



COURSE FILE

ON

LINEAR IC APPLICATIONS

CourseCode-EC404PC

II-B.Tech II-SEMESTER

A.Y.:2022-2023

Prepared by

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Assistant Professor

Head of the Department
Electronics and Communication Engg. Dept
SRI INDU INSTITUTE OF ENGG & TECH
Sheriguda(V), Ibrahimpatnam(M), R.R.Dist-501 510

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Sri Indu Institute of Engineering & Techn.
Sheriguda(VIII), Ibrahimpatnam
R.R. Dist. Telangana-501 510.



DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Academic Year	2022-2023
Course Title	LINEAR IC APPLICATIONS
Course Code	EC404PC
Programme	B. Tech
Year & Semester	II year II-semester
Branch & Section	ECE- B
Regulation	R18
Course Faculty	Mrs. P. KAVITHA, Assistant Professor

Index of Course File

S. No.	Name of the content
1	Institute vision and mission
2	Department vision and mission
3	Program Educational Objectives /Program Specific Outcomes
4	Program Outcomes
5	Course Syllabus with Structure
6	Course Outcomes(CO)
7	Mapping CO with PO/PSO and Justification
8	Academic Calendar
9	Timetable-highlighting your course periods including tutorial
10	Lesson plan with number of hours/periods, TA/TM, Text/ Reference book
11	Web references
12	Lecture notes
13	List of Power point presentations
14	University Question papers
15	Internal Question papers, Key with CO and BT
16	Assignment Question papers mapped with CO and BT
17	Tutorial topics
18	Result Analysis to identify weak and advanced learners-3 times in a semester
19	Result Analysis at the end of the course
20	Remedial class for weak students –schedule and evidences
21	CO,PO/PSO attainment sheets
22	Attendance register
23	Course file (Digital form)



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INSTITUTE VISION AND MISSION

Vision:

To become a premier institute of academic excellence by providing the world class education that transforms individuals into high intellectuals, by evolving them as empathetic and responsible citizens through continuous improvement.

Mission:

IM1: To offer outcome-based education and enhancement of technical and practical skills.

IM2: To Continuous assess of teaching-learning process through institute-industry collaboration.

IM3: To be a centre of excellence for innovative and emerging fields in technology development with state-of-art facilities to faculty and students' fraternity.

IM4: To Create an enterprising environment to ensure culture, ethics and social responsibility among the stakeholders.

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

DEPARTMENT VISION AND MISSION

Vision:

To become a recognized center in the field of Electronics and Communication Engineering by producing creative engineers with social responsibility and address ever-changing global challenges.

Mission:

DM1: To facilitate an academic environment that enables student's centric learning.

DM2: To provide state-of-the-art hardware and software technologies to meet industry requirements.

DM3: To continuously update the Academic and Research infrastructure.

DM4: To Conduct Technical Development Programs for overall professional caliber of Stake Holders.

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PROGRAM EDUCATIONAL OBJECTIVES

Program Educational objectives are to Promote:

- PEO1:** Graduates with a strong foundation in Electronics and Communication Engineering, Science and Technology to become successful in the chosen professional career.
- PEO2:** Graduates with ability to execute innovative ideas for Research and Development with continuous learning.
- PEO3:** Graduates inculcated with industry based soft-skills to enable employability.
- PEO4:** Graduates demonstrate with ability to work in interdisciplinary teams and ethical professional behavior.

PROGRAM SPECIFIC OUTCOMES

- PSO 1: Design Skills:** Design, analysis and development a economical system in the area of Embedded system & VLSI design.
- PSO2: Software Usage:** Ability to investigate and solve the engineering problems using MATLAB, Keil and Xilinx.

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PROGRAM OUTCOMES

- 1.ENGINEERING KNOWLEDGE:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- 2.PROBLEM ANALYSIS:** Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- 3.DESIGN/DEVELOPMENT OF SOLUTIONS:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- 4.CONDUCT INVESTIGATIONS OF COMPLEX PROBLEMS:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- 5.MODERN TOOL USAGE:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- 6.THE ENGINEER AND SOCIETY:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- 7.ENVIRONMENT AND SUSTAINABILITY:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- 8.ETHICS:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- 9.INDIVIDUAL AND TEAM WORK:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- 10. COMMUNICATION:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, give and receive clear instructions.
- 11. PROJECT MANAGEMENT AND FINANCE:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- 12. LIFE-LONG LEARNING:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**B. Tech. in ELECTRONICS AND COMMUNICATION ENGINEERING
II YEAR COURSE STRUCTURE AND SYLLABUS (R18)****II YEAR I SEMESTER**

S. No.	Course Code	Course Title	L	T	P	Credits
1	EC301PC	Electronic Devices and Circuits	3	1	0	4
2	EC302PC	Network Analysis and Transmission Lines	3	0	0	3
3	EC303PC	Digital System Design	3	1	0	4
4	EC304PC	Signals and Systems	3	1	0	4
5	EC305ES	Probability Theory and Stochastic Processes	3	0	0	3
6	EC306PC	Electronic Devices and Circuits Lab	0	0	2	1
7	EC307PC	Digital System Design Lab	0	0	2	1
8	EC308ES	Basic Simulation Lab	0	0	2	1
9	*MC309	Constitution of India	3	0	0	0
		Total Credits	18	3	6	21

II YEAR II SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	MA401BS	Laplace Transforms, Numerical Methods & Complex Variables	3	1	0	4
2	EC402PC	Electromagnetic Fields and Waves	3	0	0	3
3	EC403PC	Analog and Digital Communications	3	1	0	4
4	EC404PC	Linear IC Applications	3	0	0	3
5	EC405PC	Electronic Circuit Analysis	3	0	0	3
6	EC406PC	Analog and Digital Communications Lab	0	0	3	1.5
7	EC407PC	IC Applications Lab	0	0	3	1.5
8	EC408PC	Electronic Circuit Analysis Lab	0	0	2	1
9	*MC409	Gender Sensitization Lab	0	0	2	0
		Total Credits	15	2	10	21

EC404PC: LINEAR IC APPLICATIONS

B. Tech. II Year II Sem.

L	T	P	C
3	0	0	3

Pre-requisite: Electronic Devices & Circuits

Course Objectives: The main objectives of the course are:

- To introduce the basic building blocks of linear integrated circuits.
- To introduce the theory and applications of analog multipliers and PLL.
- To introduce the concepts of wave form generation and introduce some special function ICs.

Course Outcomes: Upon completing this course, the student will be able to

- Thorough understanding operational amplifiers with linear integrated circuits.
- Attain the knowledge of functional diagrams and applications of IC555 and IC 565
- Acquire the knowledge about the Data converters.

UNIT-I

Integrated Circuits: Classification, chip size and circuit complexity, basic information of Op-amp, ideal and practical Op-amp, internal circuits, Op-amp characteristics, DC and AC Characteristics, 741 op- amp and its features, modes of operation-inverting, non-inverting, differential.

UNIT-II

Op-amp and Applications: Basic information of Op-amp, instrumentation amplifier, ac amplifier, V to I and I to V converters, Sample & hold circuits, multipliers and dividers, differentiators and integrators, comparators, Schmitt trigger, Multivibrators, introduction to voltage regulators, features of 723

UNIT-III

Active Filters & Oscillators: Introduction, 1st order LPF, HPF filters, Band pass, Band reject and all pass filters. Oscillator types and principle of operation - RC, Wien and quadrature type, waveform generators - triangular, saw tooth, square wave and VCO.

UNIT-IV

Timers & Phase Locked Loops: Introduction to 555 timer, functional diagram, monostable and astable operations and applications, Schmitt Trigger. PLL - introduction, block schematic, principles and description of individual blocks of 565.

UNIT-V

D-A and A-D Converters: Introduction, basic DAC techniques, weighted resistor DAC, R-2R ladder DAC, inverted R-2R DAC, slope integration type ADC, DAC and ADC specifications.

TEXT BOOKS:

1. Linear Integrated Circuits, D. Roy Chowdhury, New Age International (p) Ltd.
2. Op-Amps & Linear ICs, Ramakanth A. Gayakwad, PHI

REFERENCESBOOKS:

1. Operational Amplifiers & Linear Integrated Circuits, R.F. Coughlin & Fredrick F. Driscoll, PHI.
2. Operational Amplifiers & Linear Integrated Circuits: Theory & Applications, Denton J. Daibey, TMH.
3. Design with Operational Amplifiers & Analog Integrated Circuits, Sergio Franco, Mc Graw Hill.
4. Digital Fundamentals-Floydan dJain, Pearson Education.



