SARDAR PATEL UNIVERSITY
Programme: B.Sc (Physics)
Semester: V
Syllabus with effect from: June-2013

Paper Code: US05CPHY05	Total Credit: 3
Title Of Paper: Analog Devices and Circuits	

Unit	Description in detail	Weighting (%)
I	**Fet And Mosfet** Introduction, Basic Ideas, Drain curves, Transconductance curves, Biasing in the ohmic region, Biasing in the active region, Transconductance, JFET amplifiers, The JFET analog switch, Other JFET applications, The depletion mode MOSFET, The enhancement mode MOSFET, CMOS	
II	**Frequency Response of Amplifiers and Tuned Amplifiers** **Frequency Response of Amplifiers**: Introduction to Hybrid h- Parameters, Obtaining Hybrid h- Parameter, Amplifier Equations, Low Frequency Response of The Transistor Amplifier, Effect of Emitter Bypass, Capacitor on Low Frequency response, Effect of Coupling Capacitor on Low Frequency response, High Frequency Response of The Transistor Amplifier, High Frequency Model For The Common Emitter Amplifier, Approximate CE High Frequency Model with a Resistive Load, CE Short Circuit Gain, High Frequency Current Gain with a Resistive Load, **Tuned Amplifiers:** Introduction to Tuned Amplifiers, Classifications of Small Signal Tuned Amplifiers, Single Tuned Inductively Coupled Amplifier	
III	**Transistor Power Amplifiers** Class A Direct Coupled Resistive Load, Transformer Coupled Resistive Load, Design Theory, Power Amplifier Design, Harmonic Distortion, Power Output, Variation of output power with load, Output transformer saturation, Disadvantages of a single ended transformer coupled amplifier, **Push-Pull Amplifiers:** Description of Operation of a Class A Push-Pull Amplifier, Theory of Operation of a Class A Push-Pull Amplifier, The Class B Push-Pull Amplifier, Crossover Distortion, Class AB Push-Pull Amplifier, Transistor Phase Inverter, Conversion Efficiency of a Class B Amplifier, Relation between maximum output power and load resistance, Other Class B Push-Pull Amplifiers, Complementary Symmetry	
IV	**Operational Amplifiers** **Operational Amplifier Characteristics:** Basic Differential amplifier analysis, DC Analysis of the Bipolar Diff. Amplifier, AC Analysis of the Bipolar Diff. Amplifier, The Common mode rejection ratio –CMRR, The Ideal Operational Amplifier -Op-Amp., Inverting and Noninverting Amplifiers – Ideal case, Op-Amp Parameters –Definitions, Universal Balancing Techniques, Measurements of Op-Amp Parameters, General Description of various Stages in Op-Amp, **Applications of operational amplifier:** Summing amplifier (Inverting Mode) and Difference amplifier, The Integrator and Differentiator, Current to Voltage Converter, Voltage to Current Converter-Floating Load, Logarithmic Amplifier using diode(Basic only) **Active filters**: Introduction, General characteristics of filters, Various filter responses, First-order active filters (Basic Low-Pass and High-Pass filters)	

Basic Text & Reference Books:-

- Electronic Principles, P Malvino, Tata McGraw Hill Pub. Co.Ltd, New Delhi
- Electronic Devices and Circuits, Allen Mottershead, PHI Pvt.Ltd., New Delhi
- Electronic Devices and Circuits, G K Mittal, Khanna Publishers, New Delhi
- Integrated Circuits, K R Botkar, Khanna Publishers, New Delhi
- Integrated electronics: analog and digital circuits and systems
- Jacob Millman and Christos C. Halkias, Tata McGraw Hill Pub.Co.Ltd, New Delhi