

NATIONAL INSTITUTE OF TECHNOLOGY TIRUCHIRAPPALLI
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

<u>COURSE PLAN – PART I</u>			
Program & Specialization	B.Tech - Electrical and Electronics Engineering		
Course Title	Control Systems		
Course Code	EEPC 20	No. of Credits	04
Department	Electrical and Electronics Engineering	Faculty	Dr. Vivek Mohan
Session:	July 2021	Section:	3 rd year EEE-B
Pre-requisite Course	MAIR 32		
Course Coordinator	--		
E-mail	vivekmohan@nitt.edu	Telephone No.	8113093716
Course Type	<input checked="" type="checkbox"/> Core course <input type="checkbox"/> Elective course <input type="checkbox"/> Laboratory course		
SYLLABUS (APPROVED BY BOS)			
<p>Modelling of physical systems: Electrical systems - Electromechanical systems – Mechanical systems – Thermal systems.</p> <p>Time domain analysis: Time-domain specifications - Generalized error series – various test signals and its importance- Routh-Hurwitz stability criterion.</p> <p>Root Locus Technique: Definitions - Root locus diagram - Rules to construct root loci - Effect of polezero additions on the root loci.</p> <p>Frequency domain analysis: Bode plot - Polar plot - Nyquist plot - phase-margin - gain margin – Nyquist stability criterion.</p> <p>Controller design: Design of P, PI, PID, lag, lead, lead-lag compensator design.</p>			
ESSENTIAL READINGS : Textbooks, reference books, Website addresses, journals, etc			
1) Katsuhiko Ogata, ‘Modern Control Engineering’, Pearson Education 2) Nagrath and Gopal, ‘Control Systems Engineering’, New Age International 3) Benjamin C Kuo and Farid Golnaraghi, ‘Automatic Control Systems’, John Wiley and Sons 4) M. Gopal, ‘Control Systems’, Tata McGrawHill			

<u>COURSE OBJECTIVES</u>						
To equip students with fundamentals of control systems						
<u>COURSE OUTCOMES (CO)</u>						
Course Outcomes	Aligned Programme Outcomes (PO)					
The students will be able to 1) understand the concepts of closed loop control systems 2) analyze the stability of closed loop control systems 3) apply the techniques to any electrical systems 4) design the classical controllers for electrical systems.	COs/POs	Course Outcomes (COs)				
	Program Outcomes (POs)		1	2	3	4
		1	M	H	L	M
		2	M	H	L	M
		3	M	H	L	M
		4	M	H	L	M
		5	M	H	L	M
		6	M	H	L	M
		7	M	H	L	M
		8	M	H	L	M
		9	M	H	L	M
		10	M	H	L	M
		11	M	H	L	M
		12	M	H	L	M
		13	M	H	L	M
14	M	H	L	M		
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<u>COURSE PLAN – PART II</u>						
<u>COURSE OVERVIEW</u>						
This is a basic course on control systems involving time domain, frequency domain and stability analyses of systems along with their controller design.						
<u>COURSE TEACHING AND LEARNING ACTIVITIES</u>						
S. No.	Week	Topic	Mode of Delivery			
1.	1 st Week of August (4hrs)	Introduction to Control Systems with Examples	Online			
2.	4 th Week of August (4hrs)	Modeling of Physical Systems (Electrical, Mechanical, Thermal)	Online			
3.	1 st Week of September (4hrs)	Intro to Time Domain Analysis, Generalized Error Series and Test Signals	Online			

4.	2 nd Week of September (3hrs)	Routh Hurwitz Stability Criterion+ 1 st Quiz	Online
5.	3 rd Week of September (4hrs)	Root Locus Technique	Online
6.	4 th Week of September (3hrs)	Intro to Frequency Domain Analysis, Bode Plot	Online
7.	1 st Week of October (1hr)	Polar and Nyquist Plot	Online
8.	2 nd Week of October (4hrs)	Revision of Frequency Domain Analysis + 2 nd Quiz	Online
9.	3 rd Week of October (3hrs)	Intro to Controller Design and PI	Online
10.	4 th Week of October (4hrs)	PI and PID continued	Online
11.	5 th Week of October (4hrs)	Compensator Designs	Online
12.	1 st Week of November (3hrs)	Compensator Designs Continued – Lead-Lag	Online
13.	2 nd Week of November (4hrs)	Numerical Solving/Tutorial/Quiz	Online
14.	3 rd Week of November (3hrs)	Numerical Solving/Tutorial/Quiz	Online
15.	4 th Week of November (2hrs)	Compensation Test	Online
16.	1 st Week of December (3hrs)	Revision	Online
17.	2 nd Week of December (2hrs)	End Sem Exam	Online

COURSE ASSESSMENT METHODS

S. No.	Mode of Assessment	Week/Date	Duration	% Weightage
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1.	Quiz-1 (1 st and 2 nd Modules)	2 nd week of September	1 hour	20%
2.	Quiz-2 (3 rd and 4 th Modules)	2 nd /3 rd week of October	1 hour	20%
3.	Viva	1 st week of October onwards	30 minutes	20%
4.	Assignment	-	-	10%
5.	Compensation test (Full Portions)	4 th Week of November	1 hour	20%
6.	End Semester Examination	2 nd week of December	2 hours	30%

COURSE EXIT SURVEY

1. Students feedback through class committee meetings
2. Feedback from students on the course outcomes shall be obtained at the end of the course

COURSE POLICY

COMPENSATION ASSESSMENT: Attending all the assessments (1, 2, 3, & 5) are mandatory for every student. If any student fails to attend the assessment 1 due to genuine reason like medical emergency, the student may be permitted to appear the compensation assessment (CPA) on submission of appropriate documents as proof. The compensation assessment (CPA) will cover full syllabus. 80% of the marks attained in CPA will only be considered for final grading. CPA is not considered as an improvement test.

ATTENDANCE POLICY: All the students are expected to attend all the contact hours. Students should maintain 75% attendance by the end of the course to attend the end semester examination.

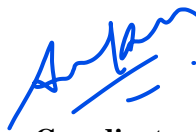
ACADEMIC HONESTY & PLAGIARISM: In case of any student found guilty indulging in any malpractice, the student will be awarded no marks in that assessment.

MODE OF COMMUNICATION: The study materials will be given through email/whatsapp group of class representative. For correspondence, please contact through email vivekmohan@nitt.edu.

FOR APPROVAL



[Dr. Vivek Mohan, AP/EEE]
Course Faculty



Course Coordinator

HoD (Dept. of EEE)