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<https://siiet.ac.in/>

COs and Mapping with PO/PSO

Course: LINEAR IC APPLICATIONS (C224)

Class: II ECE- B

Course Outcomes

After completing this course, the student will be able to:

C224.1: Understand the internal operation of Op-Amp and its specifications.

[Knowledge, Understand]

C224.2: Analyze and design linear applications like adder, subtractor, instrumentation amplifier and etc. using Op-Amp.

[Application, Analysis]

C224.3: Analyze and design non linear applications like multiplier, comparator and etc, using Op-Amp.

[Analysis, Evaluation]

C224.4: Classify various active filter configurations based on frequency response and construct using 741 Op Amp.

[Analysis]

C224.5: Operate 555 timers in different modes like bistable, monostable and astable operations and study their applications.

[Application, Analysis]

C224.6: Determine the lock range and capture range of PLL and use in various applications of communications.

[Knowledge, Understand]

Mapping of course outcomes with program outcomes:

High-3 Medium-2 Low-1

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2
C224.1	3	2	-	3	-	-	-	-	-	-	-	3	1	2
C224.2	3	3	2	-	-	-	-	-	-	-	-	2	1	2
C224.3	3	3	2	-	-	-	-	-	-	-	2	2	1	1
C224.4	3	2	1	-	-	-	-	-	-	-	-	-	1	2
C224.5	3	3	3	-	2	-	2	-	-	-	2	2	2	2
C224.6	3	2	2	-	-	-	-	-	-	2	-	-	2	2
Average	3	2.5	2	3	2	-	2	-	-	2	2	2.3	1.33	1.83



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CO-PO/PSO Mapping-Justification

Course: LINEAR IC APPLICATIONS (C224)

Class: II ECE- B

PO1: ENGINEERING KNOWLEDGE: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: PROBLEM ANALYSIS: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: DESIGN/DEVELOPMENT OF SOLUTIONS: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: CONDUCT INVESTIGATIONS OF COMPLEX PROBLEMS: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: MODERN TOOL USAGE: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO7: ENVIRONMENT AND SUSTAINABILITY: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO10: COMMUNICATION: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, give and receive clear instructions.

PO11: PROJECT MANAGEMENT AND FINANCE: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: LIFE-LONG LEARNING: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

CO-PO mapping Justification

C224.1: Understand the internal operation of Op-Amp and its specifications. [Knowledge, Understand]

	Justification
PO1	Students get the knowledge of characteristics of the operational amplifier
PO2	Students able to understand the modes of operation.
PO4	Students can analyse the applications of op-amp
PO12	Students can use this application in the future
PSO1	Students will be able to understand about ICS
PSO2	Students will be able to understand about op-amps

C224.2: Analyze and design linear applications like adder, subs tractor, instrumentation amplifier and etc. using Op-Amp. [Application, Analysis]

	Justification
PO1	Students get the knowledge of non linear applications
PO2	This approach fosters a deep understanding of circuits, facilitating the creation of reliable and efficient designs.
PO3	Students can understand the knowledge of adder and Subtractor circuit.
PO12	This concept can use in the future
PSO1	Students will be able to understand about adder circuit
PSO2	Students will be able to understand about instrumentation amplifier

C224.3: Analyze and design non linear applications like multiplier, comparator and etc, using Op-Amp. [Analysis, Evaluation]

	Justification
PO1	Students get the knowledge on Filters and Oscillators.
PO2	Students can solve problems on Filters and Oscillators.
PO3	Students able to design the different types of filters.
PO11	This concepts can use in the their projects

PO12	This concept can use in the projects
PSO1	Students will be able to understand about comparator
PSO2	Students will be able to understand about multiplier

C224.4: Classify various active filter configurations based on frequency response and construct using 741 Op Amp. [Analysis]

	Justification
PO1	Students can acquire the knowledge on timers and voltage controlled oscillator.
PO2	Students can solve problems on timers.
PO3	Students able to design the applications of IC 555 & IC 565.
PSO1	Students will be able to understand about the filters
PSO2	Students will be able to understand about timing applications

C224.5: Operate 555 timers in different modes like bistable, monostable and astable operations and study their applications. [Application, Analysis]

	Justification
PO1	Students get the knowledge on A/D and D/A Converters.
PO2	Students can solve problems on Specifications of A/D and D/A Converters.
PO3	Students able to design the different types of converters.
PO5	Students can use applications of timers
PO7	Students will be able to use in future applications
PO11	Students can get the knowledge about conversion
PO12	Students can use in project applications
PSO1	Students will be able to understand about the converters
PSO2	Students will be able to understand about timing applications

C224.6: Determine the lock range and capture range of PLL and use in various applications of communications.

[Knowledge, Understand]

	Justification
PO1	Students get the knowledge on PLL.
PO2	Students can solve problems on applications of PLL.
PO3	Students able to get knowledge of lock range.
PO10	Students can get knowledge of capture range.
PSO1	Students will be able to understand about the converters
PSO2	Students will be able to understand about applications of communications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

ACADEMIC CALENDAR 2022-23

B. Tech./B.Pharm. II YEAR I & II SEMESTERS

I SEM

S. No	Description	Duration	
		From	To
1	Commencement of I Semester classwork	28.11.2022	
2	1 st Spell of Instructions	28.11.2022	21.01.2023 (8 Weeks)
3	First Mid Term Examinations	23.01.2023	30.01.2023 (1 Week)
4	Submission of First Mid Term Exam Marks to the University on or before	04.02.2023	
5	2 nd Spell of Instructions	31.01.2023	29.03.2023 (8 Weeks)
6	Second Mid Term Examinations	31.03.2023	08.04.2023 (1 Week)
7	Preparation Holidays and Practical Examinations	10.04.2023	15.04.2023 (1 Week)
8	Submission of Second Mid Term Exam Marks to the University on or before	15.04.2023	
9	End Semester Examinations	17.04.2023	29.04.2023 (2 Weeks)

Note: No. of Working / Instructional Days: 93

II SEM

S. No	Description	Duration	
		From	To
1	Commencement of II Semester classwork	01.05.2023	
2	1 st Spell of Instructions (including Summer Vacation)	01.05.2023	08.07.2023 (10 Weeks)
3	Summer Vacation	15.05.2023	27.05.2023 (2 Weeks)
4	First Mid Term Examinations	10.07.2023	15.07.2023 (1 Week)
5	Submission of First Mid Term Exam Marks to the University on or before	22.07.2023	
6	2 nd Spell of Instructions	18.07.2023	11.09.2023 (8 Weeks)
7	Second Mid Term Examinations	12.09.2023	16.09.2023 (1 Week)
8	Preparation Holidays and Practical Examinations	19.09.2023	23.09.2023 (1 Week)
9	Submission of Second Mid Term Exam Marks to the University on or before	23.09.2023	
10	End Semester Examinations	25.09.2023	07.10.2023 (2 Weeks)

Note: No. of Working / Instructional Days: 92


 24/11/22
 REGISTRAR



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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Class Timetable

CLASS: II-B.Tech ECE-B

A.Y:2022-23

SEMESTER: II

LH: C-102

TIME/ DAY	I 9:40-10:30	II 10:30 -11:20	III 11:20-12:10	IV 12:10-1:00	1:00- 1:30	V 1:30-2:20	VI 2:20-3:10	VII 3:10-4:00
MON	EMF&W	ECA	A&DC	LTNM	L U N C H	LICA	ECA LAB / GS LAB	
TUE	LICA	A&DC	EMF&W	ECA		A&DC LAB / ICA LAB		
WED	LTNM	EMF&W	LICA	ECA		A&DC(T)/LTNM(T)/		CO-CU/DAA
THU	A&DC	COUN	GS LAB / ECA LAB			LTNM	EMF&W	SPORTS
FRI	ECA	EMF&W	LTNM(T)/A&DC(T)	LICA		A&DC	LTNM	LIB
SAT	LICA	LTNM	ECA	A&DC		ICA LAB / A&DC LAB		

