❖ ECE_1673 (Linear Control Systems)

Instructor : Jeungphill Hanne

❖ Agenda for today

1. SCUPI 2026 Spring Academic Calendar

- Academic Calendar : Midterms & Final etc.
- My Schedule : Office hours etc.

2. Course Introduction

- Course information

  - Subject, Text book, Lecture Hour, Office hour, Course website, etc.

- Course Objective & Scope, Course Learning Key Points
- Course Grading & Tentative Course Schedule

& After the break

3. Review on

"Laplace Transformation, Transfer Function, Control system "

1. SCUPI 2026 Spring Academic Calendar

- **Academic Calendar : Midterms & Final etc.**

SCUPI Academic Calendar for 2025-2026 Spring

	Mar.	Mar.				Apr.				May					Jun.				Jul.					Aug.			
Monday	2	9	16	23	30	6	13	20	27	4	11	18	25	1	8	15	22	29	6	13	13	20	27	3	10	17	24
Tuesday	3	10	17	24	31	7	14	21	28	5	12	19	26	2	9	16	23	30	7	14	14	21	28	4	11	18	25
Wednesday	4	11	18	25	1	8	15	22	29	6	13	20	27	3	10	17	24	1	8	15	15	22	29	5	12	19	26
Thursday	5	12	19	26	2	9	16	23	30	7	14	21	28	4	11	18	25	2	9	16	16	23	30	6	13	20	27
Friday	6	13	20	27	3	10	17	24	1	8	15	22	29	5	12	19	26	3	10	17	17	24	31	7	14	21	28
Saturday	7	14	21	28	4	11	18	25	2	9	16	23	30	6	13	20	27	4	11	18	18	25	1	8	15	22	29
Sunday	8	15	22	29	5	12	19	26	3	10	17	24	31	7	14	21	28	5	12	19	19	26	2	9	16	23	30
SCU Week	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**
SCU Term	2026 Spring Teaching Weeks																	Final Week	Summer Recess								

1st Midterm

2nd Midterm

Final

This schedule is preliminary!!

1. SCUPI 2026 Spring Academic Calendar

- **My Schedule : Office hours etc.**

2025-2026 Spring Semester Course Schedule					
Class time	Monday	Tuesday	Wednesday	Thursday	Friday
08:15-09:00			Optical Engineering N-209	Linear Control Systems S-506	
09:10-09:55			Optical Engineering N-209	Linear Control Systems S-506	
10:15-11:00			Optical Engineering N-209	Office Hour Linear Control N-412	
11:10-11:55			Optical Engineering N-209	Office Hour Power Engineering N-412	
Lunch Break					
13:50-14:35		Linear Control Systems S-506	Funamentals of Electric Power Engineering S-201	Office Hour Power Engineering N-412	
14:45-15:30		Linear Control Systems S-506	Funamentals of Electric Power EngineeringS-201	Office Hour Opttical Engineering N-412	
15:40-16:25		Office Hour Linear Control N-412	Funamentals of Electric Power Engineering S-201	Office Hour Opttical Engineering N-412	
16:45-17:30					

*But, you can come to my office anytime when I am in my office ^^*

K unyu, Wu

2. Course Introduction

• Linear Control Systems

- Linear Control Systems Analysis nd Design

• **Text Book**

- Feedback Control Systems, 5th Edition
  Charles L. Phillips and John M. Parr
  ISBN 9780131866140, Prentice Hall, 2011

• Reference

- Feedback Control Systems, J.V. De Vegte
- Signals and Systems using MATLAB,
  L.F. Chaparro ISBN 978-0-12-344716-7, **ELSEVIER**
- Introduction of Electrical Circuits, 9th Ed.
  J.A Svoboda and R.C. Dorf, 2014 (国际学生版
  ISBN 978-1-119-54657-3, WILEY
- The Analysis and Design of Linear Circuits,8th Ed.
  R. E. Thomas, A. J. Rosa, and G. J. Toussaint,
  ISBN: 978-1-119-23538-5, 2016 John Wiley & Sons

