



SECOND SEMESTER 2024-2025

Course Handout Part II

Date: 30-12-2024

In addition to part-I (General Handout for all courses appended to the time table) this portion gives further specific details regarding the course.

Course No.	: ECE F341 / EEE F341/ INSTR F341
Course Title	: Analog Electronics
Instructor-in-Charge	: Sk Masum Nawaz
Other Instructor	: Ponnalagu RN
Tutorial Instructors	: Sk Masum Nawaz, Ponnalagu R.N, Meera Kumari, Amit Kumar Panda
Lab Instructors	: Sk Masum Nawaz
Research Scholars	: Ramya K, Mou Sarkar, Megha Y Bhat, Sen Granthana, Shaik Sultan, Naresh Bahadursha, Mendhe Mrunali Vijay, Sajith Pm

Scope and Objective of the Course:

The aim of the course is to deal with various electronic techniques and building blocks used in analog signal processing applications. Discrete and Integrated electronic circuits will be studied. Experiments using Op-amps and discrete IC modules will be carried out in the laboratory.

Course Outcomes

After completing the course, students will be able to

- Design analog electronic circuits using Op-amps and discrete components for linear and non-linear signal processing (real time) applications.
- Analyse a given analog integrated circuit and evaluate its performance.
- Convert analog to digital and digital to analog signal of desired accuracy and resolution using data converters
- Design voltage regulators and power supplies using regulator ICs and sinusoidal and non-sinusoidal signal generators using Op-amps and timer ICs

Textbooks:

1. TB1 L.K. Maheshwari, Analog Electronics, PHI, 2005
2. TB2 L.K. Maheshwari and M.M.S. Anand, Laboratory Experiments & PSPICE Simulation in Analog Electronics Experiments, PHI, 2005.

Reference books

1. R1. A.S. Sedra, K.C. Smith, Microelectronic Circuits, 5th Ed., Oxford, 2004.
2. R2. S. Franco, “Design with Operational Amplifiers and Analog Integrated Circuits”, 3rd Ed. McGraw Hill.
3. R3. Ramakant A. Gayakwad, “Op-Amps and Linear Integrated Circuits”, 4th Ed., 2015, Pearson



Course Plan:

Lecture No.	Learning objectives	Topics to be covered	Chapter in the Text Book
1-2	Key concepts dealing with the basics of circuit theory and electronic devices are reviewed	Introduction & review of concepts	TB1 Ch 1
3-10	Introduce the basics of ideal and practical op-amps	Op-amp Basics	Class notes & TB1 Ch 2
11-14	Introduce the applications of ideal and practical op-amps in analog electronic systems	Special purpose Op-amp circuits	Class notes and TB1 Ch 3
15-22	This part discusses the important features and practical realization of active filters. Switched-capacitor filters are also included.	Active Filters	Class notes and TB1 Ch 4
23-29	Applications of Op-amps in realization of nonlinear functions such as log and antilog amplifiers, multipliers, dividers are included. Precision circuits, comparators, Schmitt trigger, analog switches, sample-and-hold circuits, analog multipliers, etc. are also introduced.	Non-linear Op-amp circuits	Class notes and TB1 Ch 5
30-34	Sinusoidal and non-sinusoidal signal generators using op-amps and timer ICs are introduced. This part also introduces phase locked loop along with other integrated circuits.	Signal generators & Phase lock loop	Class notes and TB1 Ch 6
35-37	This part includes the study of analog-to-digital and digital-to-analog converters. The performance measures and design aspects of data converters will be covered in this part.	Data Converters-D/A, A/D Converters	Class notes and TB1 Ch10
38-40	This part discusses the voltage regulators and also the design of power supply using regulator ICs.	Voltage Regulators	Class notes and TB1 Ch 7

Lab Experiments:

S.No	Experiment	Reference to Text
1	Common Emitter Amplifier	TB2 Exp 2
2	Basic Configuration of Op-amp-I	TB2 Exp 5
3	Basic Configuration of Op-amp-II	TB2 Exp 5
4	Characterization of Op-amp	TB2 Exp 5
5	Study of Feed Back Amplifiers Using Op-amps	TB2 Exp 8
6	Instrumentation and Programmable Amplifier	TB2 Exp 7
7	Study of Active Filters Using Op-amps Low Pass, High Pass & Band Pass	TB2 Exp 9
8	Precision Circuit	TB2 Exp 12
9	Sinusoidal and Non-Sinusoidal Oscillators	TB2 Exp 15
10	Integrated Circuit Timer and Phase Locked Loop	TB2 Exp 16, Exp 17

Evaluation Scheme:

Component	Duration	Weightage (%) / Marks	Date & Time	Nature of Component
Mid-Sem	90 minutes	30 % (60)	As announced in the Time table	Closed book
Quizzes	To be announced	10 % (20)	To be announced	Closed book
Laboratory – Regular lab evaluation	Lab hours	10 % (20)	Lab hours	Open book
Laboratory Exam (Quiz/Assignment/ Hardware Expt)	To be announced	10 % (20)	To be announced	Open book
Comprehensive exam	180 minutes	40 % (80)	As announced in the Time table	Closed Book
TOTAL		100 % (200)		

Chamber Consultation Hour: To be announced in class

Notices: Notices concerning the course will be put up on the LMS/CMS

Make-up Policy:

- For **Midsem and Compre** exam: In case a student is not in a position to write the exam due to medical reasons: The application for makeup should be sent prior the exam along with the medical certificate (Yellow slip) from BITS Hyderabad campus medical Centre
- **No make up for Quizzes/assignments/Lab Exams.**

Academic Honesty and Integrity Policy: Academic honesty and integrity should be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.



Prof. Sk Masum Nawaz
INSTRUCTOR-IN-CHARGE