*(T) - Tutorial Concern Faculty

Course Code	Course Name	Name of the Faculty	Course Code	Course Name	Name of the Faculty
MA401BS	LTNM-Laplace Transforms, Numerical Methods & Complex Variables	Dr.B.Mahesh	EC406PC	A&DC LAB-Analog and Digital Communications Lab	M.Ganesh/S.Naresh/K.Rajender
			EC407PC	ICA LAB-IC Applications Lab	P.Kavitha/A.Vaani/T.Divya
EC402PC	EMF&W-Electromagnetic Fields and Waves	Dr.S.Suresh	EC408PC	ECA LAB-Electronic Circuit Analysis Lab	Dr.D.Lakshmaiah/Dr.S.Suresh/K.Mallaiah
EC403PC	A&DC-Analog and Digital Communications	S.Naresh	*MC409	GS LAB-Gender Sensitization Lab	G.Ananda Rao
EC404PC	LICA-Linear IC Applications	P.Kavitha	COUN	Counseling	B.Ashwini/T.Divya/G.Anusha
EC405PC	ECA-Electronic Circuit Analysis	Dr.D.Lakshmaiah	SPORTS	Sports	G.Nirmala/M.Srilatha
			CO-CU/DAA	Co-Curricular/ Dept. Assoc.Activities	S.Alekhyia/I.Venu/K.Bhaskar Reddy
			LIB	Library	A.Sindhuja/O.Swathi

Class Incharge

Head of the Department
Electronics and Communication Engg. Dept
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Principal
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LESSON PLAN

Programme: B. Tech	Academic Year: 2022-23
Year: II	Semester: II
Course Title: LINEAR IC APPLICATIONS	Course Code: EC404PC
Name of Faculty: P.KAVITHA	

UNIT - I

Integrated Circuits: Classification, chip size and circuit complexity, basic information of Op-amp, Ideal and practical Op-amp, internal circuits, Op-amp characteristics, DC and AC Characteristics, 741 op-amp and its features, modes of operation-inverting, non-inverting, differential

No. of Sessions Planned	Topics	Reference	Teaching Method/ Aids
1	Introduction to Integrated Circuits	T1,R1	Black board
1	Classification of Integrated Circuits	T1,R1	Black board
1	Chip size and circuit complexity	T1,R1	Black board
1	Basic information of Op-amp	T1,R1,W1	Black board
1	Ideal and practical Op-amp	T1,R1	Black board
1	Internal circuit of Op-amp	T1,R1	Black board
1	AC Characteristics of Op-amp	T1,R1,R2	Black board
1	DC Characteristics of Op-amp	T1,R1,R2	Black board
1	IC 741 op-amp and its features	T1,R1	Black board
2	Inverting mode of operation	T2,R1,	Black board
1	Non-Inverting mode of operation	T2,R1,	Black board
1	Differential mode of operation	T2,R1,	Black board

Gap beyond syllabus(if any):

Gap with in the syllabus(if any)

CourseOutcome1: Understand the internal operation of Op-Amp and its specifications. [Knowledge, Understand]

*Session Duration: 50minutes

*Total Number of Hours/Unit: 13



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Unit-II Syllabus

Op-amp and Applications: Basic information of Op-amp, instrumentation amplifier, ac amplifier, V to I and I to V converters, Sample & hold circuits, multipliers and dividers, differentiators and Integrators, comparators, Schmitt trigger, Multivibrators, introduction to voltage regulators, Features of 723

No. of Sessions Planned	Topics	Reference	Teaching Method/Aids
1	Basic information of Op-amp	R2	Black board
1	Instrumentation amplifier using Op-amp	R2	Black board
1	AC amplifier using Op-amp	R2	Black board
1	V to I and I to V converters using Op-amp	R2,W2	Black board
1	Sample & hold circuits using Op-amp	R2	Black board
1	Multipliers and Dividers using Op-amp	R2	Black board
1	Differentiators using Op-amp	R2	Black board
1	Integrators using Op-amp	R2	Black board
1	Comparator using Op-amp	R2	Black board
1	Schmitt trigger using Op-amp	R2	Black board
1	Multivibrators using Op-amp	R2	Black board
1	Introduction to voltage regulators	R2	Black board
2	Features of 723	R2	Black board
Gap beyond syllabus(if any):			
Gap with in the syllabus(if any)			
CourseOutcome1: Analyze and design linear applications like adder, subtractor, instrumentation amplifier and etc. using Op-Amp. [Application, Analysis]			

*Session Duration: 50 minutes

*Total Number of Hours/Unit: 14



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Unit-III Syllabus

Active Filters & Oscillators: Introduction, 1st order LPF, HPF filters, Band pass, Band reject and All pass filters. Oscillator types and principle of operation - RC, Wien and quadrature type, waveform Generators - triangular, saw tooth, square wave and VCO.

No. of Sessions Planned	Topics	Reference	Teaching Method/ Aids
1	Introduction to Filters & Oscillators	R1,R4	Black board
1	1st order LPF filter	R1,R4,W3	Black board
1	1st order HPF filter	R1,R4	Black board
1	Band pass, Band reject filters	R2,R4	Black board
1	All Pass filters	R2,R4	Black board
1	Introduction to Oscillators	T1,R2	Black board
1	Principle of operation on Oscillators	T1,R2	Black board
1	RC Phase Shift Oscillators	T1,R2	Black board
1	Wien Bridge Oscillators	T1,R2	Black board
1	Quadrature type Oscillators	T1,R2	Black board
1	Triangular waveform generators	R4	Black board
1	Saw tooth waveform generators	R4	Black board
1	Square waveform generators	R4	Black board
1	VCO	T1,R4	Black board
Gap beyond syllabus(if any):			
Gap with in the syllabus(if any)			
CourseOutcome1: Classify various active filter configurations based on frequency response and construct using 741 Op Amp.			

*Session Duration: 50minutes

*Total Number of Hours/Unit:14



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Khalsa Ibrahimpatnam, Sheriguda (V), Ibrahimpatnam (M), RangaReddy Dist., Telangana –501510

Website: <https://siet.ac.in/>

Unit-IV Syllabus

Timers & Phase Locked Loops: Introduction to 555 timer, functional diagram, monostable and Astable operations and applications, Schmitt Trigger. PLL - introduction, block schematic, Principles and description of individual blocks of 565.

No. of Sessions Planned	Topics	Reference	Teaching Method/Aids
1	Introduction to 555 timer	R3,R4,W4	Black board
1	Functional diagram of 555 timer	R3,R4,W4	Black board
1	Monostable multivibrator using 555 timer	R3,R4	Black board
1	Astable multivibrator using 555 timer	R3,R4,W4	Black board
1	Applications of Monostable multivibrator	R2,R4,W4	Black board
1	Applications of Astable multivibrator	R2,R4	Black board
1	Schmitt Trigger	R2,R4	Black board
1	Introduction to PLL	R2,R4	Black board
1	Block schematic operation of PLL	T2, R4	Black board
1	Description of individual blocks of 565	T2, R4	Black board
1	Applications of PLL	T2, R4	Black board
Gap beyond syllabus(if any):			
Gap with in the syllabus(if any)			
CourseOutcome1: Operate 555 timers in different modes like bistable, monostable and astable operations and study their applications			

*Session Duration: 50minutes

*Total Number of Hours/Unit: 11



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Website: <https://siiet.ac.in/>

Unit-V Syllabus

D-A and A-D Converters: Introduction, basic DAC techniques, weighted resistor DAC, R-2R ladder DAC, inverted R-2R DAC, and IC 1408 DAC, Different types of ADCs - parallel comparator type ADC, counter type ADC, successive approximation ADC dual slope integration type ADC, DAC and ADC specifications.

No. of Sessions Planned	Topics	Reference	Teaching Method/ Aids
1	Introduction to D-A and A-D Converters	T1	Black board
2	Weighted resistor DAC	T1	Black board
1	R-2R ladder DAC	T1	Black board
2	Inverted R-2R DAC	T1	Black board
1	IC 1408 DAC	T1	Black board
2	Parallel Comparator type ADC	T1	Black board
1	Counter type ADC	T1	Black board
2	Successive Approximation ADC	T1	Black board
2	Dual Slope Integration type ADC	T1	Black board
1	DAC and ADC specifications.	T1	Black board
Gap beyond syllabus (if any):			
Gap with in the syllabus(if any)			
Course Outcome 1			

*Session Duration: 50minutes

*Total Number of Hours/Unit: 15

TEXT BOOKS:

T1: Linear Integrated Circuits, D. Roy Chowdhury, New Age International (p) Ltd.

