base Amplifier, Frequency response & characteristics of Common Collector Amplifier, comparison of CE, CB&CC amplifiers.

UNIT- IV
 Single Stage FET Amplifiers: Small signal analysis of JFET Amplifiers & frequency response of Common Drain (CD) Amplifier, Common Gate Amplifier, Gain Band Width Product, comparison between the performances of BJT & FET amplifiers.

UNIT- V
Multi Stage Amplifiers: Multi Stage Amplifiers Methods of Inter Stage Coupling, Equivalent Circuits, Miller's Theorem, Frequency Effects, frequency analysis of RC coupled Amplifier, Darlington amplifier, Cascode amplifier.

UNIT-VI
Power Amplifiers: classification of power amplifiers, analysis of Class A, Class B, Class AB and Class C Power Amplifiers.

UNIT- VII
Tuned Amplifiers: Single Tuned Amplifier, Double Tuned Amplifier, Stagger Tuned amplifiers, Application of Tuned Amplifiers, Stability Considerations.

UNIT- VIII
Oscillators: Condition for oscillations, classification of oscillators, RC-phase shift oscillators, Wein bridge oscillator, Hartley and Colpitts oscillators, Crystal oscillators, Frequency and amplitude stability of oscillators.

Learning Resources

Text Books:

1. Electronic Devices and Circuits , T.F. Bogart Jr., J.S.Beasley and G.Rico, Pearson Education, 6th edition, 2004.
2. Integrated Electronics, J. Millman and C.C. Halkias, Mc Graw-Hill, 1972.

References:

1. Electronic Devices and Circuits Theory , Robert L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall,9th Edition,2006.
2. Micro Electronic Circuits , Sedra A.S. and K.C. Smith, Oxford University Press, 5th Edition,2009.
3. Electronic Circuit Analysis and Design, Donald A. Neaman, Mc Graw Hill, 2001.