

**II B.Tech – II Semester**  
**(20EC4005) ANALOG ELECTRONIC CIRCUITS**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	-	-	3

**Pre-Requisites: Electronic Devices and Circuits**

**Course Objectives:**

- To understand and analyse cascading of single stage amplifiers
- To design and analyse different types of Power amplifiers and tuned amplifier circuits.
- To perform the analysis of different Multivibrator circuits.
- To learn the functioning of different types of time-base Generators and Sampling Gates
- To analyse differential amplifiers and illustration of Op-Amp

**UNIT-I: Multistage Amplifiers**

Classification of amplifiers, Methods of coupling, cascaded transistor amplifier and its analysis, analysis of two stage RC coupled amplifier, CE-CC Amplifier, Cascode amplifier, High input resistance transistor amplifier circuits and their analysis-Darlington pair amplifier, Boot-strap emitter follower, Analysis of multi stage amplifiers using FET,

**UNIT-II: Power Amplifiers and Tuned Amplifiers**

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

**Tuned Amplifiers:** Introduction, Q-Factor, 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.

**UNIT-III: Multivibrators**

**Bistable Multivibrator:** Analysis and Design of Fixed Bias, Self-Bias Bistable Multivibrator, Collector Catching Diodes, Commutating Capacitors, Triggering of Binary Circuits, Emitter Coupled Bistable Multivibrator (Schmitt Trigger).

**Monostable Multivibrator:** Analysis and Design of Collector Coupled Monostable Multivibrator, Triggering of Monostable Multivibrator, Applications of Monostable Multivibrator.

**Astable Multivibrator:** Analysis and Design of Collector Coupled Astable Multivibrator, Application of Astable Multivibrator as a Voltage to Frequency Converter.

**UNIT-IV: Time base Generators & Sampling gates**

**Time base Generators:** General features of a time base signal, Methods of generating time base waveform, Exponential Sweep Circuits, Negative Resistance Switches, Basic principles in Miller and Bootstrap time base generators, Transistor Miller time base generator, Transistor Bootstrap time base generator.

**Sampling gates:** Basic Operating Principles of Sampling Gates, Diode Unidirectional Sampling Gate and Two-Diode Bi-Directional Sampling Gate, Four-Diode gates, Reduction of Pedestal in Sampling Gates, Applications of Sampling Gates.

## UNIT–V: Operational Amplifiers

Differential Amplifier – DC and AC analysis of Dual input Balanced output Configuration, Properties of other differential amplifier configuration (Dual Input Unbalanced Output, Single Ended Input – Balanced/Unbalanced Output), DC Coupling and Cascade Differential Amplifier Stages, Level translator, Characteristics of OP-Amps, Op-amp Block Diagram, ideal and practical Op-amp Specifications, DC and AC characteristics.

### Course Outcomes:

After successful completion of the course, the students can be able to:

S.No	Course Outcome	BTL
1	Analyse multistage amplifiers using BJT and FET.	L4
2	Classify the power and tuned amplifiers and perform comparative analysis.	L4
3	Design and analyse different multivibrator circuits.	L5
4	Understand the basic concepts of Time base generators and Sampling gates.	L2
5	Analyse differential amplifier circuits and understand the characteristics of operational amplifiers	L4

### Correlation of COs with POs& PSOs:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	1	-	-	-	-	-	-	-	-	-	2	-
CO2	2	2	1	-	-	-	-	-	-	-	-	-	3	-
CO3	1	3	1	-	-	-	-	-	-	-	-	-	3	-
CO4	1	2	2	-	-	-	-	-	-	-	-	-	3	-
CO5	1	2	-	-	-	-	-	-	-	-	-	-	3	-

### Text Books:

1. Integrated Electronics– Millman & Halkias, Tata Mc-Graw Hill, Second Edition, 2009.
2. Electronic Devices and Circuits – S. Salivahanan, N. Suresh Kumar, A. Vllavaraj, Tata Mc-Graw Hill, Third Edition, 2013.
3. Linear Integrated Circuits– D.Roy Choudhury, New Age International(P) Ltd, Second Edition, 2003.

### Reference Books:

1. Electronic Devices and Circuits Theory – Robert L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall, Tenth Edition, 2009.
2. Electronic Circuit Analysis–K.Lal Kishore, B S Publications, Fourth Edition, 2016.
3. Op-Amps & Linear ICs– Ramakanth A. Gayakwad, Pearson/ Prentice Hall, 1987.