

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN**B.E. THIRD YEAR****ELECTRONICS & COMMUNICATION**

(In Force June 2006)

SEMESTER – V**EC 502: ANALOG SYSTEM DESIGN**

Teaching Scheme		Examination Scheme				
Theory Hrs.	Practical Hrs.	Theory Hrs.	Theory Marks	Pract./ Viva Marks	Term Work Marks	Total Marks
4	2	3	100	25	25	150

SYLLABUS

1. **Operational Amplifiers:** The basic OPAMP, Differential Amplifier, Emitter Coupled Differential Amplifier, Transfer characteristics of differential amplifier, OPAMP parameters & its measurements, Frequency response of OPAMP, Dominant Pole Compensation, Pole zero compensation, Lead Compensation, Step response of OPAMP.
2. **Application of Operational Amplifier:** Linear Applications:- AC/DC Amplifier, Inverting and Non-Inverting Amplifier, AC Amplifiers with single supply voltage, The Peaking Amplifier, Summing, Scaling and Averaging Amplifier, Instrumentation Amplifier, Differential input and Differential output amplifier, Integrator, Differentiator, Voltage to Current Converter with floating and grounded load, Current to Voltage Converter, Voltage Follower, Non Linear Applications:-Comparator, Zero Crossing Detector, Schmitt Trigger, Voltage Limiters, Clipper and Clampers, Absolute Value Output circuit, Peak Detector, Sample and Hold Circuit, Precision Rectifier – Half/Full Wave, Square, Triangular and Saw tooth Wave Generator, Log/ Antilog Amplifier,
3. **ANALOG FILTERS**
 - Classification of Filters, Magnitude & attenuation characteristics, Magnitude & frequency scaling, first Order Filter circuits.
 - Realization of Transfer function of filters using Inverting & Non- inverting OPAMP circuits, All Pass circuits.
 - The Biquad Ckt.: Design parameter Q & ω_0 . The Biquad ckt. Frequency & phase response.
 - Butter worth Low Pass Filters: The ideal low pass filter Butter worth response, Butter worth pole locations, Low pass filter specifications, Sallen & Key circuit, RC-CR transformation.
 - Butter worth Band-pass Filters: A frequency transformation, Geffe algorithm, Deliyann's-Friend's circuit,
4. **Other Specialized ICs:**
 - 555 Timer and its Applications: Block Diagram, Monostable and Astable MultiVibrators, Applications as Frequency Divider, Square Wave Generator, Free- Running Ramp Generator etc.
 - Phase Locked Loop and Its Applications: Block Diagram and Operation, Applications as Frequency Multiplier, Frequency Shift Keying
 - Design of Power Supply: Simple OP-AMP Voltage regulator, three terminal Voltage Regulators, Fixed and Adjustable Voltage Regulators (78XX, LM317), Heat Sink, Dual Power supply (LM320, LM317), Basic Switching Regulator and its characteristics
 - Power Amplifiers: Monolithic Power Amplifiers (LM380)

Mini Project / Design of Electronic circuit is to be submitted as a part of laboratory work.

REFERENCE BOOKS:

- 1) Op-Amp and Linear Integrated Circuits, 4th Edition by Ramakant A. Geikwad (PHI)
- 2) Analog Filter Design by Van Valkenburg, Oxford Publication
- 3) Application and design with Analog Ics, 2nd Edition by J. Michael Jacob-(PHI)
- 4) Design with Operational Amplifiers & Analog Ics, 3rd Edition by Sergio Franco (TMH)
- 5) Linear and Digital Integrated Circuits by S P Eugene Xavier - (Khanna publications)
- 6) Linear Integrated Circuits and Applications by Dr. Y. Venkatramani - (ISTE learning material)