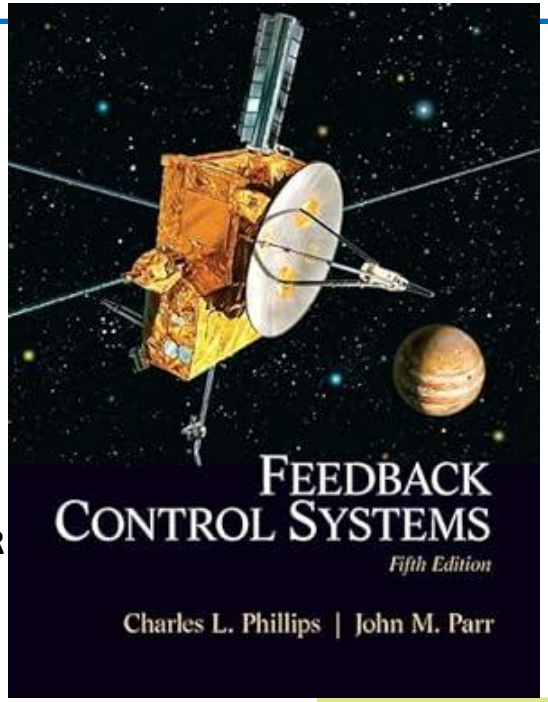
• **Lecture**

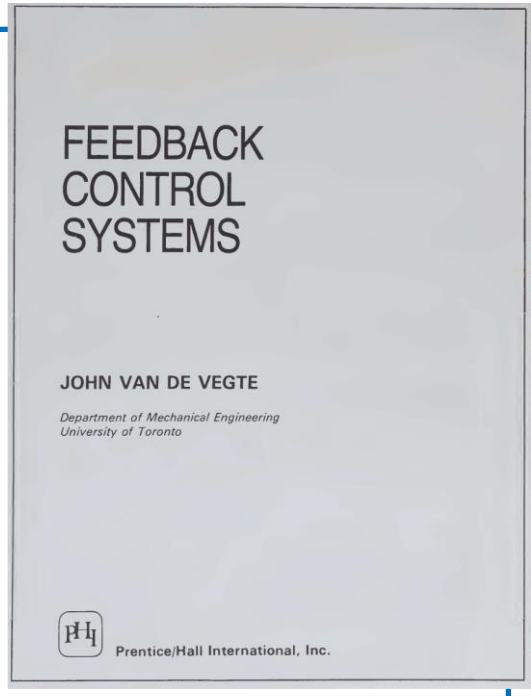
- Instructor : Jeungphill Hanne, PhD
  jeungphill.hanne@scupi.cn
- Time : Tues. (13:50-15:30) /Thur. (08:15-09:55)
  @ S506,SCUPI Bldg.
- Office Hour: Tue.(15:40-16:25)
  / Thr.(10:15-11:00) @ N412,SCUPI Building

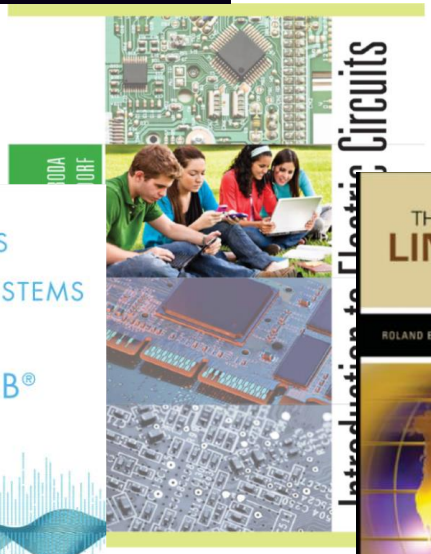
• **Grader :** Kun Wu

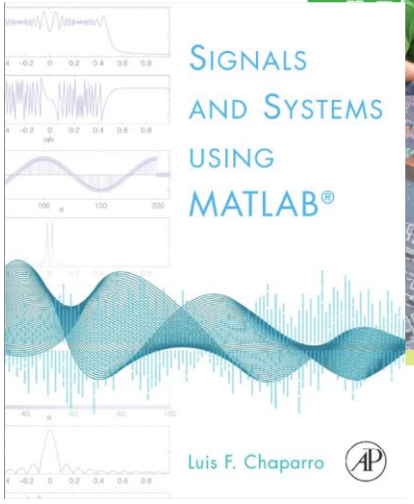
• **Course Format :** Lecture & Computer Lab

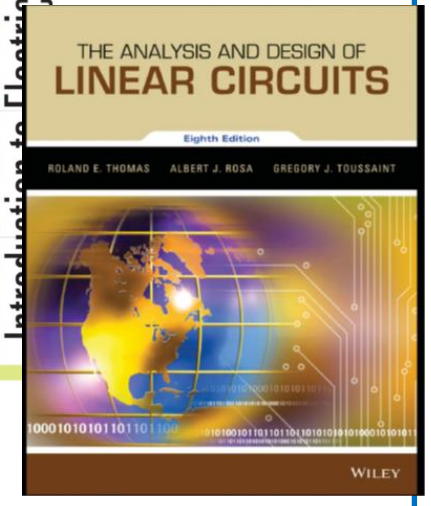
• **Course Grading:** HW+Lab+Quiz, 2 Midterm,
  1 Final and Attitude etc.











