3-3-110-R20

SRI VENKATESWARA UNIVERSITY

B.Sc. DEGREE COURSE IN ELECTRONICS
III SEMESTER

(Revised Syllabus under CBCS w.e.f. 2021-22)

PAPER – 3

Analog Circuits and Communication

OBJECTIVES:

- To understand the concepts, working principles and key applications of linear integrated circuits.
- To perform analysis of circuits based on linear integrated circuits.
- To design circuits and systems for particular applications using linear integrated circuits.
- To introduce students to various modulation and demodulation techniques of analog communication.
- To analyse different parameters of analog communication techniques.
- It also focuses on Transmitters and Receivers.

Unit – I **(12hrs)**

OPERATIONAL AMPLIFIERS: Definition, Characteristics of Op-Amp, Block diagram of op-amp, inverting, non inverting, virtual ground, summing amplifier, subtractor, voltage follower, op-amp parameters, voltage to current convertor ,integrator, differentiator, differential amplifier, Logarithmic amplifier.

Unit- II: **(12hrs)**

OP-AMP CIRCUITS: voltage regulator, comparator, zero cross detecting circuit, instrumentation amplifier, Schmitt trigger. sine wave generator, square wave generator, triangular wave generator, Active filters (Basics)-low pass, high pass, band pass filters
IC-555 –functional block diagram and mention it's applications

UNIT –III **(12Hrs)**

AMPLITUDE MODULATION:

Need for modulation, amplitude modulation-frequency spectrum of AM wave, representation of AM, power relations in the AM wave. Generation of AM- Transistor modulators. Detection of AM signals – Diode detector.

UNIT-IV ***(12hrs)***

FREQUENCY MODULATION:

Theory of FM, Frequency deviation and carrier swing, modulation index, deviation ratio, percent modulation. Mathematical representation of FM, frequency spectrum and bandwidth of FM waves, Generation of FM signals – Varactor diode modulator and Reactance modulator. Detection of FM waves – FM demodulation with discriminator.

UNIT-V (12hrs) RADIO BROADCASTING AND RECEPTION:

Spectrum of electromagnetic waves, Radio broadcasting and reception, Transmitter, AM receivers- Straight forward receiver, Super heterodyne receiver. FM receivers.

TEXT BOOKS:

1. Op Amp and Linear Integrated Circuits By Ramakant Gaykwad
2. Linear Integrated Circuits By Roy Choudary
3. Unified Electronics Vol II – J.P. Agarwal and Amit Agarwal.
4. Electronic Communications - George Kennedy
5. Antennas and Wave Propagation – G.S.N.Raju – PHI
6. Principles of communication system –Herbert Taub & D.L.Schilling

Reference Books :

1. Jacob Millan ,Micro Electronics,McGraw Hill.
2. Mithal G K, Electronic Devices and Circuits Thana Publishers.
3. Allan Motter shead ,Electronic Devices and Circuits – An Introduction-Prentice Hall
4. Electronic Communications – Roody & Colen
5. Communication Systems – Hayken--- 4^{th} Edition
6. Modern digital and analog communication system –B.P. Lathi

OUTCOMES:

- ✓ Understand the fundamentals and areas of applications for the integrated circuits.
- ✓ Analyze important types of integrated circuits.
- ✓ Demonstrate the ability to design practical circuits that perform the desired operation.
- ✓ Select the appropriate integrated circuit modules to build a given application.
- ✓ Use of different modulation and demodulation techniques used in analog communication.
- ✓ Identify and solve basic communication problems.
- ✓ Analyze transmitters and receiver circuits.

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Electronics Lab - 3

(Analog Circuits and Communication)

LAB LIST:

1. Op-Amp as inverting and non-inverting
2. OpAmp Voltage follower and current follower.
3. Op-Amp as integrator and differentiator
4. Op-Amp as adder & subtractor
5. Op-Amp as voltage to current converter
6. Op-Amp as square wave generator
7. Amplitude modulation and demodulation.
8. AM Transimitter and Receiver.
9. FM Transmitter and Receiver.

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MODEL QUESTION PAPER

Time: 3 hours Marks: 75 marks

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer any five of the following questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks.

PART – A

Answer any *Five* of the following question. (5X5=25M)

1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	

PART – B

Answer All The Questions. Each question carries 10 marks (5X10= 50M)

9.	(A) OR (B)
10.	(A) OR (B)
11.	(A) OR (B)
12.	(A) OR (B)
13.	(A) OR (B)