

PEI4D001 ANALOG SIGNAL PROCESSING (Honours)

(Syllabus at university level)

Module - I (10 lectures)

Introduction: Review of Operational Amplifier Fundamentals, Current-to-Voltage Converters, Voltage-to-Current Converter, Current Amplifiers, Difference Amplifiers, Instrumentation Amplifiers, Instrumentation amplifiers and its applications, Transducer Bridge Amplifiers. Bandwidth, slew rate and frequency response. Op-amp applications: DC and AC amplifiers.

Module - II 12 lectures

Linear Analog Functions: Addition, Subtraction, Differentiation, Integration, Impedance Transformation and AC/DC Signal Conversion: Signal Rectification, Peak and Valley Detection, rms to dc Conversion, Amplitude Demodulation Other Nonlinear Analog Functions: Voltage Comparison, Voltage Limiting (Clipping), Logarithmic Amplifiers, Analog Multipliers, Analog Dividers.

Module - III 13 lectures

Analog Filters: Introduction to filtering and filter design, components for filter implementation, active low-pass, high-pass, band-pass, band-reject and all-pass filters – design and realization, Switch capacitance filter.

Interference and Noise: Sources of signal coupling, Grounding and shielding techniques, Isolation amplifiers, Noise fundamentals, Noise modelling for electronic components and Circuits.

Text Books:

1. Sergio Franco, *Design with Operational Amplifiers and Analog Integrated Circuits*, 3rd Edn., Tata McGraw Hill Education Pvt. Ltd., New Delhi, 2002, ISBN: 0-07-232084-2.
2. Ramon Pallas-Areny, John G. Webster, *Analog Signal Processing*, John Wiley & Sons, 1999, ISBN: 9814-12-696-9.

Reference Books:

1. R. Schaumann and M. E. Valkenberg, *Design of Analog Filters*, Oxford University Press, 2001, ISBN: 0-19-568087-1.
2. Don Meador, *Analog Signal Processing With Laplace Transform and Active Filter Design*, Thomson Learning.
3. Ashok Ambardar, *Analog and Digital Signal Processing*, 2nd Edn., Michigan Technological University Published by Nelson Engineering, 1999.
4. A.S. Sedra and K.C. Smith, *Microelectronic Circuits*, Oxford University Press, New Delhi
5. J.N. Jacob, *Application & Design with Analog Integrated Circuits*, PHI Pub, New Delhi.
6. D. Patranabis, *Electronic Instrumentation*, PHI Pub, New Delhi