



Model Institute of Engineering
& Technology (Autonomous)
Course Handout

Kot, Bhalwal, Jammu

COURSE HANDOUT

ELECTRONIC DEVICES & CIRCUITS (ECE-301)

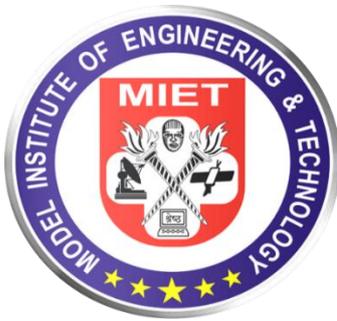
ECE-3RD SEMESTER

ACADEMIC YEAR (2024-25)

Dr Suhaib Ahmed Batt

Assistant Professor

Department of Electronics and Communication Engineering



Department of Electronics and Communication Engineering

Model Institute of Engineering & Technology (Autonomous)

Kot Bhalwal, Jammu - 181122

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Dr. Arun K. Gupta Teaching-Learning Centre

Version 1.1



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Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
							Sessional	Final Exam	Total
ECE-301	Electronic Devices & Circuits	PCC	4	3	1	0	50	100	150

COURSE OUTCOMES

At the end of the course the student will be able to:	
CO1	Understand the multistage amplifiers and different coupling methods
CO2	Analyze different topologies of feedback amplifiers
CO3	Understand the concepts to design various oscillators
CO4	Classify different power amplifiers and analyze distortions
CO5	Illustrate various OP-AMP functions to design linear integrated circuits

Section - A

Unit-I

Need of cascading for Single and Multistage Amplifiers, Techniques for improving input resistance (Darlington transistor, Bootstrap emitter follower amplifiers), method of coupling multistage amplifiers (RC coupling, DC coupling, transformer coupling), Frequency response of amplifiers, Effect of emitter and bypass capacitors on the bandwidth and frequency response of a cascaded amplifiers.

(12 Hrs)

Unit-II

Feedback Amplifier, Need for feedback, Feedback concept, Gain with and without feedback, negative feedback, output resistance and bandwidth of the amplifier, their respective analysis for feedback amplifiers, Procedure for analysis of feedback amplifiers, Analysis of different topologies.

(10 Hrs)

Unit-III

Sinusoidal Oscillators Introduction, Barkhausen Criteria, Requirements of oscillators, Types of oscillators (RC phase shift, Wien Bridge, LC, Crystal)

(8 Hrs)

Section-B

Unit-IV

Power Amplifiers Introduction, Classification of power amplifiers, crossover distortion, harmonic distortion in power amplifiers

(7 Hrs)

Unit-V

Block Diagram of Op-Amp, Ideal & Practical Op-Amp & Characteristics, Op-Amp open loop configurations, Measurement of Op-Amp parameters, Op-Amp Applications, Inverting/Non-Inverting configuration, Differentiator, Integrator, Op-Amp Waveform generators (saw tooth, triangular, square, sine wave), Sample & hold circuit, Peak detector, Voltage Limiter, Comparator, Schmitt Trigger, Phase-Locked Loops & 555 Timers.

(9 Hrs)

Textbooks

S.No	Name of the Books	Name of the Author	Publisher Name	Edition (Pub.Yr.)
T1	Electronic Devices & Circuit Theory	Robert L. Boylestad and Louis Nashelsky	Pearson	11th (2015)
T2.	Op-Amps and Linear Integrated circuits	Ramakant A. Gayakwad	PHI	4th (2002)



Reference Books

S.No	Name of the Books	Name of the Author	Publisher Name	Edition (Pub.Yr.)
R1	Electronic Principles	Malvino Leach	TMH	7th (2017)
R2	Microelectronic Circuits	Adel S. Sedra and Kenneth C. Smith	Oxford University Press	7th (2014)

