

MAR GREGORIOS COLLEGE OF ARTS & SCIENCE

Department of Electronics and communication science

Academic Semester:2023- 2024



Semester:III	Section:	Course Code: SG23A	Course:Analog Electronics
Course Instructor: SAVITHRI V& SHANTHA S		Contact Hours /week: 5	# of credits: 4
CIA:25		ESE :75	Exam Hours: 03

Prerequisites if any:

Code No	Course Name	Description	Semester
SG23A	Analog Electronics		III

Content delivery: Chalk and Talk, Power Point Presentation, Quiz and Assignments

**COURSE SYLLABUS:**

Contents of Units	Hrs	Co's
Amplifiers : General principles of small signal & large signal amplifiers. Classification of Amplifiers – Concept of Multistage Amplifier – RC coupled amplifiers - Working – Frequency response – Transformer coupled amplifiers – working – frequency response (Qualitative Analysis) – Direct coupled amplifier – Working - Emitter Follow	10	To familiarize the student with the analysis and design of basic transistor amplifier circuits, feedback amplifiers and multi vibrator circuits
Power Amplifier & Feedback Amplifier : Classification – Class A, B, C amplifiers class A – single ended amplifier – Transformer coupled amplifier – Cross over distortion (definition) – complementary symmetry class B Push pull amplifier – power dissipation and output power calculations Feedback: Basic concepts of feedback – Derivation for transfer gain with feedback - effects of negative feedback on input and output resistances, gain, gain stability, distortion and bandwidth – Types of feedback (Voltage series, Voltage shunt, Current series, Current shunt)	15	To understand the concepts of Multi Stage Amplifier.



Sinusoidal and Non Sinusoidal Oscillators – Barkhausen criterion for oscillation – RC and LC oscillators – Hartley, Colpitt's, Phase shift & Wien bridge oscillators – Working - frequency of oscillations – Crystal oscillator – UJT Relaxation Oscillator.	15	To study the operation of Hartley, Colpitts, RC Phase shift, crystal and wien bridge oscillators and To determine the operating characteristic of Unijunction Transistor Oscillator
Operational Amplifiers & Timer – IC Identification – op-amp parameters – frequency response of an op-amp – Differential amplifier – CMRR – Inverting amp – Non-inverting amp – voltage follower – IC 555 – pin functions – Internal Architecture.	10	To study the characteristics of Operational Amplifier
Applications – Opamp: Summing amplifier – Comparator – Integrator – Differentiator – Square wave generators – Triangular wave generators. IC 555: Astable – Monostable – Schmitt trigger	10	To study the various applications of Operational amplifier and IC 555

#### Text Books:

- Jacob Millman and Christos C.Halkias, Integrated Electronics, McGraw Hill.
- Roy Choudary D, Shail Jain, Linear Integrated Circuits, New Age International Pvt. Ltd., 2000.
- Sedha, R.S. A TextBook of Applied Electronics, S. Chand & company Ltd.
- Ramakant A. Gayakwad, OP-AMP and Linear ICs, 4th Edition, Prentice Hall / Pearson Education, 1994.
- G.K.Mithal, Basic Electronic Devices and circuits, 2nd Edition, G.K.Publishers Pvt. Ltd. 1998.

#### REFERENCE BOOKS:

- Allen Mottershead, Electronic Devices and Circuits-an Introduction - Prentice Hall.
- Mithal G.K., Electronic Devices and Circuits, Khanna Publishers.
- Donald L.Schilling, Charles Belove, Discrete and Integrated Electronic Circuits, McGraw Hill.
- Jacob Milliman, Micro Electronics, McGraw Hill.

#### Online Resources / Web Resources/ MOOC/NPTEL

- <https://www.youtube.com/watch?v=CR1O8cRF5Bs>
- <https://nptel.ac.in/courses/108104087>
- <https://www.youtube.com/watch?v=qqiZ2LPkFws>
- <https://nptel.ac.in/courses/108102112>

**COURSE OUTCOMES:** At the end of the Course, the Student will be able to:

<b>C01</b>	<b>Design and analyze of electronic circuits,</b>
<b>C02</b>	Recognize power amplifier circuits, their design and uses in electronics and communication circuits.
<b>C03</b>	Know the concept of Multistage and feedback amplifier and their characteristics.
<b>C04</b>	Design the different oscillator circuits for various frequencies
<b>C05</b>	Design of circuits using Operational Amplifier and IC 555.



