University of Computer Studies, Yangon
B.C.Sc./B.C.Tech.

CT-305	**: Linear Control Systems**	**First Semester**
Text book	: Modern Control System (12th Edition) by Richard C. Dorf and Robert H. Bishop	
Period	: 45 periods for 15 weeks (3 periods/week) (Lecture +Lab)	

Course Description

Introduction to automatic control systems; mathematical models of physical systems; block diagrams and signal flow graphs; transient and steady state responses.

Course Objectives

- To teach the fundamental concepts of Control systems and mathematical modeling of the
  system
- to provide basic linear systems background with emphasis on deriving mathematical models for linear time invariant electrical, mechanical and electromechanical systems, and relating the output behavior to these models.
- To study the concept of time response and frequency response of the system
- To teach the basics of stability analysis of the system

References

1. Modern Control Systems (12th Edition) by Richard C. Dorf & Robert H. Bishop
2. Design of Feedback Control Systems (4th Edition), 2002 by Raymond T. Stefani, Bahram Shahian, late Clement J. Savant, and late Gene H. Hostetter Oxford Press
3. Modern Control Engineering, 2001 by Katsuhiko Ogata Prentice-Hall
4. Modern Control System Theory, 2001 by M.Gopal Wiley Eastern Ltd.
5. Introduction to Control Theory (2nd Ed) by J. Doyle, B. Francis, and A. Tannenbaum

Assessment Plan for the Course

Paper Exam: 60%

Attendance: 10%

Test/ Quiz: 10%

Lab: 10%

Lab Assessment: 10%

Tentative Lecture Plan

No.	Chapter	Page	Period	Detail Lecture Plan
1.	**Chapter 1 Introduction to Control Systems**	1-48	**2**	Overall
	Chapter 2 Mathematical Models of Systems	49-160	**14**	All Examples, Exercises and Problems
2.	2.1 Introduction	50-50	1	/
3.	2.2 Differential Equations of Physical Systems	50-55	2	/
4.	2.3 Linear Approximations of Physical Systems	55-58	2	/
5.	2.4 The Laplace Transform	58-64	2	/
6.	2.5 The Transfer Function of Linear Systems	65-79	2	/
7.	2.6 Block Diagram Models	79-84	2	/
8.	2.7 Signal-Flow Graph Models	84-90	1	/
9.	2.8 Design Examples	90-112	1	/
10.	2.10 Sequential Design Examples	128-130	1	/
	Chapter 4 Feedback Control System Characteristics	234-303	**10**	All Examples, Exercises and Problems
12.	4.1 Introduction 4.2 Error Signal Analysis	235-239	2	/
13.	4.3 Sensitive of Control Systems to Parameter Variations	239-242	2	/
14.	4.4 Disturbance Signals in a Feedback Control Systems	242-247	2	/
15.	4.5 Control of the Transient Response 4.6 Steady-State Error	247-253	2	/
16.	4.7 The Cost of Feedback 4.8 Design Example	253-267	1	/
17.	4.10 Sequential Design Examples	273-277	1	/
	Chapter 5 The Performance of Feedback Control Systems	304-385	**10**	All Examples, Exercises and Problems

No.	Chapter	Page	Period	Detail Lecture Plan
19.	5.1 Introduction 5.2 Test Input Signals	305-307	2	/
20.	5.3 Performance of a Second-Order System 5.4 Effects of a Third Pole and a Zero on the Second-Order System Response	308-320	2	/
21.	5.5 The s-plane Root Location and the Transient Response	320-322	2	/
22.	5.6 The Steady State Error of Feedback Control Systems	322-330	2	
23.	5.7 Performance Indices 5.8 The Simplification of Linear Systems	330-342	1	/
24.	5.11 Design Examples 5.13 Sequential Design Examples	342-363	1	/
	Chapter 6 The Stability of Linear Feedback Systems	386-	**7**	All Examples, Exercises and Problems
26.	6.1 The Concept of Stability	387-391	1	/
27.	6.2 The Routh-Hurwitz Stability Criterion	391-399	1	/
28.	6.3 The Relative Stability of Feedback Control Systems 6.4 The Stability of State Variable Systems	399-404	2	/
29.	6.5 Design Example	404-412	2	/
30.	6.7 Sequential Design Example	421-423	1	
32.	Revision		**2**	All chapters