

SYLLABI OF COURSES FOR DIPLOMA PROGRAMME IN ELECTRICAL ENGINEERING LEVEL IV & V

5102 – POWER ELECTRONIC & DRIVES CONTROL										
Teaching Schedule Per Week			Progressive Assessment		Examination Schedule (Marks)					
Lectures	Practical	Credits			Theory		Practical Ex.		Total	
4	1	5	25	25	3 Hrs	100	-	150		
Pre-requisite		Source	Semester	Theory	Test	Total	TW	PR	Gr Total	
4102		ELL		75	25	100	25	-	125	

**COURSE CONTENTS**

	Hrs	Mk
<b>1. INTRODUCTION (Descriptive Treatment only)</b> Application of power electronics, Power semiconductor devices & their characteristics, Diodes, Thyristers, GTO, MCT, TRIAC, DIAC, PUT, IGBT, Power Mesfet.	4	4
<b>2. POWER SEMICONDUCTOR DIODES</b> Power diodes types, General purpose diodes, Fast recovery diodes, Schottky diodes, Series connected diodes, parallel connected diodes.	4	4
<b>3. DIODES CIRCUITS &amp; RECTIFIERS (Descriptive Treatment only)</b> Diodes with RC & RL Loads, Free wheeling diodes, Recovery of trapped energy with a diode, single phase Half wave & full wave rectifier, Multiphase star rectifier, Three phase Bridge rectifier, Effects of source & load inductance	6	8
<b>4. THYRISTERS</b> Thyristor characteristics, Two transistor model of a thyrstier, Thyristor turn-on & turn-off methods, di/dt & dv/dt protection, Series & parallel operation of thyrister, Thyristor firing circuits (Using UJT, PUT)	10	16
<b>5. CONTROLLED RECTIFIER</b> Principle of phase-controlled converter operation, Single phase Half wave and full wave converters, Single phase dual converter, Three phase half wave and full wave converters, Three phase dual converters.	6	8
<b>6. A C VOLTAGE CONTROLLER (Using thyristor)</b> Principle of on-off control, Principle of phase control, Single phase controllers, Three phase Half wave and full wave controllers, single phase and three phase cyclo-converters, AC voltage controllers with PWM control.	8	16
<b>7. D C CHOPPERS, INVERTERS &amp; STATIC SWITCHES (No analysis)</b> Chopper classification, Switching mode regulation-Buck regulators, Boost regulators, Single phase Bridge inverters, Three phase inverters, single phase & three phase AC switches, D.C. switches & solid state relay.	6	8
<b>8. D.C. MOTOR CONTROL (Descriptive treatment only)</b> Single phase & three phase drives (with half wave & full wave converters), Chopper controlled drives.	8	16
<b>9. A. C. MOTOR CONTROL (Descriptive treatment only)</b> Stator voltage control, Rotor voltage control, Frequency control, Voltage & Frequency control, Current control, Slip energy recovery scheme	10	16
<b>10. PROTECTION OF POWER DEVICES</b> Cooling & Heat sinks, Snubber circuits, Current protection (Descriptive treatment only).	2	4
<b>Total</b>	<b>64</b>	<b>100</b>

**PRACTICALS:** Minimum ten (Study demonstrative type)

1. Ac Phase controlled supply. Calculation and comparison of rms for different firing angles
2. SCR power supply. Calculation and comparison of D.C. voltage with respect to firing angles. Comparison of angles by CRO for R-C & R-L load.
3. Characteristics of SCR, Trise and time for RC.
4. Study of inverter.
5. Study of cyclo-converter.
6. TRIAC for light dimmer and fan speed control
7. PUT as turn-on circuit.
8. Study of chopper circuit.
9. Study of speed control of DC motor using SCR.
10. Firing circuit using UJT.
11. Study of V/f control scheme for three phase Induction motor.

**REFERENCE BOOKS:**

1. Power Electronics By M. H. Rashid T.M.H.
2. Electric Drives by V. Subramanyam. TMH
3. Electric Drives by G. K. Dubey.
4. Modern Power Electronics by P. C. Sen.
5. Industrial Electronics and control by S. K. Bhattacharya TMH.
6. Power Thyristors and application by M. Raswarthy.