T2: Op-Amps & Linear ICs, Ramakanth A. Gayakwad, PHI

REFERENCES BOOKS:

R1: Operational Amplifiers & Linear Integrated Circuits, R.F. Coughlin & Fredrick F. Driscoll, PHI.

R2: Operational Amplifiers & Linear Integrated Circuits: Theory & Applications, Denton J. Daibey, And TMH.

R3: Design with Operational Amplifiers & Analog Integrated Circuits, Sergio Franco, McGraw Hill.

R4: Operational Amplifiers with Linear Integrated Circuits by K.Lal Kishore-Pearson, 2009.

WEBREFERENCES:

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S. No.	Web Link
1	https://www.electronics-tutorials.ws/opamp/opamp_1.html
2	https://www.youtube.com/watch?v=GugPxYOscg4
3	https://kobita1234.files.wordpress.com/2016/11/ch-68.pdf
4	https://www.electricaltechnology.org/2014/12/555-timer.html



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Lecture notes

Unit1link:

https://drive.google.com/file/d/1dA3H76w0uFN3uZkxWOrv_5Ffl7mHX_CU/view?usp=sharing

Unit 2 link:

https://drive.google.com/file/d/1ECYXlkF15n_l2KsMOTUB2ZSJMI6doqCD/view?usp=sharing

[ew?usp=sharing](https://drive.google.com/file/d/1ECYXlkF15n_l2KsMOTUB2ZSJMI6doqCD/view?usp=sharing)

Unit 3 link:

[https://drive.google.com/file/d/1y9NTts5iAfOG_V5WFcA9TqZZg1tAVIUE/view?usp=sha](https://drive.google.com/file/d/1y9NTts5iAfOG_V5WFcA9TqZZg1tAVIUE/view?usp=sharing)

[ring](https://drive.google.com/file/d/1y9NTts5iAfOG_V5WFcA9TqZZg1tAVIUE/view?usp=sharing)

[ring](https://drive.google.com/file/d/1y9NTts5iAfOG_V5WFcA9TqZZg1tAVIUE/view?usp=sharing)

Unit 4 link:

[https://drive.google.com/file/d/113KvDQASle9tgzATOTKLOtIGa2_u8A_B/view?usp=drive link](https://drive.google.com/file/d/113KvDQASle9tgzATOTKLOtIGa2_u8A_B/view?usp=drive_link)

Unit5link:

[https://drive.google.com/file/d/132Ovh44E9E_sb4QD5agUA2F9UpzBYO1B/view?usp=drive link](https://drive.google.com/file/d/132Ovh44E9E_sb4QD5agUA2F9UpzBYO1B/view?usp=drive_link)



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Khalsa Ibrahimpatnam, Sheriguda (V), Ibrahimpatnam (M), Ranga Reddy Dist., Telangana-501510
Website: <https://siiet.ac.in/>

Power point presentation

PPT link:

https://docs.google.com/presentation/d/18OkUb6NIO8IH5M3l4L_a6zy83VdN57kd/edit?usp=sharing&ouid=115911641205636277165&rtpof=true&sd=true

Code No: 154BH**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B. Tech II Year II Semester Examinations, April/May - 2023****LINEAR IC APPLICATIONS****(Common to ECE, EIE)****Time: 3 Hours****Max. Marks: 75**

- Note:** i) Question paper consists of Part A, Part B.
ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.
iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A**(25 Marks)**

- Define slew rate and PSRR. [2]
- b) What are the properties of dual input unbalanced output differential amplifier? [3]
- c) What is a voltage regulator? Mention types of voltage regulators. [2]
- d) Explain how comparator is used as level detector. [3]
- e) What are the characteristics of all pass filters? [2]
- f) The resonant frequency f_0 of a band pass filter is 1 kHz and its bandwidth is 3 kHz. Find the value of Q. [3]
- g) Why control terminal of IC 555 timer is connected to ground through a $0.01\mu\text{F}$ bypass capacitor? [2]
- h) Define capture range and Lock range in PLL. [3]
- i) Which is the fastest ADC and why it is so? [2]
- j) The LSB of a 10-bit DAC is 20 mV. Calculate the output voltage for an input, 1011001101. [3]

PART – B**(50 Marks)**

- 2.a) Explain about DC coupling and cascaded differential amplifier stages.
- b) What is an Op-amp? Briefly explain the function of different stages of an Op-amp with respect to its block schematic. [5+5]

OR

- 3.a) The two input terminals of an op-amp are connected to voltage signals of strength $745\mu\text{V}$ and $740\mu\text{V}$ respectively. The gain of the OP-AMP in differential mode is 5×10^5 and its CMRR is 80dB. Calculate the output voltage and percentage error due to common mode.
- b) Draw the circuit diagram of non-inverting amplifier and explain its working. [5+5]
- 4.a) Design an instrumentation amplifier to have a variable differential gain in the range 5-200. Use a 50 kilo-ohm potentiometer.
- b) Draw the circuit diagram of an integrator and explain its working. [5+5]

OR

5.a) Describe the working of practical differentiator circuit. Derive the expression for output voltage.

b) Explain the monostable multivibrator operation by using op amp. [5+5]

6.a) Discuss in detail about band pass filter with neat sketch.

b) Explain the operation of the second order low pass Butterworth filter. [5+5]

OR

7.a) Explain, how to obtain triangular wave using a square wave generator.

b) What is VCO, draw and explain the functional block diagram of VCO. [5+5]

8.a) Explain the monostable operation of 555 IC timer with neat sketch.

b) Draw and explain the circuit of an astable multivibrator using 555 timer. [5+5]

OR

9.a) Draw and explain the principles and description of individual blocks of PLL in detail.

b) Compute the free running frequency f_o , lock in range and capture range of PLL 565. Assume $R_T=20$ k-ohm, $C_T=0.01\mu F$, $C=1\mu F$ and supply voltage is $\pm 6v$. [5+5]

10.a) What are the draw backs of weighted resistor DAC? How they can be overcome by using R-2R ladder DAC.

b) Find out step size and analog output for 4-bit R-2R ladder DAC, when input is 0 1 1 1 and 1 1 1 1, assume $V_{ref} = +5V$. [5+5]

OR

11.a) With neat sketch explain the principle and operation of successive approximation ADC.

b) Enlist the advantages and disadvantages of dual slope ADC. [5+5]

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R18

Code No: 154BH

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech II Year II Semester Examinations, August/September - 2021

LINEAR IC APPLICATIONS

(Common to ECE, EIE)

Time: 3 Hours

Max. Marks: 75

**Answer any five questions
All questions carry equal marks**

- 1.a) Derive closed loop voltage gain, input resistance, output resistance and band width for inverting amplifier with feedback arrangement.
- b) Differentiate the functional classification of the differential amplifiers used in the first two stages of Op-amp. [8+7]
- 2.a) List and explain DC characteristics of op-Amp.
- b) Brief out the classification of ICs. [10+5]
- 3.a) Discuss the necessity of negative feedback in amplifier applications. How does negative feedback affect the performance of an inverting amplifier?
- b) Write about the sampling process and its requirement and explain the basic circuit for sample and hold circuit. [8+7]
- 4.a) Discuss the design of differentiators and integrators in brief.
- b) Design a practical integrator circuit to process input sinusoidal wave forms up to 1 kHz with given input amplitude is 10mV. [7+8]
- 5.a) Explain the classification and operation of all types of filters with their characteristics.
- b) Design square waveform generator circuit using op-Amp and then explain the same. [6+9]
- 6.a) Design Band pass circuit using op-Amp.
- b) Design Wein-bridge oscillator using op-Amp and then derive its expression for frequency of oscillations. [5+10]
- 7.a) Draw the circuit of Schmitt trigger using 555 timer and explain its operation.
- b) Design a 555 Astable multivibrator to operate at 10 KHz with 40% duty cycle. [7+8]
- 8.a) Mention about the weighted resistor DAC and R-2R ladder DAC design.
- b) Draw the schematic circuit diagram of a counter type A/D converter and explain the operations of the system. [8+7]

