IV SEMESTER

ANALOG ELECTRONICS II

Paper Code **ECS-401**

Course Credits 4

Lectures/ Week 3

Tutorials/ Week 1

Course description

UNIT-I DIRECT- COUPLED AMPLIFIERS

Difference amplifier, the emitter-Coupled differential amplifier, Common-mode gain, differential- mode gain, (CMRR), current mirrors, active loads, BJT-input stage, gain stage, level shifter, output stages, complete op-amp cascade with qualitative analysis, frequency response and compensation.

UNIT-IIOP-AMP APPLICATIONS

Brief review of inverting/non-inverting VCVS, Integrators, differentiators, ICVS and VCIS, instrumentation amplifier, logarithmic amplifiers, Log/Antilog modules, temperature compensation, op-amp-parameters and their measurements.

UNIT-III WAVEFORM GENERATORS AND WAVESHAPING

Op-amp comparators, regenerative comparators (Schmitt trigger), waveshaping, zero crossing detector, astable and monostable multivibrators, square/triangular wave function generator, saw-toothwave generator, sample and hold circuit, precision rectifiers, peak detector and window detector.

UNIT- IV I C TIMER AND IC PLL

The IC 555 timer, operational modes, time delay, astable and monostable operations, VCO etc., phase locked loop IC 565 (PLL), principle of operation, three modes of operation, PLL applications frequency synthesis, FM demodulaton, frequency to Voltage Converter etc.

UNIT- V ANALOG MULTIPLIER AND VOLTAGE REGULATORS

Analog multiplier using BJTs, IC analog multiplier and its applications, voltage regulators: op-amp based regulators, IC regulators, fixed voltage regulators (78/79XX), 723 IC regulators, current limiting and current foldback circuits, SMPS.

References Books

1. Sedra and Smith, “Microelectronic circuits”, Oxford university press.
2. S. Soclof, “Applications of Analog Integrated circuits”, PHI.
3. Coughlin and Driscoll, “Operational amplifiers and Linear Integrated circuits”, PHI
4. J. Millman and Grabel, “Microelectronics”, McGraw Hill Book Co.
5. K. Laker, “Design of Analog Integrated Circuits and Systems, Tata McGraw Hill.

Course Outcomes

CO 1: Ability to describe and analyze the characteristics of differential amplifiers and their DCand small signal characteristics. Ability to realize different gains like common mode and differential mode and the CMRR of the differential amplifier can easily be calculated.

CO 2: Ability to design, construct, measure and realize various applications of Op-amp like VCVS, ICVS and VCIS, Integrators, differentiators, instrumentation amplifier, Log/Antilog modules and other different parameters.

CO3: Ablity to understand and design various wave generator circuits and shaping circuits like Schmitt trigger, zero crossing detector, astable and monostablemultivibrators, square/triangular wave function generator, saw-toothwave generator, sample and hold circuit, precision rectifiers, peak detector and window detector.

CO 4: Ability to design, construct and understand the various application of the op-amp based circuits like VCO, IC 555 timer based circuits and IC 565 PLL based circuits.

CO5: Ability to Design, construct, and take measurement of various analog multiplier, Voltage regulator and Op-amp based circuits to compare experimental/ simulated results in the laboratory with theoretical analysis.

Computer usage/ Software required: PSPICE