2. Course Introduction

• Course Scope & Objective

- Scope & Objective

: Introduction to feedback control systems, mathematical models, dynamical systems response and identification, system types, steady-state errors, root locus analysis and design, Bode plots, Nyquist theory and frequency domain compensation techniques, and introduction to modern control design. Includes Matlab/Simulink labs.

- Topics (selected):

- Introduction to Control Systems / System modeling
- System responses of first-order, or second order systems
- System Types/ Analysis of System Stability
- Root locus method
- Phase-lead compensator and phase-lag compensator;
- PID (Proportional Integral Derivative) control
- Frequency response analysis
- Frequency response design
- Introduction to Analysis and Design Of Digital Control Systems

• Course Grading :

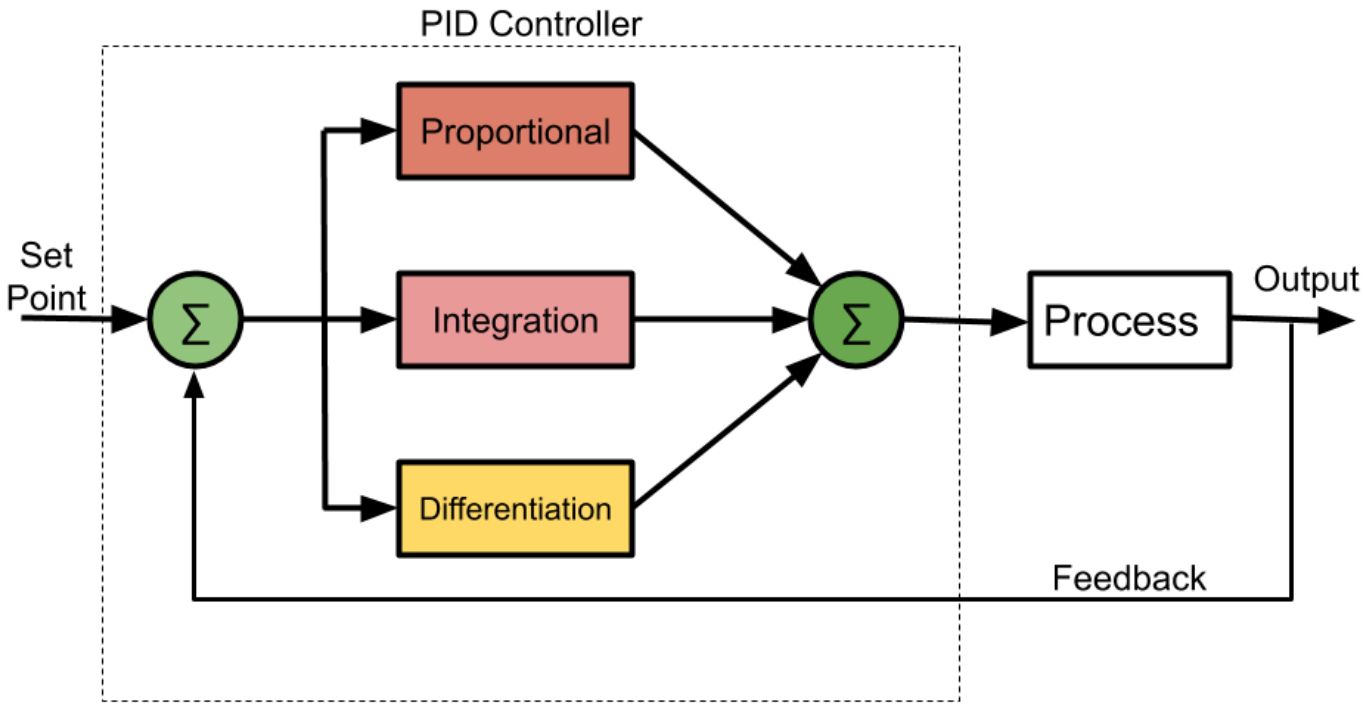
- Grading : HW + Lab Report + Quiz (20%), Midterm I (25%), Midterm II (25%), Final (25%) and Attitude(5% : Attendance, Focus, Engagement, Punctuality for HW, etc.)