---ooOoo---

Code No: 154BH

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**B. Tech II Year II Semester Examinations, August/September – 2022****LINEAR IC APPLICATIONS****(Common to ECE, EIE)****Time: 3 Hours****Max. Marks: 75****Answer any five questions****All questions carry equal marks**

- - -

- Draw and explain the equivalent circuit of an operational amplifier.
- b) An input of 3V is fed to the non-inverting terminal of an op-amp. The amplifier has a R_i of 10 K Ω and R_f of 10 K Ω . Find the output voltage.
- c) Write all the DC and AC characteristics of an ideal OP-AMP with relevant expressions. [7+4+4]
- 2.a) Sketch an instrumentation amplifier using 3 Op-Amp and derive its output voltage equation.
- b) What is a comparator? With neat circuit diagram, explain its characteristics. [8+7]
- 3.a) Discuss a sample and hold circuit and explain its operation.
- b) Explain the op-amp multiplier in detail. [8+7]
- 4.a) What is VCO? Explain its operation with neat diagram.
- b) Design and draw the square wave generator using op-amp and explain its operation. [7+8]
- 5.a) Design a second order Butterworth LPF operating at a frequency of 4KHz.
- b) Design RC phase shift oscillator using op-amp and derive the necessary expression. [7+8]
- 6.a) Explain the operation of a monostable multivibrator using 555 timer? Also derive pulse Width.
- b) Draw the circuit of Schmitt trigger using IC555 timer and explain its operation. [7+8]
- 7.a) With neat block diagram, explain successive approximation type A/D converter in detail.
- b) Draw and explain the operation of counter type ADC. [7+8]
- 8.a) Draw and explain the operation of weighted resistor DAC.
- b) Discuss the specifications of DAC's. [8+7]

Code No: 154BH

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**B. Tech II Year II Semester (Special) Examinations, January/February - 2021****LINEAR IC APPLICATIONS****(Electronics and Communication Engineering)****Time: 2 Hours****Max. Marks: 75****Answer any Five Questions
All Questions Carry Equal Marks**

- - -

- 1.a) Explain different modes of operation of op-Amp.
- b) What is level translator? Explain the necessity of level translator stage in cascading differential amplifiers. [8+7]
- 2.a) Explain the term slew rate and write its importance in op-amp circuits.
- b) For the given dual-input, balanced-output differential amplifier $R_C = 2.2 \text{ k}\Omega$, $R_E = 4.7 \text{ k}\Omega$, $R_{in1} = R_{in2} = 50 \text{ }\Omega$, $V_{CC} = +10 \text{ V}$, $V_{EE} = -10 \text{ V}$, $\beta_{DC} = \beta_{AC} = 100$ and $V_{BE} = 0.71 \text{ V}$, determine I_{CQ} , V_{CEQ} , r_e , voltage gain, input and output resistances. [7+8]
3. What is the necessity of Instrumentation amplifier? Design Instrumentation amplifier using op-amp. Also, explain the advantages of it. [15]
4. Design the following using OP-Amps:
a) V-to-I converter b) I to V converters.
Also, give their applications. [7+8]
5. Draw and explain the operation of Wein bridge oscillator and derive its frequency of oscillation. [15]
6. Write the design steps of the second order low pass filter and design it using OP-Amp. [15]
7. Draw and explain the Monostable mode of operation of 555IC timer and also derive its pulse with expression. [15]
- 8.a) Draw and explain the successive approximation ADC.
- b) List and explain specifications of ADC. [8+7]

---ooOoo---

Code No: 154BH**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B. Tech II Year II Semester Examinations, November/December - 2020****LINEAR IC APPLICATIONS****(Common to ECE, EIE)****Time: 2 Hours****Max. Marks: 75****Answer any Five Questions
All Questions Carry Equal Marks**

- - -

- 1.a) Perform AC analysis of single input dual output differential amplifier Configuration.
 - b) List out the features of ideal OP-Amp. [10+5]
 - 2.a) What are the differences between the inverting and non inverting terminals? What do you mean by the term “virtual ground”?
 - b) List out AC and DC characteristics of OP-AMP. [7+8]
 - 3.a) Draw the circuit diagram of instrumentation amplifier using 741 op-amp and explain its operation.
 - b) How OP-AMP is used as integrator? Explain its working. [9+6]
 - 4.a) How OP-AMP is used as Comparator? Explain its working.
 - b) How OP-AMP is used as Arithmetic circuits? Explain its working. [6+9]
 - 5.a) Design a active high pass filter with cutoff frequency of 4 KHz.
 - b) Explain the working principle of Wein Oscillator. [7+8]
 - 6.a) How to generate a Saw tooth waveform? Explain the working of such a circuit with a neat circuit diagram.
 - b) Discuss in detail about band pass and band reject filters. [8+7]
- Describe the 555 timer monostable multivibrator applications in:
- i) Frequency divider
 - ii) Pulse width modulation.
- b) Explain the terms frequency multiplication, frequency translation of PLL. [8+7]
- 8.a) What is the conversion time of a 10 bit successive approximation ADC if its input clock is 5 MHz?
 - b) List and explain the specifications of DAC. [6+9]

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Sri Indu Institute of Engineering & Technology

Sheriguda (V), Ibrahimpatnam (M), R.R.Dist-501 510

I - Mid Examinations, JULY - 2023

Set -I

Year & Branch: II –ECE (A&B)

Subject: **LINEAR IC APPLICATIONS**

Max. Marks: 10

Date: 11/07/23(AN)

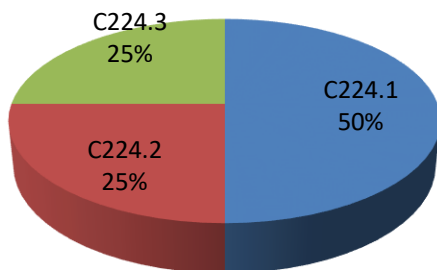
Time: 60 mins

Answer any **TWO** Questions. All Question Carry Equal Marks

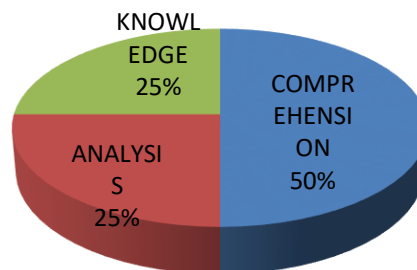
2*5=10 marks

1. Explain practical inverting amplifier? **5** (C224.1) (COMPREHENSION)
2. Explain in detail DC and AC Characteristics of an op-amp? **5** (C224.1) (COMPREHENSION)
3. Derive the output voltage and frequency response of the practical Differentiator? **5** (C224.2) (ANALYSIS)
4. Define active filters? Derive the equation for first order low pass Filter? **5** (C224.3) (KNOWLEDGE)

QUESTION PAPER MAPPING WITH CO-PO



QUESTION PAPER MAPPING WITH BT



Sri Indu Institute of Engineering & Technology

Sheriguda (V), Ibrahimpatnam (M), R.R.Dist-501 510

II - Mid Examinations, SEP -2023

Set -II

Year & Branch: II –ECE(A&B)

Date: 13 /09/23(AN)

Subject: **LINEAR IC APPLICATIONS** Max. Marks: 10

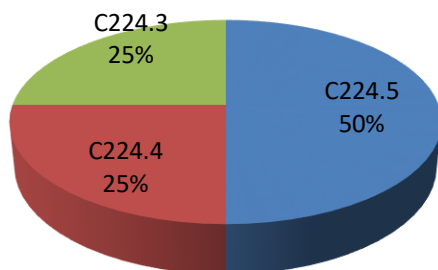
Time: 60 mins

Answer any **TWO** Questions. All Question Carry Equal Marks

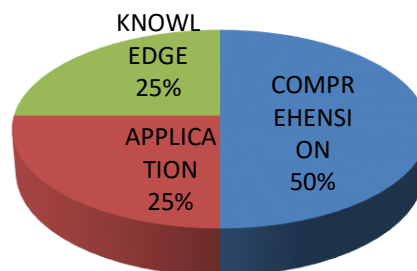
2*5=10 marks

1. Draw the basic circuit of RC-Phase Shift Oscillator and explain its operation. Also derive the expression for frequency of oscillations. **5** (C224.3) (Application)
2. Describe the working of an Astable multivibrator using IC555 with circuit diagram. **5** (C224.4) (Knowledge)
3. Draw the circuit diagram of Weighted Resistor DAC and explain the operation in detail. **5** (C224.5) (Comprehension)
4. Explain in detail specifications of ADC/DAC Converter. **5** (C224.5) (Comprehension)

