DEPARTMENT OF <u>PRODUCTION ENGINEERING</u>

NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

Course Title				
AND SIGNATURE PROPERTY	ELECTRICAL AND CO	NTROL SYSTEMS	denerators attemptors	
Course Code	PRPC19	No. of Credits	3	
Course Code of Pre- requisite subject(s)	EEIR11	HIS LEARNING AD	COURSE TEACHING A	
Session	July/ Jan. <u>2018</u>	Section (if, applicable)	A /B	
Name of Faculty	Ms.S.MALARVILI	Department	EEE, New II	
Email	anolom (Telephone No.	3 pre	
Name of Course Coordinator(s) (if, applicable)	s: (Single phase only) roult and regulation	ry Transformen equivalent or	Ill week of Janua 2 (15% – 19%)	
E-mail		Telephone No.		
Course Type	Core course	Elective co	ourse	
DC machines - Characte phase only)- equivalent Alternators - EMF equi motors starting and app Three - phase induction and speed control of inc	motor - Cage and slip rin luction motors - single pha	ses and efficiency - a chronous impedanc ig motors -torque sli ase induction motors	auto transformer. e method - Synchronous p characteristics –starting and universal motors.	
DC machines - Character phase only)- equivalent Alternators - EMF equivalent motors starting and apport Three - phase induction and speed control of incident and dependent of the energy meters. Control System - oper second order system - for routh criterion for simple COURSE OBJECTIVE:	eristics - Starting and speed circuit and regulation - loss ation - regulation by syndications. I motor - Cage and slip rinduction motors - single phase all factory, textile mill - purstruction and working of a loop and closed loop strequency response method in loop systems S d to apply concepts of electric districts and street loop street loops.	ses and efficiency - a chronous impedance in motors - torque slip ase induction motors imp, blowers, hoists dynamometer type way stems- transfer full and - polar plot. Conce	auto transformer. The method - Synchronous The characteristics -starting The and universal motors. The traction etc group and The watt meters and induction The property of stability - application	
DC machines - Character phase only)- equivalent Alternators - EMF equivalent motors starting and appoint Three - phase induction and speed control of incident and dependent of the control of the contro	eristics - Starting and specification - los ation - regulation by syndications. I motor - Cage and slip rinduction motors - single phase al factory, textile mill - pustruction and working of a loop and closed loop strequency response method ple systems S d to apply concepts of electrical	ses and efficiency - a chronous impedance in motors - torque slip ase induction motors imp, blowers, hoists dynamometer type way stems- transfer full and - polar plot. Conce	auto transformer. e method - Synchronous p characteristics -starting and universal motors. traction etc group and watt meters and induction nction - time response of	
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DC machines - Character chase only)- equivalent characters - EMF equivalent characters - EMF equivalent characters - EMF equivalent characters - phase induction and speed control of incomplete characters - Constituted and drives - Constituted characters - Control System - opens of routh criterion for simple course of course is designed and a course outcomes	eristics - Starting and specification - los ation - regulation by syndications. I motor - Cage and slip rinduction motors - single phase al factory, textile mill - pustruction and working of a loop and closed loop strequency response method ple systems S d to apply concepts of electrical	ses and efficiency - a chronous impedance impedance induction motors in pedance induction i	p characteristics –starting and universal motors. traction etc group and watt meters and induction of the response of the proof of stability - application of the response of the stability - application of the response of the stability - application of the response of the stability - application of the sta	
DC machines - Character phase only)- equivalent Alternators - EMF equivalent and speed control of incomplete energy meters. Control System - oper second order system - for routh criterion for simple COURSE OBJECTIVES This course is designed and strial applications a COURSE OUTCOMES COURSE OUTCOMES COURSE OUTCOMES	eristics - Starting and specification - los ation - regulation by syndications. I motor - Cage and slip rinduction motors - single phase al factory, textile mill - purstruction and working of a loop and closed loop strequency response method apple systems Sold to apply concepts of element to test various electrication (CO)	ses and efficiency - a chronous impedance impedance induction motors in pedance induction i	auto transformer. The method - Synchronous The p characteristics -starting The and universal motors. The traction etc group and Watt meters and induction The property of stability - application The property of stability - applicatio	

COURSE PLAN - PART II

COURSE OVERVIEW

This course examines the basic theory, characteristics, construction operation and application of rotating electrical machines. It includes the study of direct current motors, direct current generators, alternators, synchronous motors, polyphase induction motors and single phase motors. This course provides an introduction to linear systems, transfer functions, and Laplace transforms. It covers stability and feedback, and provides basic design tools for specifications of transient response. It also briefly covers frequency-domain techniques.

COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	Week/Contact Hours	Topic Topic	Mode of Delivery
1	II week of January (8 th – 12 th) 3 hrs	Introduction to the course, DC machines- Characteristics – Starting and speed control of DC motors	Name of Faculty Email
2	III week of January (15 th – 19 th) 3 hrs	Transformers: (Single phase only)-equivalent circuit and regulation	Name of Course Coordinator(s) (if, applicable) E-mail
3	IV week of January (22 nd & 23 rd) 2 hrs	Transformer: losses and efficiency - auto transformer	Lecture(Chalk&board / Power point
4	V week of January (29 th & 30 th) & 2 nd February 3 hrs	Laboratory session 1. No - load speed characteristics of D.C. shunt motor 2. Load test on D.C.Shunt generator 3. Equivalent circuit of single - phase transformer	presentation) Lab(Practical experimentation)
5	II week of February (5 th – 9 th) 3 hrs	Alternators - EMF equation - regulation by synchronous impedance method	individual drives - Co type energy meters. Control System - opt
6	III week of February (12 th – 16 th) 3 hrs	Synchronous motors starting and applications, Three - phase induction motor - Cage and slip ring motors	of routh criterion for s COURSE OBJECTIV This course is design
7	19 th February	Assessment 1 (OO) 8	Descriptive type
8	IV week of February (20 th & 23 nd) 2 hrs	Torque slip characteristics –starting and speed control of induction motors, Single phase induction motors and universal motors	

9	V week of February (26 th & 27 th) 2 hrs	Electric drive for general factory, textile mill - pump, blowers, hoists, traction etc-group and individual drives				Lecture(Chalk&board /		
10	II week of March (5 th – 9 th) 3 hrs	Construction and working of dynamometer type watt meters and induction type energy meters.				presentation)		
11	III week of March (12 th – 16 th) 3 hrs	loop sy	System – open loop stems- transfer func se of second order sys	tion - time				
12	IV week of March (19 th – 23 rd) 3 hrs	4.Swint 5.Semic charact	eristics conductor zener	diode V-I		PRACTICAL EXPERIMENTATION		
13	26 th March	of they i	Assessment 2	d maintain missed the r	Descriptive Type			
14	I week of April (2 nd - 6 th) 3 hrs	Laborat	ratory session TLab simulation of Polar plot			Lecture(Chalk&board Power point presentation)		
15	II week of April (9 th & 10 th) 2 hrs		t of stability - applicat for simple systems		Lab(Practical experimentation)			
COURS	SE ASSESSMENT METHO	DDS (sha	Il range from 4 to 6)	tly produce	chones	3. Students who		
S.No.	Mode of Assessm	ent	Week/Date	Duratio	on	% Weightage		
1 .	Cycle test- 1		19 th February	1 hour	ibtoo	20		
2	Cycle test- 2		26 th March	1 hour	C their	20		
3	Assignment				_18	10		
4	Laboratory	Laboratory				20		
СРА	Compensation Assessment*		13 th April	1 hou	2	20		
6	Final Assessmen	÷ *	Month of April	3 hour		50		

ESSENTIAL READINGS: Textbooks, reference books Website addresses, journals, etc.

- 1. Palani, S. Control Systems , Shanmuga Priya Publishers, 1995.
- 2. Theraja, B.L., Electrical Technology, Vol. 1 and 2, S.Chand and Co. Ltd, 23rd and 24th Edition, 2009.

COURSE EXIT SURVEY (mention the ways in which the feedback about the course is assessed and indicate the attainment also)

- 1. Student's feedback through Class Committee Meetings
- 2. Anonymous feedback from students using questionnaire

COURSE POLICY (preferred mode of correspondence with students, policy on attendance, compensation assessment, , academic honesty and plagiarism etc.)

ATTENDANCE

- 1. Every student should maintain 75% attendance, if not they have to redo the course.
- 2. Students who have missed the regular lab class should get the prior permission for attending compensation lab class

ACADEMIC HONESTY & PLAGIARISM

- 1. All the students are expected to be genuine during the course work. Taking information by copying another student's paper or using study material of any form during any assessments is considered dishonest.
- 2. Any evidence of such academic dishonesty will result in loss of marks in that assessment. Additionally names of such students will be reported to Class Committee Chairperson and HOD for necessary actions.
- 3. Students who honestly produce ORIGINAL and OUTSTANDING work will be rewarded

ADDITIONAL INFORMATION

- 1. The Course Coordinator is available for consultation during the time intimated to the students then and there.
- 2. All correspondence will be sent to webmail id of the students alone. Hence all students are advised to check their webmail regularly.

