VL5003 DESIGN OF ANALOG FILTERS AND SIGNAL CONDITIONING CIRCUITS

DETAILED SYLLABUS

OBJECTIVE:

•   This course deals with CMOS circuit design of various Analog Filter architectures. The required signal conditioning techniques in a Mixed signal IC environment are also dealt in this course.

UNIT I FILTER TOPOLOGIES

The Bilinear Transfer Function - Active RC Implementation, Trans conductor-C Implementation, Switched Capacitor Implementation, Biquadratic Transfer Function, Active RC implementation, switched capacitor implementation, High Q, Q peaking and instability, Trans conductor-C Implementation, the Digital Biquad.

UNIT II INTEGRATOR REALIZATION

Lowpass Filters, Active RC Integrators – Effect of finite Op-Amp Gain Bandwidth Product, Active RC SNR, gm-C Integrators, Discrete Time Integrators.

UNIT III SWITCHED CAPACITOR FILTER REALIZATION

Switched capacitor Technique, Biquadratic SC Filters, SC N-path filters, Finite gain and bandwidth effects, Layout consideration, Noise in SC Filters.

UNIT IV SIGNAL CONDITIONING TECHNIQUES

Interference types and reduction, Signal circuit grounding, Shield grounding, Signal conditioners for capacitive sensors, Noise and Drift in Resistors, Layout Techniques.

UNIT V SIGNAL CONDITIONING CIRCUITS

Isolation Amplifiers, Chopper and Low Drift Amplifiers, Electrometer and Transimpedance Amplifiers, Charge Amplifiers, Noise in Amplifiers

REFERENCES:

1. Ramson Pallas-Areny, John G. Webster "Sensors and Signal Conditioning", A wiley Inter science Publication, John Wiley & Sons INC,2001.

2. R. Jacob Baker, "CMOS Mixed-Signal Circuit Design", John Wiley & Sons, 2008.

3. Schauman, Xiao and Van Valkenburg, "Design of Analog Filters", Oxford University Press, 2009.