C		Course Name	L-T-P -	Yea	r of		
Cour	rse		Credits	Introdu	uction		
COO EE3		Lincor Control Systems	2103	201	6		
Drorogu	usito: Ni	Linear Control Systems	2-1-0-3	2010			
Course	Objectiv	II VOS•					
• To provide a strong foundation on the analytical and design techniques on electrical control theory							
	and mode	lling of dynamic systems	iniques on clas		of theory		
Syllabus : Open loop-and closed loop control systems- Transfer function - Control system components-Steady stare error- static error coefficient- dynamic error coefficient-Stability Analysis- Root locus- Frequency domain analysis-Bode plot-polar plot-Nyquist stability criterion- Non-minimum phase system - transportation lag.							
The students will have the ability to							
i. develop mathematical models of various systems.							
ii. analyse the stability aspects of linear time invariant systems.							
Text Books:							
 Dorf R. C. and R. H. Bishop, Modern Control Systems, Pearson Education, 2011. Nagarath I. J. and Gopal M., Control System Engineering, Wiley Eastern, 2008. Nise N. S., Control Systems Engineering, 6/e, Wiley Eastern, 2010. Ogata K., Modern Control Engineering, Prentice Hall of India New Delhi 2010. 							
Refere	ences:	, <u> </u>					
 Gibson J. E., F. B. Tuteur and J. R. Ragazzini, Control System Components, Tata McGraw Hill, 2013 Gopal M., Control Systems Principles and Design, Tata McGraw Hill, 2008. Imthias Ahamed T P, <i>Control Systems</i>, Phasor Books, 2016 Kuo B. C., Automatic Control Systems, Prentice Hall of India, New Delhi, 2002. 							
		Course Plan	1				
Module		Contents		Hours	Sem. Exam Marks		
I	Open lo systems force cu reductio equation	oop-and closed loop control systems: Transfer fur Mechanical and Electromechanical systems – Ford arrent analogy - block diagram representation - l n - signal flow graph - Mason's gain formula - n.	nction of LTI ce voltage and block diagram characteristic	8	15%		
п	Control system components: DC and AC servo motors – synchro - gyroscope - stepper motor - Tacho generator.		6	15%			
	response step resp	me domain analysis of control systems: Transient and steady state 0 13% sponses - time domain specifications - first and second order systems - p responses of first and second order systems.					
	1_	FIRST INTERNAL EXAMINAT	ION	· · · ·			
III	Error an 0,1, 2 sy Concept feedbach	alysis - steady state error analysis - static error coef stems - Dynamic error coefficients. of stability: Time response for various pole location system - Routh's stability criterion	fficient of type as - stability of	7	15%		
IV	Root loc loci - eff	cus - General rules for constructing Root loci – stab fect of addition of poles and zeros.	ility from root	7	15%		
SECOND INTERNAL EXAMINATION							
V	Frequen based or	cy domain analysis: Frequency domain specification Bode plot - Log magnitude vs. phase plot,	ions- Analysis	7	20%		

VI	Polar plot- Nyquist stability criterion-Nichols chart - Non-minimum phase		20%
	system - transportation lag.		2070

END SEMESTER EXAM

QUESTION PAPER PATTERN:

Maximum Marks: 100

Exam Duration: 3Hourrs.

Part A: 8 compulsory questions.

One question from each module of Modules I - IV; and two each from Module V & VI.

Student has to answer all questions. (8 x5)=40

Part B: 3 questions uniformly covering Modules I & II. Student has to answer any 2 from the 3 questions: $(2 \times 10) = 20$. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.

Part C: 3 questions uniformly covering Modules III & IV. Student has to answer any 2 from the 3 questions: $(2 \times 10) = 20$. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.

Part D: 3 questions uniformly covering Modules V & VI. Student has to answer any 2 from the 3 questions: $(2 \times 10) = 20$. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.

