II Year-I Semester		**T**	**P**	**C**
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ELECTRONIC CIRCUIT ANALYSIS (RT22041)

Prerequisite Course:

-ELECTRONIC DEVICES AND CIRCUITS-

Course Description and Objectives:

- Small signal high frequency BJT transistor amplifier Hybrid-π equivalent circuit and the expressions for conductance's and capacitances are derived.

- Cascading of single stage amplifiers is discussed. Expressions for overall voltage gain are derived.

- The concept of feedback is introduced. Effect of negative feedback on amplifier characteristics is explained and necessary equations are derived.

- Basic principle of oscillator circuits is explained and different oscillator circuits are given with their analysis.

- Power amplifiers Class A, Class B, Class C, Class AB and other types of amplifiers are analysed.

- Different types of tuned amplifier circuits are analysed.

Course Outcomes:

Upon completion of the course, the student will be able to achieve the following outcomes.

COs	Course Outcomes	POs
1	Design and analysis of small signal high frequency transistor amplifier using BJT and FET.	3
2	Design and analysis of multi stage amplifiers using BJT and FET and Differential amplifier using BJT.	2
3	Derive the expressions for frequency of oscillation and condition for oscillation of RC and LC oscillators and their amplitude and frequency stability concept.	3
4	Know the classification of the power and tuned amplifiers and their analysis with performance comparison.	3

SYLLABUS

UNIT – I

Small Signal High Frequency Transistor Amplifier models:
BJT: Transistor at high frequencies, Hybrid- π common emitter transistor model, Hybrid π conductances, Hybrid π capacitances, validity of hybrid π model, determination of high-frequency parameters in terms of low-frequency parameters, CE

short circuit current gain, current gain with resistive load, cut-off frequencies, frequency response and gain bandwidth product.

FET: Analysis of common Source and common drain Amplifier circuits at high frequencies.

UNIT – II

Multistage Amplifiers: Classification of amplifiers, methods of coupling, cascaded transistor amplifier and its analysis, analysis of two stage RC coupled amplifier, high input resistance transistor amplifier circuits and their analysis-Darlington pair amplifier, Cascode amplifier, Boot-strap emitter follower, Analysis of multi stage amplifiers using FET, Differential amplifier using BJT.

UNIT – III

Feedback Amplifiers: Feedback principle and concept, types of feedback, classification of amplifiers, feedback topologies, Characteristics of negative feedback amplifiers, Generalized analysis of feedback amplifiers, Performance comparison of feedback amplifiers, Method of analysis of feedback amplifiers.

UNIT – IV

Oscillators: Oscillator principle, condition for oscillations, types of oscillators, RC-phase shift and Wein bridge oscillators with BJT and FET and their analysis, Generalized analysis of LC Oscillators, Hartley and Colpitt's oscillators with BJT and FET and their analysis, Frequency and amplitude stability of oscillators.

UNIT – V

Power Amplifiers: Classification of amplifiers, Class A power Amplifiers and their analysis, Harmonic Distortions, Class B Push-pull amplifiers and their analysis, Complementary symmetry push pull amplifier, Class AB power amplifier, Class-C power amplifier, Thermal stability and Heat sinks, Distortion in amplifiers.

UNIT – VI

Tuned Amplifiers: Introduction, Q-Factor, small signal tuned amplifier, capacitance single tuned amplifier, double tuned amplifiers, effect of cascading single tuned amplifiers on band width, effect of cascading double tuned amplifiers on band width, staggered tuned amplifiers, stability of tuned amplifiers, wideband amplifiers.

Text Books:

1. Integrated Electronics- J. Millman and C.C. Halkias, Tata Mc Graw-Hill, 1972.

2. Electronic Devices and Circuits- Salivahanan, N.Suressh Kumar, A. Vallavaraj, TATA McGraw Hill, Second Edition

References:

1. Electronic Circuit Analysis and Design – Donald A. Neaman, Mc Graw Hill.

2. Electronic Devices and Circuits Theory – Robert L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall, Tenth Edition.

3. Electronic Circuit Analysis-B.V.Rao,K.R.Rajeswari, P.C.R.Pantulu,K.B.R.Murthy, Pearson Publications.

4. Microelectronic Circuits-Sedra A.S. and K.C. Smith, Oxford University Press, Sixth Edition.