Module No.	Unit No.	Topics	Hrs.
1.0		**Introduction to Operational Amplifier**	**07**
	1.1	Block diagram of Op-Amp. Ideal and practical characteristics of op-amp.	
	1.2	Configurations of Op-Amp: Open loop and closed loop configurations of Op-amp, Inverting and Non-inverting configuration of Op-amp and buffer.	
	1.3	Summing amplifier, difference amplifiers and Instrumentation amplifier using Op-amp.	
2.0		**Linear Applications of Operational Amplifier**	**08**
	2.1	Voltage to current and current to voltage converter.	
	2.2	Integrator & differentiator (ideal & practical), Active Filters: First and Second order active low pass, high pass, band pass, band reject and Notch filters.	
	2.3	Positive feedback, Barkhausen's criteria, Sine Wave Oscillators: RC phase shift oscillator, Wien bridge oscillator.	
3.0		**Non-Linear Applications of Operational Amplifier**	**07**
3.0	**3.1**	Comparators: Inverting comparator, non-inverting comparator, zero crossing detectors, window detector.	
	3.2	Schmitt Triggers: Inverting Schmitt trigger, non-inverting Schmitt trigger.	
	3.3	Waveform Generators: Square wave generator and triangular wave generator. Basics of Precision Rectifiers: Half wave and full wave precision rectifiers. Peak detector.	
4.0		**Timer IC 555 and it's applications**	**07**
	4.1	Functional block diagram and working of IC 555	
	4.2	Design of Astable and Monostable multivibrator using IC 555	
	4.3	Applications of Astable and Monostable multivibrator as Pulse width modulator and Pulse Position Modulator.	
5.0		**Voltage Regulators.**	**06**
	5.1	Functional block diagram, working and design of three terminal fixed voltage regulators (78XX, 79XX series).	
	5.2	Functional block diagram, working and design of general purpose IC 723 (HVLC and HVHC).	
	5.3	Introduction and block diagram of switching regulator, Introduction of LM 317.	
6.0		**Special Purpose Integrated Circuits**	**04**
	6.1	Functional block diagram and working of VCO IC 566 and application as frequency modulator.	
	6.2	Functional block diagram and working of PLL IC 565 and application as FSK Demodulator.	
		Total	**39**