

GUJARAT TECHNOLOGICAL UNIVERSITY

DIPLOMA IN INSTRUMENTATION & CONTROL

SEMESTER- VI

Subject Name: **INDUSTRIAL ELECTRONICS AND CONTROL**

Sr. No.	Subject Content	Hrs.	Pract. Hrs.
1	1.0 THYRISTOR : 1.1 SCR, DIAC, TRIAC, UJT constructions, operations and characteristics. 1.2 Two transistor analogy of SCR. 1.3 Overview of following properties of SCR 1.3.1 Voltage and current rating of SCR. 1.3.2 Latching and holding current of SCR. 1.3.3 Turn on time, turn off time, dv/dt, di/dt. 1.3.4 Forced and natural commutation. 1.4 Turn on methods. 1.5 Firing of SCR using UJT. 1.6 Series and parallel operation of SCR. 1.7 Importance of Snubber circuit	9	6
2	2.0 MODERN POWER CONTROL DEVICES: 2.1 Power BJT, MOSFET & IGBT operations & characteristics 2.2 Merits & demerits of above power devices. 2.3 Simple driver circuit of MOSFET and IGBT	5	4
3	3.0 CONVERTERS : 3.1 Operation of half controlled and fully controlled bridge converters. 3.2 Microprocessor based firing circuit of converters using SCR 3.3 Effect of inductance on free wheeling diodes. 3.4 Principle of operation of Dual converter. 3.5 Protective circuits for over current and over voltage.	7	2
4	4.0 CYCLO-CONVERTERS : 4.1 Principle of operation of single phase Cyclo-converter Circuits. 4.2 Merits and demerits of Cyclo-converters.	5	4

5	5.0 CHOPPERS & INVERTERS : 5.1 Operational principle of chopper. 5.2 Principle and operation of Line commutated and forced commutated inverters. 5.3 Principle and operation of Series and Parallel inverter	5	4
6	6.0 CONTROL OF D.C. MOTOR : 6.1 Speed control using current and speed feedback. 6.2 Field current control. 6.3 Circulating current method.	4	4
7	7.0 CONTROL OF A.C. MOTOR : 7.1 Speed and torque control of a.c. Motors. 7.2 Static methods of control.	2	2
8	8.0 Resistance Welding Control: 8.1 Duty cycle of welding process. 8.2 SCR as electronic contactor in welding 8.3 Energy storage welding 8.4 Sequence timer using IC	5	2
	Total	42	28

Note :- Above are the minimum experiences required, but the college can do more experiences if possible.

Reference Books:

1. Industrial electronics and control - S K Bhattacharya & S. Chatterjee (TMH Publication)
2. Power electronics (TMH Publication) - M D Singh
3. Modern power electronic (TMH Publication)- Ned mohan.
4. Thyristor and their application -M Ramamorthy
5. Power Electronics (Khanna Publication) -P S Bimmhra