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MOGAPPAIR WEST, CHENNAI

ACKNOWLEDGED CATHOLIC EDUCATION INSTITUTE WITH 83 YEARS OF EXPERIENCE IN EDUCATION

APPROVED BY THE GOVT. OF TAMILNADU & AFFILIATED TO THE UNIVERSITY OF MADRAS



## DEPARTMENT OF ELECTRONICS AND COMMUNICATION SCIENCE

### 6- LESSON PLAN



### LESSON PLAN

Lecture	Unit	Topics	BT levels L1-L6*	CO mapping	Planned Date	Actual Date	Faculty Sign	Remarks	
1	I	Power Amplifier	L4	CO1	04/07/2023	4/7/23	[Signature]		
2		Classification	L4		05/07/2023	5/7/23	[Signature]		
3		Class A, B, C amplifiers Single ended amplifier	L4		06/07/2023	6/7/23	[Signature]		
4		Transformer coupled amplifier	L4		12/07/2023	12/7/23	[Signature]		
5		Cross over distortion	L4		13/07/2023	13/7/23	[Signature]		
6		Complementary symmetry class B Push pull amplifier	L4		14/07/2023	14/7/23	[Signature]		
7		Complementary symmetry class B Push pull amplifier	L4		17/07/2023	17/7/23	[Signature]		
8		II	Power dissipation and output power calculations	L4	CO2	20/07/2023	24/7/23	[Signature]	Causal Law
9			Basic concepts of feedback	L4		21/07/2023	21/7/23	[Signature]	
10			Derivation for transfer gain with feedback - effects	L4		24/07/2023	24/7/23	[Signature]	
11			Effects of negative feedback on input and output resistances	L4		25/07/2023	25/7/23	[Signature]	
12		gain, gain stability, distortion and bandwidth	L4		28/07/2023	28/7/23	[Signature]		
Signature (Head of the Department)									
13	II	Voltage shunt, feedback	L4		01/08/2023	01/8/23	[Signature]	SDP	
14		Current series feedback	L4		02/08/2023	7/8/23			
15		Current shunt feedback	L4		07/08/2023	7/8/23			
16		Operational amplifiers- Introduction	L2		08/08/2023	8/8/23			
17		Op-Amp supply voltages- Explanation of pin configuration	L2		09/08/2023	9/8/23			
18		Op-Amp parameters- Input offset voltage, output offset voltage	L2		10/08/2023	10/8/23			
19		Input impedance, Output impedance and CMRR	L2		16/08/2023	18/8/23			
20		Slew rate, Bandwidth	L2		17/08/2023	17/8/23			
21		Comparison of ideal and practical characteristics	L2		18/08/2023	18/8/23	[Signature]	Seminar	

21		voltage amplifier, difference amplifier	L2		21/08/2023	21/8/23	✓	
22		Op-amp as Inverting amplifier	L3		24/08/2023	24/8/23	✓	
23	V	Op-amp as Non- Inverting amplifier	L3		25/08/2023	25/8/23	✓	
24		Op-amp as Voltage follower.	L3		28/08/2023	28/8/23	✓	
25		IC 555 timer - pin functions -	L2		29/08/2023	31/8/23	✓	Onam
26		Internal architecture.	L2		30/08/2023	30/8/23	✓	
		Internal architecture.			05/09/2023	5/9/23	✓	

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28		op-amp circuits-introduction to Summing amplifier	L3		07/09/2023	7/9/23	✓	
29		working of Inverting Summing amplifier	L3		08/09/2023	8/9/23	✓	
30		working of Non Inverting Summing amplifier	L3		11/09/2023	11/9/23	✓	
31		Op-amp working as Differential amplifier	L3		13/09/2023	13/9/23	✓	
32		Comparator principles and explanation	L3		14/09/2023	14/9/23	✓	
33		Op amp as Integrator working and output derivation	L3		15/09/2023	15/9/23	✓	
34		Op amp as Differentiator working and output derivation	L3		21/09/2023	21/9/23	✓	
	V	IC 555 Applications-	L4		22/09/2023	22/9/23	✓	
36		Schmitt trigger	L4		25/09/2023	25/9/23	✓	
37		Astable multivibrator	L4		26/09/2023	26/9/23	✓	
38		Monostable multivibrator	L4		03/10/2023	3/10/23	✓	
39		Revision			04/10/2023	4/10/23	✓	
		Seminar			05/10/2023	5/10/23	✓	
		Seminar			06/10/2023	6/10/23	✓	

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\*L1 - Remembering; L2 - Understanding; L3 - Applying; L4 - Analysing; L5 - Evaluating; L6 - Creating



**MAR GREGORIOS COLLEGE OF ARTS & SCIENCE**

Department of Electronics and communication science

Academic Semester:2023- 2024



Semester:III	Section:	Course Code: SG25A	Course:Analog Electronics
Course Instructor: SAVITHRI V& SATHIYA M& SASIKALA R		Contact Hours /week: 5	# of credits: 4
CIA:25	ESE :75	Exam Hours: 03	