QUESTION PAPER MAPPING WITH CO-PO



QUESTION PAPER MAPPING WITH BT



SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF ECE

B.Tech II Year II Sem I Mid –Term Examination, JULY-2023

LINEAR IC APPLICATIONS

(Objective Exam)

DATE:11/07/2023(AN)

TIME: 20 Min

MAX.MARKS: 10

NAME:

ROLL NO:

MARKS:

I. CHOOSE THE CORRECT ALTERNATIVE:

10X0.5=5M

1. In ----- IC's all the active as well as passive elements components []
Along with inter connections are integrated on a single crystal
a) Hybrid b) Thick and Thin c) Monolithic d) None
2. If input to the integrator is Unit step signal. Output is ----- []
a) Positive going ramp b) Negative going ramp c) Unit step only d) Impulse signal
3. How many gates can design on MSI----- []
a) 3 to 30 b) 30 to 300 c) 300 to 3000 d) All of the above
4. Open loop gain of an Ideal OP-Amp. []
a) 0 b) 1 c) -1 d) infinite
5. Choose the limitation of an Integrated Circuit. []
a) Less weight b) Less heat dissipation c) Less cost d) Less Power consumption
6. Which is not the internal circuit of Operational Amplifier []
a) Differential Amplifier b) Level Translator c) Output Driver d) Clamper
7. The Output of the Inverting amplifier with respect input is--- []
a) 180 degree out of phase b) 180 degree in phase
c) -180 degree out of phase d) -180 degrees out of phase
8. The Overall voltage gain of an Inverting amplifier, If $R_1=10\text{kohms}$, $R_f= 100\text{Kohms}$ []
a) -1 b) -10. c) 11 d) 9
9. What are the applications of comparator? []
a) Zero crossing detectors. b) Adder c) Subtractor d) Multiplexer
10. The output of Comparator []
a) Sine wave b) Square Wave c) Triangular Wave d) Sawtooth Wave

II. Fill in the Blanks:

10X0.5=5M

1. The difference between the two input bias currents when the output voltage is Zero is called _____
2. The Output equation of differentiator is _____
3. What is CMRR _____
4. The Gain of Non-Inverting Amplifier _____
5. The Output equation of Integrator is _____
6. The output of Voltage follower _____
7. The Output voltage of inverting summer _____
8. What is the functions of op-amp pin number 2, 5, 7 _____
9. Instrumentation amplifier is also called as _____
10. What are the types of V to I Converter _____

SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF ECE

B. Tech II Year II Sem II Mid –Term Examination, SEP-2023

LICA

(Objective Exam)

DATE: 13/09/2023 (AN)

TIME: 20 Min

MAX.MARKS: 10

NAME:

ROLL NO:

I. CHOOSE THE CORRECT ALTERNATIVE:

10X0.5=5M

1. Filters are classified as []
a) Analog or digital b) Passive or active
c) Audio or radio frequency d) All of the above

2. Given the lower and higher cut-off frequency of a band-pass filter are 2.5kHz and 10kHz. Determine its bandwidth. []
a) 750 Hz b) 7500 Hz
c) 75000 Hz d) None of the above

3. IC 555 Timer is used for generating----- []
a) Accurate time delay from micro sec to hrs b) Accurate time delay from hrs to days
c) Only days d) Only hours

4. The time period for Monostable operation is----- []
a) $0.69RC$ b) $1.1 RC$ c) $.45RC$ d) $0.405RC$

5. -----is defined as the ratio of ON time to the total time period. []
a) Duty cycle b) Timer c) oscillations d) Multivibrator

6. Which A/D converter is considered to be simplest, fastest and most expensive []
a) Servo Converter b) flash type converter
c) Counter type d) All of the above

7. The Phase locked loop principle has been used in application such as []
a) Motor speed controls b) tracking filters
c) FM Demodulation d) All of the above

8. -----is defined as the range of frequency over which the PLL system follows the change in the input frequency fin []
a) Capture range b) lock range c) pull in time d) none of the above

9. -----circuit uses a successive approximation register to find the required value of each bit by trial and error []
a) Successive approximation b) flash type converter
c) Counter type d) tracking servo type

10. Applications of IC-555 timer astable multivibrator are []
a) FSK generator b) PPM c) A&B d) None of the above

II. Fill in the Blanks:

10X0.5=5M

1. Write the voltage gain formula of Low Pass Filter _____
2. A first order low pass Butterworth filter is realized by RC network and _____
3. A monostable 555 timer has the _____ no of stable states
4. Monostable multivibrator needs _____
5. Square wave generator is an application of _____
6. Example of ADC technique is _____
7. VCO is also called as _____
8. Astable multivibrator is also called as _____
9. The phase locked loop goes through three states _____, _____ and _____.
10. Write the IC555 pin description of Pins 2,3 &6-----.

Sri Indu Institute of Engineering & Technology

Sheriguda (V), Ibrahimpatnam (M), R.R.Dist-501510

B-Tech I-Mid Examinations, JULY-2023

Year & Branch: II-ECE-A & B

Date: 11-07-2023(AN)

Subject : LICA

ANSWER KEY

Descriptive paper key link:

https://drive.google.com/file/d/1-zu1OuYhTfUFOno291-0nlV8_32LvwsI/view?usp=drive_link Objective

Key Paper

I. CHOOSE THE CORRECT ALTERNATIVE:

1. c
2. a
3. b
4. d
5. b
6. d
7. a
8. b
9. a
10. b

II. FILL IN THE BLANKS:

1. Input offset current
2. $V_0 = -C_1 R_f \frac{d}{dt} V_{in}$
3. $\frac{A_d}{A_c}$
4. $(1 + \frac{R_f}{R_1})$
5. $\frac{-1}{C_f R_f} V_{in}$
6. $V_0 = V_{in}$
7. $V_0 = -(V_1 + V_2)$
8. Inverting, offset null, positive supply voltage
9. Data amplifier
10. floating load & grounded load

Sri Indu Institute of Engineering & Technology

Sheriguda (V), Ibrahimpatnam (M), R.R.Dist-501510

B-Tech II-Mid Examinations, SEP-2023

Year& Branch: II-ECE-A & B

Date: 13-09-2023(AN)

Subject: LICA

ANSWERKEY

Descriptive paper key link:

https://drive.google.com/file/d/1L9oZqCXGiEzrnf7g3Uf79w4TFrTN_dEU/view?usp=sharingObjective/Quiz

Key Paper

I. CHOOSE THE CORRECT ANSWERS

1. b
2. b
3. a
4. b
5. a
6. b
7. d
8. b
9. a
10. b

II. FILL IN THE BLANKS

1. $\frac{AF}{\sqrt{1+(\frac{f}{f_c})^2}}$

2. op-amp
3. Single (1)
4. External trigger pulse
5. Astable multi vibrator
6. Mobile phone
7. Voltage to frequency converter
8. Free running
9. Lock in range, capture range ,pull in time
10. Trigger input, output, threshold



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Website: <https://siiet.ac.in/>

ASSIGNMENT-1

SUBJECT: Linear IC Applications

1. Explain the AC & DC characteristics of op-amp and its features? (C224.1) (COMPREHENSION)
2. Derive the gain expression for practical inverting amplifier? (C224.1) (COMPREHENSION)
3. What is op-amp? Explain its ideal characteristics of op-amp and its features?
(C224.2) (ANALYSIS)
4. Derive the output voltage and frequency of practical Differentiator?
(C224.2) (ANALYSIS)
5. What is instrumentation amplifier? And explain three op-amp instrumentation amplifiers?
(C224.3) (ANALYSIS)



