4139- CIRCUIT DESIGN

Teaching Schedule Per Week			Progressive Assessment		Examination Schedule (Marks)			
					Theory		Practical Ex.	Total
Lectures	Practical	Credit						150
3	2	5	25	25	3 Hrs	100	-	
Pre-requisite		Source						
4132		EXN						

Semester	Theory	Test	Total	TW	PR	Gr Total

Rationale: This course is intended to create capabilities to analyse circuits encounted in Basic Electronics and Devices. This also helps in acquiring experience in the design of the basic circuits in Electronics Course.

COURSE CONTENTS	Hrs	Mks
1. INTRODUCTION TO COMPONENT SELECTION	10	20
Resistors: Resistors types, variable resistors, colour coding, power ratings, choosing the resistors for a circuit, resistor faults.		
Inductors: Self-inductance, mutual inductance, and calculation of turns and core area for a given inductance. Inductive reactance, Q of a core, applications with examples.		
Capacitors: Typical capacitors colour coding, charging and discharging of a capacitor. Capacitate reactance, Time constant, applications with examples, capacitor faults.		
Transformer: Single-phase step up, step down transformer. Types of cores core losses, calculations of primary and secondary turns and core area for 50Hz-power supply. Typical applications with examples.		
2. POWER SUPPLY	14	30
Designing half wave rectifier, Full wave rectifier for specified voltage and power. Use of simple filters in rectifiers. Applications with examples. Designing a zener regulator for specified output values. Study of IC 723 regulator, designing of Series regulators for giving o/p voltages and power. Concept in discrete and integrated modes. Calculations and design considerations. Switching regulator concepts. Design of HW and FW controlled rectifier (RC phase shift NW) using SCR for a given voltage and firing angles. Design of controlled Power supply using Triac for light dimmer and motor speed control.		
3. AMPLIFIERS	12	25
Design of biasing circuits for a single stage typical amplifier. Stability factor. Design of discrete and integrated power amplifier. Design of typical multistage RC amplifier for specified voltage and currents.		
4. OSCILLATORS	12	25
Designing of RC phase shift Oscillators for a specified frequency and voltage. Designing a stable multi-vibrator using transistors and IC 555, for a specified frequency and voltage. Designing a relaxation oscillator using UJT and PUT for a specified saw-tooth voltage and frequency. Designing, integrating and differentiating circuit using RC components.		
Total	48	100

PRACTICALS: (Any 6) (No. Of turns)

1. Designing a zener regulator for specified I, V, P ratings. (2)
2. Designing of 723 regulator for specified ratings. (2)
3. Designing of a single stage amplifier circuit for specified ratings. (2)
4. Designing of a multistage RC amplifier circuit for specified (3)
5. Performance / ratings (3)
6. Designing of RC phase shift oscillator for a specified frequency and voltage.
7. Designing of Astable Multivibrator using transistor and IC 555 for a specified frequency and voltage. (2)
8. Designing of UJT relaxation oscillator for a specified sawtooth voltage and frequency (2)
9. Designing Integrator / Differentiator circuits for specified performance (3)
10. Parameters.

REFERENCE BOOKS:

1. Transistor Approximations by Malvino.
2. Electronic Devices and Circuits by Louis Neshelkey