



Sardar Patel Institute of Technology

Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058-India
(Autonomous Institute Affiliated to University of Mumbai)

Course Code	Course Name	Teaching Scheme (Hrs/week)			Credits Assigned			
		L	T	P	L	T	P	Total
EXC703	Power Electronics II	4	--	--	4	--	--	4
		Examination Scheme						
		ISE		MSE	ESE			
		10		30	100 (60% Weightage)			

Pre-requisite Course Codes		EXC 604: Power Electronics – I EXC 404: Principles of Control Systems
After successful completion of the course, student will be able to		
Course Outcomes	CO1	Analyze different methods of power converters.
	CO2	Describe power electronic applications.
	CO3	Analyze different power electronic application in DC Drives.
	CO4	Analyze different power electronic application in AC Drives.

Module No.	Unit No.	Topics	Ref.	Hrs.
1		Rectifiers and Inverters:		12
	1.1	Effect of source inductance in 1-phase and 3-phase rectifiers, distortion in line current waveforms, voltage distortion for diode and SCR based rectifiers	3	
	1.2	PWM for 3-phase voltage source inverters, Space Vector Modulation (SVM) technique for 3-phase voltage source inverters, hysteresis control.	3	
2		DC-DC Converters:		10
	2.1	Average model, linearized and transfer function models, state-space average models of basic buck, boost and buck-boost converters, Feedback control of these converters (PI and PID).	7	
3		Power Electronic Applications		6
	3.1	Use of power electronic systems in SMPS, Battery charging systems, UPS and Induction heating.	2	
4		Power Electronic Applications in DC Drives		10
	4.1	Various schemes of DC motor speed control, single-phase half-wave semi converter & full converter drive for separately excited DC motor, Dynamic and Regenerative braking of DC motor	1,4	
5		Power Electronic Applications in AC Drives		14
	5.1	Introduction to speed control of three-phase induction motor methods: i) Stator voltage ii) Variable frequency iii) Rotor resistance iv) V/f control v) Regenerative braking.	1, 4	



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Total	52
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References:

- [1] M. Rashid, Power Electronics: Circuits, Devices, and Applications, PHI, Third Edition.
- [2]. By M. D. Singh, K. B. Khanchandani, Power Electronics, Tata McGraw Hill, Second Edition.
- [3]. Mohan, Undeland and Riobbins, Power Electronics: Converters, Applications and Design, Wiley (Student Edition), Second Edition.
- [4]. P. S. Bimbhra, Power Electronics, Khanna Publishers, Edition 2012.
- [5]. R. W. Erickson, D. Maksimovic, Fundamentals of Power Electronics, Springer, Second Edition.
- [6]. J. P. Agrawal, Power Electronics Systems: Theory and Design, Pearson Education, Edition 2002.
- [7]. S. Bacha, I. Munteanu and A. Bratcu, Power Electronic Converters: Modeling and Control, Springer-Verlag, Edition 2014.
- [8]. H. Sira-Ramírez, R. Silva-Ortigoza, Control Design Techniques in Power Electronics Devices, Springer-Verlag, Edition 2006