COURSE PLAN		
Unit-I		
S.No	Topics	Recommended Books
1	Need of cascading for Single and Multistage Amplifiers	Book T1, Ch. 5
2	Techniques for improving input resistance	Book T1, Ch. 5
3	Darlington transistor	Book T1, Ch. 5
4	Bootstrap emitter follower amplifiers	Book T1, Ch. 5
5	Method of coupling multistage amplifiers	Book T1, Ch. 5 & Book R2, Ch. 9
6	RC coupling	Book T1, Ch. 5 & Book R2, Ch. 9
7	DC coupling	Book T1, Ch. 5 & Book R2, Ch. 9
8	Transformer coupling	Book T1, Ch. 5 & Book R2, Ch. 9
9	Frequency response of amplifiers	Book T1, Ch. 9 & Book R2, Ch. 10
10	Effect of emitter capacitors on the bandwidth and frequency response of a cascaded amplifiers	Book T1, Ch. 9 & Book R2, Ch. 10
11	Effect of bypass capacitors on the bandwidth of a cascaded amplifiers	Book T1, Ch. 9 & Book R2, Ch. 10
12	Effect of emitter and bypass capacitors on the frequency response of a cascaded amplifiers	Book T1, Ch. 9 & Book R2, Ch. 10
Unit-II		
13	Feedback amplifiers	Book T1, Ch. 14 & Book R2, Ch. 11
14	Need for feedback and Feedback concept	Book T1, Ch. 14 & Book R2, Ch. 11
15	Gain with and without feedback	Book T1, Ch. 14 & Book R2, Ch. 11
16	negative feedback	Book T1, Ch. 14 & Book R2, Ch. 11
17	output resistance and bandwidth of the amplifier	Book T1, Ch. 14 & Book R2, Ch. 11
18	respective analysis for feedback amplifiers	Book T1, Ch. 14 & Book R2, Ch. 11
19	Procedure for analysis of feedback amplifiers	Book T1, Ch. 14 & Book R2, Ch. 11
20	Voltage Series & Voltage Shunt feedback	Book T1, Ch. 14 & Book R2, Ch. 11
21	Current Series & Current Shunt feedback	Book T1, Ch. 14 & Book R2, Ch. 11
22	Analysis of different topologies	Book T1, Ch. 14 & Book R2, Ch. 11
Unit-III		
23	Sinusoidal Oscillators Introduction	Book T1, Ch. 14
24	Barkhausen Criteria	Book T1, Ch. 14
25	Requirements of oscillators	Book T1, Ch. 14
26	Types of oscillators	Book T1, Ch. 14
27	RC phase shift oscillator	Book T1, Ch. 14
28	Wien Bridge oscillator	Book T1, Ch. 14
29	LC oscillator	Book T1, Ch. 14
30	Crystal oscillator	Book T1, Ch. 14



Unit-IV		
31	Power Amplifiers Introduction	Book T1, Ch. 12 & Book R2, Ch. 12
32	Classification of power amplifiers	Book T1, Ch. 12 & Book R2, Ch. 12
33	Class A and B power amplifiers	Book T1, Ch. 12 & Book R2, Ch. 12
34	Class AB power amplifiers	Book T1, Ch. 12 & Book R2, Ch. 12
35	Class C power amplifiers	Book T1, Ch. 12 & Book R2, Ch. 12
36	Crossover distortion in power amplifiers	Book T1, Ch. 12 & Book R2, Ch. 12
37	Harmonic distortion in power amplifiers	Book T1, Ch. 12 & Book R2, Ch. 12
Unit-V		
38	Block Diagram of Op-Amp, Ideal & Practical Op-Amp & Characteristics	Book T2, Ch. 1 & Ch. 2
39	Op-Amp open loop configurations, Measurement of Op-Amp parameters	Book T2, Ch. 2 and Ch. 4
40	Op-Amp Applications, Inverting/Non-Inverting configuration	Book T2, Ch. 6
41	Differentiator, Integrator	Book T2, Ch. 6
42	Waveform generators (saw tooth, triangular, square, sine wave)	Book T2, Ch. 7
43	Sample & hold circuit, Peak detector	Book T2, Ch. 8
44	Voltage Limiter, Comparator	Book T2, Ch. 8
45	Schmitt Trigger	Book T2, Ch. 8
46	Phase-Locked Loops & 555 Timers	Book T2, Ch. 9

ADDITIONAL WEB RESOURCES

1.	MOOC: Introduction to Electronics https://www.coursera.org/learn/electronics
2.	NPTEL: Video lectures on Analog Electronic Circuits by Prof. Pradip Mandal, IIT Kharagpur https://nptel.ac.in/courses/108105158

GRADING AND ASSESSMENT

- **Sessional Test:** 20 marks
- **Assignment:** 20 marks
- **Attendance:** 10 marks
- **Final Examination:** 100 marks

COURSE POLICIES

- **Attendance:** Minimum 75% attendance is mandatory to appear in the final examination of the course.
- **Academic Integrity:** MIET's academic integrity policies apply. Plagiarism will not be tolerated.
- **Late Submissions:** Assignments and projects must be submitted by the specified timelines.

FACULTY INFORMATION

- **Office Hours**
Monday (12:05 PM - 12:55 PM)
Friday (12:05 PM - 12:55 PM)
- **Contact Information**
suhaib.ece@mietjammu.in

