Subject Code	Course Name	Teaching Scheme	Credits Assigned					
		Theory	Practical	Tutorial	Theory	TW/ Practical	Tutorial	Total
EXC703	Power Electronics II	04	--	--	04		--	04

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Practical	Oral	Total
		Internal assessment			End Sem. Exam				
		Test 1	Test 2	Avg. of Test 1 and Test 2					
EXC703	Power Electronics II	20	20	20	80	--	--	--	100

Course Pre-requisites:

- EXC 604: Power Electronics – I
- EXC 404: Principles of Control Systems

Course Objectives:

1. To enhance and expand the ideas of students for more complex power electronic systems.
2. To teach the analytical methods in power electronic systems.
3. To expose the students to various applications of power electronics in various electronics equipments and drives.

Course Outcomes:

After successful completion of the course students will be able to:

1. Thoroughly understand the modern methods of analysis and control of power electronic systems.
2. Carry out the theoretical analysis of the power electronic systems from the 'Systems Theory' point of view.
3. Appreciate the ubiquity of power electronics systems in engineering fields
4. Simulate and analyze power electronic systems

Module No.	Unit No.	Topics	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	
	1.2	PWM for 3-phase voltage source inverters, Space Vector Modulation (SVM) technique for 3-phase voltage source inverters, hysteresis control.	
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).	
3		**Power Electronic Applications**	06
	3.1	Use of power electronic systems in SMPS, Battery charging systems, UPS and Induction heating.	
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	
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**.**	
		Total	**52**

Recommended Books:

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

Internal Assessment (IA):

Two tests must be conducted which should cover at least 80% of syllabus. The average marks of both the test will be considered as final IA marks

End Semester Examination:

1. Question paper will comprise of 6 questions, each of 20 marks.
2. Total 4 questions need to be solved.
3. Question No.1 will be compulsory and based on entire syllabus wherein sub questions of 2 to 5 marks will be asked.
4. Remaining questions will be selected from all the modules