**Prerequisites if any:**

Code No	Course Name	Description	Semester
SG25A	MICROCONTROLLER		V

**Content delivery:** Chalk and Talk, Power Point Presentation, Quiz and Assignments

Unit	Contents of Units	Hrs	Co's
1	Introduction to Microcontroller – comparison of Microcontroller & Microprocessor – 8051 Architecture – Block diagram – 8051 Pin details- Memory Organization– Counter and Timers – Serial Communication – Interrupts.		To familiarize with different types of microcontroller
2	8051 Instruction set – Addressing Modes – Data Transfer, Arithmetic, Logical, Branching Instructions, Bit level Instructions		To know 8051 microcontroller in detail
3	Programming Exercise (8 Bit) : Addition, Subtraction, Multiplication, Division, Data Transfer, Largest/Smallest Number, Ascending/Descending Order-Basic Time Delay		To learn programming and Interfacing with 8051 microcontroller
4	Interfacing : Keyboards – Displays – ADC & DAC – Stepper motor		To develop an in-depth understanding of the operation of microcontroller and interfacing techniques
5	Embedded systems: Block Diagram-Uses Von Neumann and Harvard Architecture – Introduction to CISC and RISC		To understand and use various IO devices such as keypads, stepper motor, A to D

## TEXT AND REFERENCE BOOKS

1. Kenneth J Ayala, The 8051 Microcontroller: Architecture, Programming and Applications, West Publishing company
  2. Mazidi, E. and Mazidi, F., The 8051 Microcontroller and Embedded systems, Prentice – Hall of India (2004) 2nd ed.
  3. Jack Ganssle and others, Embedded Hardware, Elsevier Inc
- Online Resources / Web Resources/ MOOC/NPTEL

1. <https://www.youtube.com/watch?v=dcNk0urQsQM>
2. <https://www.youtube.com/watch?v=7l3-iq6OtEE>
3. <https://www.youtube.com/watch?v=AloSgVjW06w>
4. [https://www.youtube.com/watch?v=AvUTg\\_pVmXE](https://www.youtube.com/watch?v=AvUTg_pVmXE)
5. <https://nptel.ac.in/courses/117104072>

**COURSE OUTCOMES:** At the end of the Course, the Student will be able to:

CO1	Describe the architecture of 8051 microcontroller
CO2	Describe the operation of microcontroller
CO3	Implement the machine language programming
CO4	Demonstrate keyboard, display, stepper motor, ADC & DAC interfaces
CO5	To understand and use various controllers and I/O Devices.



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Lecture	Unit	Topics	BT levels L1-L6*	CO mapping	Planned Date	Actual Date	Faculty Sign	Remarks
1	1	Introduction to Micro controller	K1, K4	CO1	10/07/2023			
2		Microcontroller & Microprocessor comparison				11/07/2023	12/7/23	U
3		8051 Pin details-			18/07/2023	11/7/23	U	-
4		8051 Pin details-			19/07/2023	18/7/23	U	-
5		Block diagram of 8051			26/07/2023	19/7/23	U	-
6		Architecture			27/07/2023	26/7/23	U	-
7		Register banks			03/08/2023	29/7/23	U	-
8		Special function registers			04/08/2023	7/8/23	U	Skill Development program
9		Memory Organization—internal & external ROM			11/08/2023	8/8/23	U	Freshers day
10		Memory Organization—internal & external RAM			14/08/2023	11/8/23	U	-
11		Counter			22/08/2023	29/8/23	U	Seminar
12		Modes of operation			23/08/2023	23/8/23	U	-
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12		Timer	K3		31/08/2023	31/8/23	U	

13	1	Timer modes	CO 4	01/09/2023	01/09/23	8	-
14		Serial Communication		11/09/2023	11/09/23	8	-
15		Types of communication		12/09/2023	13/09/23	9	Dept Feet
16		Interrupts		19/09/2023	19/09/23	4	-
17		Various types of Interrupts		20/09/2023	20/09/23	4	-
	4	Interfacing : Keyboards – Displays		27/09/2023	27/09/23	4	-
19		Keyboard Interface		09/10/2023	<del>10/10/2023</del>	4	Start part
20		7 Segment interface		11/10/2023	11/10/23	4	-
21		ADC Interface		18/10/2023	18/10/23	4	-
22		DAC Interface		19/10/2023	19/10/23	4	-
23		Stepper motor Interface	20/10/2023	20/10/23	4	-	

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