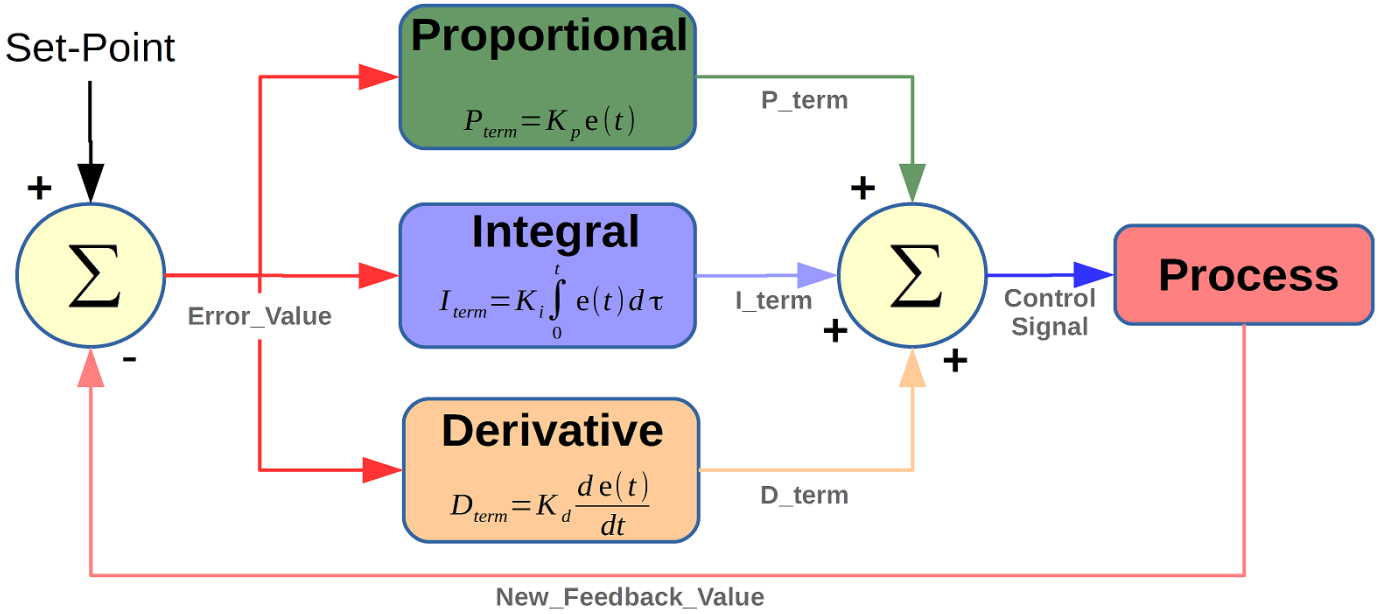
→ Less than 60% attendance might be failed for the course!

Can be flexible!