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ASSIGNMENT-2

SUBJECT: Linear IC Applications

1. Draw the basic circuit of RC-Phase Shift Oscillator and explain its operation. Also derive the expression for frequency of oscillations. (C224.3) (APPLICATION)
2. Describe the working and Operation of IC555 Timer and also its PIN diagram in detail? (C224.4) (ANALYSIS)
3. Explain the working of each block in PLL in detail? (C224.4) (COMPREHENSION)
4. Explain the working of R-2R ladder DAC with neat circuit diagram?
(C224.5) (COMPREHENSION)
5. Explain the working of weighted Resistor DAC with neat circuit diagram?
(C224.5) (COMPREHENSION)



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RESULT ANALYSIS TO IDENTIFY SLOW AND ADVANCED LEARNERS

Course Title	Linear IC Applications
Course Code	EC404PC
Programme	B. Tech
Year & Semester	II year I-semester, B sec
Regulation	R18
Course Faculty	P.KAVITHA, Assistant Professor, ECE

Slow Learners:

S. No	Roll Number	No. of Backlogs	MID-I Marks	MID-2 Marks
1	21X31A0440	5S	17	20
2	21X31A0441	4S	14	18
3	21X31A0443	5S	18	22
4	21X31A0445	5S	14	18
5	21X31A0448	5S	21	23
6	21X31A0450	5S	14	18
7	21X31A0453	5S	17	22
8	21X31A0455	4S	20	22
9	21X31A0456	5S	21	21
10	21X31A0457	3S	14	18
11	21X31A0458	5S	15	20
12	21X31A0460	5S	18	22
13	21X31A0470	4S	23	23
14	22X35A0424	4S	20	22
15	22X35A0427	5S	17	20
16	22X35A0428	4S	18	22
17	22X35A0433	5S	16	18

18	22X35A0435	4S	19	22
19	22X35A0436	4S	24	23
20	22X35A0439	3S	20	22
21	22X35A0441	5S	16	18

Advanced Learners (From II-I Result Analysis having ≤ 2 backlogs):

Total 34 advanced learners are identified.

S.No	Roll Number	GATE Material Provided
1	21X31A0438	<p>Classification, chip size and circuit complexity, basic information of Op-amp, Op-amp characteristics, DC and AC Characteristics, 741 op- amp and its features, modes of operation-inverting, non-inverting, differential, instrumentation amplifier, differentiators and integrators, Schmitt trigger, Multivibrators, 1st order LPF, HPF filters, waveform generators - triangular, saw tooth, square wave and VCO. Introduction to 555 timer, functional diagram, monostable and astable, PLL - introduction, block schematic, principles, basic DAC techniques, weighted resistor DAC, R-2R ladder DAC</p>
2	21X31A0442	
3	21X31A0444	
4	21X31A0446	
5	21X31A0447	
6	21X31A0449	
7	21X31A0451	
8	21X31A0452	
9	21X31A0454	
10	21X31A0459	
11	21X31A0461	
12	21X31A0462	
13	21X31A0463	
14	21X31A0464	
15	21X31A0465	
16	21X31A0466	
17	21X31A0467	
18	21X31A0468	
19	21X31A0469	
20	21X31A0471	
21	21X31A0472	
22	22X35A0421	

23	22X35A0422	
24	22X35A0423	
25	22X35A0425	
26	22X35A0426	
27	22X35A0429	
28	22X35A0430	
29	22X35A0431	
30	22X35A0432	
31	22X35A0434	
32	22X35A0437	
33	22X35A0438	
34	22X35A0440	



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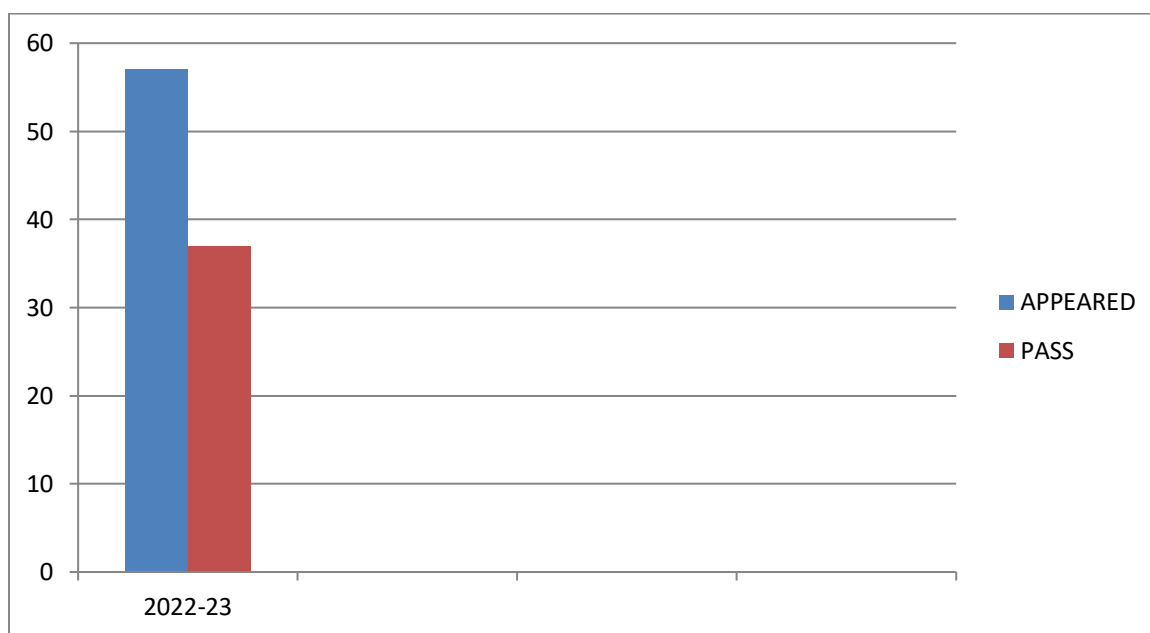
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BATCH ECE-II BTECH II SEM ECE-A RESULT ANALYSIS

ACADAMIC YEAR	COURSE NAME	NUMBER OF STUDENTS		QUESTION PAPER SETTING		PASS%
		APPEARED	PASSED	INTERNAL	EXTERNAL	
2022-23	Linear IC Applications	57	37	COURSE FACULTY	JNTUH	64.9

Linear IC APPLICATIONS (C224) RESULT ANALYSIS





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Khalsa Ibrahimpatnam, Sheriguda (V), Ibrahimpatnam (M), Ranga Reddy Dist., Telangana – 501 510

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING


REMEDIAL CLASSES TIME TABLE

A.Y 2022-23

SEMESTER-II

BRANCH/ SEC	MON 4.00 PM- 5.00 PM	TUE 4.00 PM- 5.00 PM	WED 4.00 PM- 5.00 PM	THUR 4.00 PM- 5.00 PM	FRI 4.00 PM- 5.00 PM
II ECE-A	EMF&W	LTNM	A&DC	LICA	ECA
II ECE-B	LICA	A&DC	EMF&W	ECA	LTNM
III ECE-A	DSP	VLSID	A&P	ESD	IM
III ECE-B	A&P	ESD	DSP	IM	VLSID
III ECE-C	IM	A&P	ESD	VLSID	DSP
IV ECE-A	WSN	ML	LPVLSID	-	-
IV ECE-B	ML	LPVLSID	WSN	-	-
IV ECE-C	LPVLSID	WSN	ML	-	-


Head of the Department
Electronics and Communication Engg. Dept
SRI INDU INSTITUTE OF ENGG & TECH
Sheriguda(V), Ibrahimpatnam(M), R.R.Dist-501 510


PRINCIPAL
PRINCIPAL
Sri Indu Institute of Engineering & Tech
Sheriguda(VIII), Ibrahimpatnam
R R Dist Telangana -501 510

43	22X35A0428	4				5				3	5
44	22X35A0429	5		4						4	5
45	22X35A0430	5		3						5	5
46	22X35A0431			5		5				9	5
47	22X35A0432	5		5						9	5
48	22X35A0433					4				9	5
49	22X35A0434	5		5						4	5
50	22X35A0435			2						4	5
51	22X35A0436					4				5	5
52	22X35A0437	3								8	5
53	22X35A0438			5		5				7	5
54	22X35A0439	3		1						6	5
55	22X35A0440	2				3				2	5
56	22X35A0441			2						2	5
Target set by the faculty / HoD		3.00	0.00	3.00	0.00	3.00	0.00	3.00	0.00	6.00	3.00
Number of students performed above the target		39	0	32	0	13	0	2	0	10	56
Number of students attempted		43	0	43	0	13	0	2	0	54	56
Percentage of students scored more than target		91%		74%		100%		100%		19%	100%

