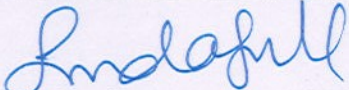
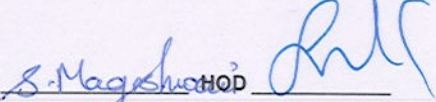


DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

COURSE PLAN – PART I															
Course Title	Power Electronic Drives														
Course Code	EE654	No. of Credits	3												
Pre-requisite	A course in Power Electronics and Electrical Machines														
Session	Jan. __2018__	Section (if, applicable)	--												
Name of Faculty	Dr. K. Sundareswaran	Department	EEE												
Email	kse@nitt.edu	Mobile No.	+919486001122												
Name of Course Coordinator(s) (if, applicable)	--														
E-mail		Telephone No.													
Course Type	<input checked="" type="checkbox"/> Core course	<input type="checkbox"/> Elective course													
Syllabus (approved in BoS)															
<p>Basic power electronic drive system, components - Different types of loads, shaft-load coupling systems - Stability of power electronic drive.</p> <p>Conventional methods of D.C. motor speed control - single phase and three phase converter fed D.C motor drive - Power factor improvement techniques, four quadrant operation.</p> <p>Chopper fed drives, input filter design - Braking and speed reversal of DC motor drives using choppers, multiphase choppers - PV fed DC drives.</p> <p>Conventional methods of induction motor speed control - Solid state controllers for stator voltage control, soft starting of induction motors, rotor side speed control of wound rotor induction motors - Voltage source and Current source inverter fed induction motor drives – d-q axis modeling and vector control.</p> <p>Speed control of synchronous motors, field oriented control, load commutated inverter drives, switched reluctance motors and permanent magnet motor drives - Introduction to design aspects of machines.</p> <p>Reference Books:</p> <ol style="list-style-type: none"> 1. P.C Sen, 'Thyristor DC Drives', John Wiley and Sons, New York, 1991. 2. R. Krishnan, 'Electric Motor Drives – Modeling, Analysis and Control', Prentice-Hall of India Pvt. Ltd., New Delhi, 2003. 3. Bimal K .Bose, 'Modern Power Electronics and AC Drives', Pearson Education (Singapore) Pvt. Ltd., New Delhi, 2003. 															
COURSE OBJECTIVES															
To introduce basic concepts of load and drive interaction, speed control concepts of ac and dc drives, speed reversal, regenerative braking aspects, design methodology.															
COURSE OUTCOMES (CO)															
Course Outcomes	Aligned Programme Outcomes (PO)														
1. Understand and analyze dc and ac motors supplied from different power converters.	CO no	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P O 12	P O 13	P O 14
2. Simulate and study motor characteristics with different converter configurations.	1	M	H	H	M	L	M	M	N A	L	M	L	M	M	H
3. Design and implement a prototype drive system.	2	H	M	H	L	H	H	M	M	M	L	M	N A	H	M
	3	H	H	M	M	H	L	L	H	H	M	M	M	M	M

