

## DISCIPLINE SPECIFIC ELECTIVES (DSE) COURSES OFFERED BY THE DEPARTMENT

### DISCIPLINE SPECIFIC ELECTIVE: Linear Integrated Circuits (INDSE4A)

#### CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical / Practice		
Linear Integrated Circuits(INDSE4A)	04	03	-	01	Class XII passed with Physics + Mathematics/Applied Mathematics + Chemistry / Computer Science/Informatics	Understanding of Analog electronics & Operational Amplifiers

#### Learning Objectives

The Learning Objectives of this course are as follows:

- Familiarity and designing of various non-linear circuits using op-amp
- Familiarity and designing of multivibrators using 555 timer.
- Use of op-amp in designing of D/A and A/D convertors.
- Familiarity with different Linear ICs like 380, 555, 565, 566, 78xx and 79xx.

#### Learning outcomes

The Learning Outcomes of this course are as follows:

- Design and explain the working of log & anti-log amplifier, analog multiplier and precision rectifier using op-amp.
- Design and explain the working of D/A and A/D convertors using op-amp.
- Design and explain the working of different types of multivibrators using IC 555.
- Use the regulator ICs for regulation purposes.

## SYLLABUS OF DSE-2

### UNIT – 1 (12 hours)

Sample and hold circuits, logarithmic amplifiers, antilogarithmic amplifiers, analog multipliers, Precision rectifier circuit: Half wave rectifier, full wave rectifier, bridge rectifier, peak rectifier, clipper, clamping, and applications of precision rectifier circuits.

### UNIT – 2 (12 hours)

**D/A convertor:** Binary weighted resistors, R/2R resistor. A/D convertor: Successive approximation.

**Power Amplifiers:** Monolithic power amplifier (IC 380), use of power boosters (IC 3329/03), application of power amplifiers

### UNIT – 3 (12 hours)

**Multivibrators (IC 555):** Pin and block diagram, Astable and monostable multivibrator circuit, applications of astable and monostable multivibrators.

Phase locked loops (PLL): Block diagram, operating principle, phase detector types, monolithic phase locked loops (IC565). Application of PLL IC 565: Frequency multiplier and frequency shift keying. Voltage controlled oscillator (IC 566).

### UNIT – 4 (9 hours)

**Voltage Regulators IC:** Fixed voltage regulator (IC 78xx and IC 79xx), adjustable voltage regulator (IC 317 and IC 337), switching regulator (IC 1723) and special regulator.

### Practical component: (30 hours)

1. Designing of precision half wave rectifier circuit.
2. Designing of precision full wave rectifier circuit.
3. Designing of precision positive and negative clipper circuit.
4. Designing of precision positive and negative clamper circuit.
5. Designing of binary weighted D/A convertor OR R/2R resistor D/A convertor
6. Design an astable multivibrator using IC 555.
7. Design a monostable multivibrator using IC 555.
8. Design a voltage regulator circuit using voltage regulator IC.

### Essential/recommended readings

1. Skoog & Lerry, Instrumental Methods of Analysis, Saunders College R. A. Gayakwad, Op-Amps and Linear IC's, Pearson Education 4th Edition, May 2015.

2. R. F. Coughlin and F. F. Driscoll, Operational amplifiers and Linear Integrated circuits, Pearson Education (2001).
3. J. Millman and C.C. Halkias, Integrated Electronics, Tata McGraw-Hill, (2001).
4. A.S. Sedra and K.C. Smith, Microelectronics Circuit, Oxford (2011).

### **Suggestive readings**

1. A.P.Malvino, David J Bates, Electronic Principals, 7th Edition, Tata McGraw-Hill Education, (July 2017).

**Note:** Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.