CO Mapping with Exam Questions:

CO - 1										Y	Y
CO - 2										Y	Y
CO - 3										Y	Y
CO - 4											
CO - 5											
CO - 6											

% Students Scored >Target %	91%		74%		100%		100%		19%	100%
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CO Attainment based on Exam Questions:

CO - 1									19%	100%
CO - 2									19%	100%
CO - 3									19%	100%
CO - 4										
CO - 5										
CO - 6										

CO	Subj	obj	Asgn	Overall	Level
CO-1		19%	100%	59%	2.00
CO-2		19%	100%	59%	2.00
CO-3		19%	100%	59%	2.00
CO-4					
CO-5					
CO-6					

Attainment Level	
1	40%
2	50%
3	60%

Attainment (Internal 1 Examination) = **2.00**

SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY



Department of Electronics and Communication Engineering
Course Outcome Attainment (Internal Examination-2)

Name of the faculty : P.KAVITHA

Academic Year: 2022-2023

Branch & Section: ECE - B

Examination: II Internal

Course Name: LINEAR IC APPLICATIONS

Year: II

Semester: II

S.No	HT No.	Q1a	Q1b	Q2a	Q2b	Q3a	Q3b	Q4a	Q4b	Obj4	A4
Max. Marks ==>		5		5		5		5		10	5
1	21X31A0438			5		3				10	5
2	21X31A0439							4		5	5
3	21X31A0440			5		4				10	5
4	21X31A0441			5		5				10	5
5	21X31A0442			5		5				10	5
6	21X31A0443			4		5				10	5
7	21X31A0444			5		5				10	5
8	21X31A0445							4		5	5
9	21X31A0446			5		5				10	5
10	21X31A0447	4				5				10	5
11	21X31A0448			2				3		9	5
12	21X31A0449	2						4		10	5
13	21X31A0450	2						3		10	5
14	21X31A0451			5		5				9	5
15	21X31A0452			5		5				9	5
16	21X31A0453			4		5				9	5
17	21X31A0454			2		5				9	5
18	21X31A0455			4		5				10	5
19	21X31A0456	5				4				10	5
20	21X31A0457	5		3						10	5
21	21X31A0458			5		3				10	5
22	21X31A0459			5		5				10	5
23	21X31A0460	3				2				10	5
24	21X31A0461					3		5		10	5
25	21X31A0462			5				3		10	5
26	21X31A0463							4		5	5
27	21X31A0464			3		5				10	5
28	21X31A0465							4		5	5
29	21X31A0466	3		5						10	5
30	21X31A0467			3		3				10	5
31	21X31A0468			3				4		10	5
32	21X31A0469			5		5				10	5
33	21X31A0470			5		4				10	5
34	21X31A0471			5		5				10	5
35	21X31A0472			5				5		10	5
36	22X35A0421					5		5		10	5
37	22X35A0422			5				5		10	5
38	22X35A0423			5		5				10	5
39	22X35A0424			2		3				10	5
40	22X35A0425			5				4		10	5
41	22X35A0426			5		5				10	5
42	22X35A0427			5		1				9	5
43	22X35A0428			5		3				10	5
44	22X35A0429			5		4				10	5
45	22X35A0430							4		5	5
46	22X35A0431			5		5				10	5

47	22X35A0432					5		5		10	5
48	22X35A0433			4						10	5
49	22X35A0434			5		4				10	5
50	22X35A0435			5		4				10	5
51	22X35A0436			5		4				10	5
52	22X35A0437			5		5				9	5
53	22X35A0438					5				10	5
54	22X35A0439			4		3				10	5
55	22X35A0440			5		3				10	5
56	22X35A0441			3		1				9	5
Target set by the faculty / HoD		3.00	0.00	3.00	0.00	3.00	0.00	3.00	0.00	6.00	3.00
Number of students performed above the target		5	0	39	0	37	0	16	0	51	56
Number of students attempted		7	0	42	0	40	0	16	0	56	56
Percentage of students scored more than target		71%		93%		93%		100%		91%	100%

CO Mapping with Exam Questions:

CO - 1											
CO - 2											
CO - 3											
CO - 4	Y								Y	Y	
CO - 5			Y		Y				Y	Y	
CO - 6							Y		Y	Y	

% Students Scored >Target %	71%		93%		93%		100%		91%	100%
-----------------------------	-----	--	-----	--	-----	--	------	--	-----	------

CO Attainment based on Exam Questions:

CO - 1											
CO - 2											
CO - 3											
CO - 4	71%								91%	100%	
CO - 5			93%		93%				91%	100%	
CO - 6							100%		91%	100%	

CO	Subj	obj	Asgn	Overall	Level
CO-1					
CO-2					
CO-3					
CO-4	71%	91%	100%	88%	3.00
CO-5	93%	91%	100%	95%	3.00
CO-6	100%	91%	100%	97%	3.00

Attainment Level	
1	40%
2	50%
3	60%

Attainment (Internal Examination-2) **3.00**

Percentage of students scored more than target	67%
Attainment level	3

3	60%
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SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electronics and Communication Engineering

Course Outcome Attainment

Name of the faculty : P.KAVITHA

Academic Year: 2022-2023

Branch & Section: ECE - B

Examination: I Internal

Course Name: LINEAR IC APPLICATIONS

Year: II

Semester: II

Course Outcomes	1st Internal Exam	2nd Internal Exam	Internal Exam	University Exam	Attainment Level
CO1	2.00		2.00	3.00	2.75
CO2	2.00		2.00	3.00	2.75
CO3	2.00		2.00	3.00	2.75
CO4		3.00	3.00	3.00	3.00
CO5		3.00	3.00	3.00	3.00
CO6		3.00	3.00	3.00	3.00
Internal & University Attainment:			2.50	3.00	
Weightage			25%	75%	
CO Attainment for the course (Internal, University)			0.63	2.25	
CO Attainment for the course (Direct Method)			2.88		

Overall course attainment level

2.88



SRI INDU INSTITUTE OF ENGINEERING & TECHNOLOGY

Department of Electronics and Communication Engineering

Program Outcome Attainment (from Course)

Name of Faculty: P.KAVITHA Academic Year: 2022-2023
Branch & Section: ECE - B Year: II
Course Name: LINEAR IC APPLICATIONS Semester: II

CO-PO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	-	3	-	-	-	-	-	-	-	3	1	2
CO2	3	3	2	-	-	-	-	-	-	-	-	2	1	2
CO3	3	3	2	-	-	-	-	-	-	-	2	2	1	1
CO4	3	2	1	-	-	-	-	-	-	-	-	-	1	2
CO5	3	3	3	-	2	-	2	-	-	-	2	2	2	2
CO6	3	2	2	-	-	-	-	-	-	2	-	-	2	2
Course	3	2.5	2	3	2	-	2	-	-	2	2	2.3	1.333	1.83

CO	Course Outcome Attainment
CO1	2.75
CO2	2.75
CO3	2.75
CO4	3.00
CO5	3.00
CO6	3.00
Overall course attainment level	2.88

PO-ATTAINMENT

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO Attainment	2.88	2.40	1.92	2.88	1.92		1.92			1.92	1.92	2.24	1.28	1.76

CO contribution to PO - 33%, 67%, 100% (Level 1/2/3)



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Khalsa Ibrahimpatnam, Sheriguda (V), Ibrahimpatnam (M), Ranga Reddy Dist., Telangana-501510

Website: <https://siiet.ac.in/>

ASSIGNMENTS AND ATTENDANCE REGISTER

Assignment1 script link:

https://drive.google.com/file/d/1jk7qokJN_kQxBFLUju3qHBBjslLXe4l2/view?usp=sharing

Assignment2 script link:

<https://drive.google.com/file/d/1GIV0cMm3vRTaGkLKnCMtrGHJUBuO7kTy/view?usp=sharing>

Attendance register link:

<https://drive.google.com/file/d/12m5qQBIRrLsZrRlpt37ejrqTEJnKCzNy/view?usp=sharing>