COURSE PLAN – PART II			
COURSE OVERVIEW			
Students can understand and analyze dc and ac motors supplied from different power converters. Further they will be exposed to simulation and various motor characteristics with different converter configurations. Students can learn about designing as well as implementing a prototype drive system.			
COURSE TEACHING AND LEARNING ACTIVITIES			
S.No	Week/Contact Hours	Topic	Mode of Delivery
1	Week 1 08-01-18 to 12-01-18 (3 contact hours)	<u>Unit-1:</u> Basic power electronic drive system.	Lecture C&T/ PPT or any suitable mode
2	Week 2 15-01-18 to 19-01-18 (3 contact hours)	Components - Different types of loads, shaft-load coupling systems.	
3.	Week 3 22-01-18 to 26-01-18 (2 contact hours)	Stability of power electronic drive.	
4.	Week 4 29-01-18 to 02-02-18 (3 contact hours)	<u>Unit-2:</u> Conventional methods of D.C. motor speed control	
5.	Week 5 05-02-18 to 09-02-18 (3 contact hours)	Single phase and three phase converter fed D.C motor drive	
6.	Week 6 12-02-18 to 16-02-18 (2 contact hours)	Power factor improvement techniques, four quadrant operation	
(1 hour Assessment)		Assessment- 1	
7.	Week 7 19-02-18 to 23-02-18 (3 contact hours)	<u>Unit-3:</u> DC-DC converter fed DC motor – 4 quadrant operation.	Lecture C&T/ PPT or any suitable mode
8.	Week 8 26-02-18 to 02-02-18 (2 contact hours)	Braking and speed reversal of DC motor drives using choppers, Non-receptive lines multiphase DC-DC converters- Dual input DC-DC converters	
9.	Week 9 05-03-18 to 09-03-18 (3 contact hours)	<u>Unit-4:</u> Conventional methods of induction motor speed control - Solid state controllers for stator voltage control	Lecture C&T/ PPT or any suitable mode
10.	Week 10 12-03-18 to 16-03-18 (3 contact hours)	Soft starting of induction motors, rotor side speed control of wound rotor induction motors - Voltage source and Current source inverter fed induction motor drives- d-q axis modeling and vector control	
11.	Week 11 19-03-18 to 23-03-18 (1 hour Assessment)	Assessment- 2	
	(2 contact hours)	<u>Unit-5:</u> Speed control of synchronous motors, field oriented control.	Lecture C&T/ PPT or any suitable mode
12.	Week 12 26-03-18 to 30-03-18 (2 contact hours)	Load commutated inverter drives, switched reluctance motors and permanent magnet motor drives.	

13.	Week 13 02-04-18 to 06-04-18 (3 contact hours)	Introduction to design aspects of machines.		
COURSE ASSESSMENT METHODS (shall range from 4 to 6)				
S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Assessment-1 (Written Test)	6 th Week (12-2-18 to 16-2-18)	60 minutes	20
2	Assessment-2 (Written Test)	11 th Week (19-3-18 to 23-3-18)	60 minutes	20
3	Assignment	--	--	10
4.	Compensation Assessment Written Test (First four units)	16-04-18 to 19-04-18	60 minutes	20
5	End semester exam	23-04-18 to 04-05-18	180 minutes	50
COURSE EXIT SURVEY (mention the ways in which the feedback about the course shall be assessed)				
<ol style="list-style-type: none"> 1. Students' feedback through class committee meetings 2. Feedback questionnaire from students – twice during the semester 3. Feedback from students on Course Outcomes at the end of the semester 				
COURSE POLICY (preferred mode of correspondence with students, policy on attendance, compensation assessment, academic honesty and plagiarism etc.)				
<ol style="list-style-type: none"> 1. All the students are expected to attend all the contact hours. Students should maintain 75% minimum physical attendance by the end of the semester to attend the End semester examination. 2. Any student who fails to maintain 75 % attendance needs to appear for the compensation test and score more than 50 % marks to be eligible for attending the end semester examination. Students not having 75 % minimum attendance at the end of the semester and also scores less than 50 % in the compensation test will have to REDO the course. 3. Attending all the assessments (1- 4) are mandatory for every student. Flexibility is given to the students to fix the date for each mode of evaluation convenient to majority of the students. If any student fails to attend the cycle tests due to genuine reason like medical emergency, the student may be permitted to appear the compensation test on submission of appropriate documents as proof. In any case, compensation test is not considered as an improvement test. 4. The minimum marks for passing this course and grading pattern will adhere to the regulations of the institute. 5. In case of any student found guilty indulging in any mal practice, the student will be awarded no marks in that particular assessment. If found using mobile phones or any other gadgets for any mal-practice during the examination, the answer sheet of the student will not be evaluated and will be awarded ZERO marks. 				
ADDITIONAL INFORMATION				
<ol style="list-style-type: none"> 1. The faculty is available for consultation during the time intimated to the students then and there. 2. All correspondence will be sent to the webmail id of the students alone if required. The students will be communicated through the email id: kse@nitt.edu for any academic related issues (including sharing of study materials) with respect to this course. 				
FOR APPROVAL				
 Course Faculty _____		 CC-Chairperson <u>S. Magasham</u> HOD _____		