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Course Faculty & CC-Chairperson

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	COURSE PLA	N - PART I	
Course Title	ELECTRICAL AND CO	NTROL SYSTEMS	of rotology electrical ma
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Course Code of Pre- requisite subject(s)	EEIR11	ND LEARNING AC	COURSE TEACHING AI
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Email	stolem	Telephone No.	3 bits
Name of Course Coordinator(s) (if, applicable)	(Single phase only- cuit and regulation	Transformers equivalent cir	III week of Januar 2 (170 – 194)
E-mail		Telephone No.	
Course Type	Core course	Elective c	ourse
and speed control of inc Electric drive for general individual drives - Constype energy meters. Control System - oper second order system - for routh criterion for sim COURSE OBJECTIVES	n motor - Cage and slip rinduction motors - single phase al factory, textile mill - pustruction and working of a loop and closed loop strequency response method apple systems	ase induction motor ump, blowers, hoist dynamometer type systems- transfer for od - polar plot. Conduction ectrical drives and	lip characteristics –starting is and universal motors. s, traction etc group and watt meters and induction unction - time response of cept of stability - application control systems to various
COURSE OUTCOMES	(CO)		7 214 February
Course Outcomes			Aligned Programme Outcomes (PO)
1. To understand the con-	cepts of transformers and D	C machines	PO ₁ , PO ₆ , PO ₇ – PO ₁₂
2. To understand open lo	op and closed loop system	phase inductions	PO ₁ , PO ₆ , PO ₇ – PO ₁₂
3. To conduct exercises	s for learning DC motors		PO ₁ , PO ₆ , PO ₇ – PO ₁₂

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COURSE OVERVIEW

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COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	Week/Contact Hours	Topic Topic	Mode of Delivery
1	II week of January (10 th = 12 th) 3 hrs	Introduction to the course, DC machines- Characteristics – Starting and speed control of DC motors	Name of Faculty Email
2	III week of January (17 th – 19 th) 3 hrs	Transformers: (Single phase only)-equivalent circuit and regulation	Name of Course Coordinator(s) (if, applicable) E-mail
3	IV week of January (24 th & 25 th) 2 hrs	Transformer: losses and efficiency - auto transformer	Lecture(Chalk&board / Power point
4	V week of January (31st) & (1st & 2 nd)February 3 hrs	Laboratory session 1. No - load speed characteristics of D.C. shunt motor 2. Load test on D.C.Shunt generator 3. Equivalent circuit of single - phase transformer	presentation) Lab(Practical experimentation)
5	II week of February (7 th – 9 th) 3 hrs	Alternators - EMF equation - regulation by synchronous impedance method	individual drives - Cor type energy meters. Control System - ope
6	III week of February (14 th – 16 th) 3 hrs	Synchronous motors starting and applications, Three - phase induction motor - Cage and slip ring motors	of routh criterion for sa COURSE OBJECTIV
7	21st February	Assessment 1	Descriptive type
809	IV week of February (22 nd & 23 rd) 2 hrs	Torque slip characteristics –starting and speed control of induction motors, Single phase induction motors and universal motors	

9	V week of February (28 th) & 1 st March 2 hrs	mill - pu	drive for general far mp, blowers, hoists, nd individual drives	Lecture(Chalk&board /				
10	II week of March (7 th – 9 th) 3 hrs	Construction induction	presentation)					
11	III week of March (14 th – 16 th) 3 hrs	loop sys	System – open loop stems- transfer fund e of second order sys	ction - time	solbai South			
12	IV week of March (21st – 23rd) 3 hrs	Laborato 4.Swinbi 5.Semic characte 6.Semic characte		PRACTICAL EXPERIMENTATION				
13	28th March	Assessi	ment 2	Descr	Descriptive Type			
14	frequency response method - polar plot I week of April (4 th - 6 th) Laboratory session 7.MATLab simulation of Polar plot					Lecture(Chalk&board and Power point presentation) Lab(Practical		
15	II week of April (11 th & 12 th) 2 hrs					experimentation)		
COURS	SE ASSESSMENT METHO	ODS (shal	I range from 4 to 6)	composit the		ilw sinobaye 1		
S.No.	Mode of Assessm	nent	Week/Date	Duratio	on	% Weightage		
1	Cycle test- 1	e students	21st February	1 hour	ndence	20		
2	Cycle test- 2		28th March	1 hour	11981 2	20		
3	Assignment					10		
4	Laboratory				9	20		
СРА	Compensation Assessment*		13 th April	1 hou	ır	20		

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FOR APPROVAL

Course Faculty & CC-Chairperson