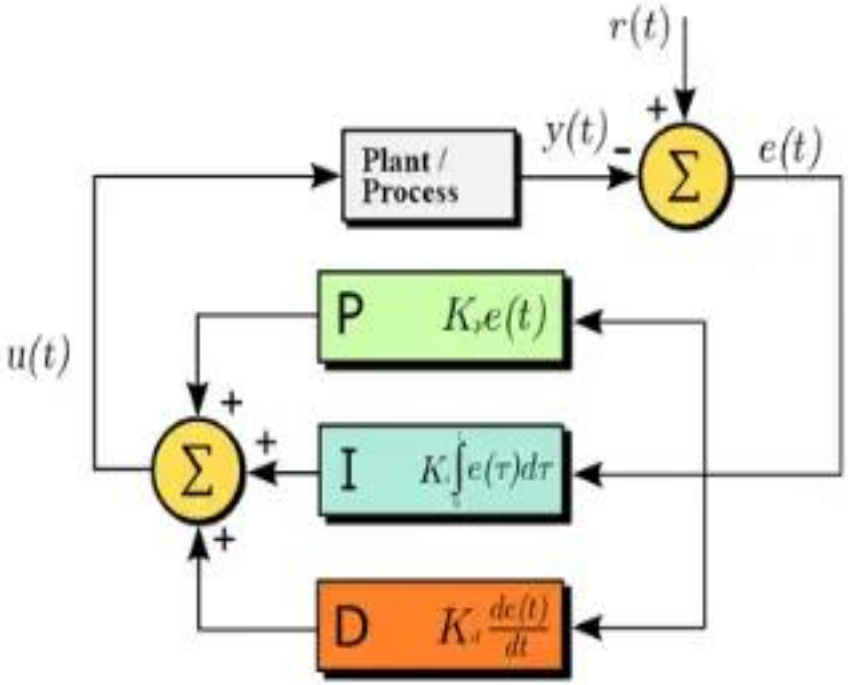
• Tentative Course Schedule

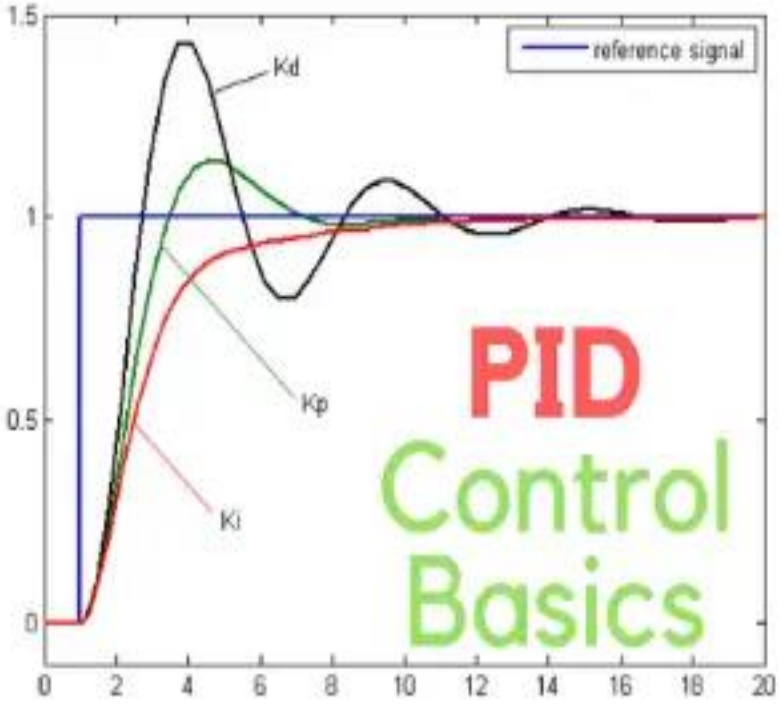
Week	Linear Control Systems	Topics	Assignment
Week 1 (3/9-3/15)	Introduction & Review on Transfer Function	**Syllabus & Review on Transfer Function**	
Week 2 (3/16-3/22)	Chap 1 (Phillips) & Chap 1 (De Vegte)	**Review on Control System**	
Week 3 (3/23-3/29)	Chap 2 (Phillips) & Chap 2 (De Vegte)	**Transfer Function/ Dynamic Model of Physical system**	HW1
Week 4 (3/30-4/5)	Chap 4 (Phillips)	**System Responses**	HW2
Week 5 (4/6-4/12)	Chap 5 (Phillips) & Lab	**Control System Characteristics / Lab**	
Week 6 (4/13-4/19)	Chap 6 (Phillips) & **Mid Term 1**	**Stability Analysis**	HW4
Week 7 (4/20-4/26)	Chap 7 (Phillips)	**Root-Locus Analysis and Design**	HW5
Week 8 (4/27-5/3)	Chap 8 (Phillips) & Lab	**Frequency-Response Analysis / Lab**	
Week 9 (5/4-5/10)	Chap 8 (Phillips) & Chap 9 (Phillips)	**Frequency-Response Analysis and Design**	HW6
Week 10 (5/11-5/17)	Chap 9 (Phillips)	**Frequency-Response Design**	
Week 11 (5/18-5/24)	Chap 9 (Phillips) & **Mid Term 2**	**Frequency-Response Design**	HW7
Week 12 (5/25-5/31)	Lab & Chap 10 (Phillips)	**Lab / Review on Z-transform**	
Week 13 (6/1-6/7)	Chap 10 (Phillips)	**Review on Discrete-Time Systems**	HW8
Week 14 (6/8-6/14)	Chap 11 (Phillips)	**Analysis of Digital Control Systems**	HW9
Week 15 (6/15-6/21)	Chap 11 (Phillips)	**Design Of Digital Control Systems**	HW10
Week 16 (6/22-6/28)	Lab & **Review**	**Lab & Review**	
Week 17 (6/29-7/5)	**Final**		
Week 18 (7/6-7/12)			
Week 19 (7/13-7/19)			


PID Controller
Proportional
Integration
Differentiation
Set
Point
Process
Output
Feedback


Set-Point
Proportional
$P_{term} = K_p e(t)$
P_term
Integral
$I_{term} = K_i \int_0^t e(t) d\tau$
I_term
Derivative
$D_{term} = K_d \frac{de(t)}{dt}$
D_term
Error_Value
Control
Signal
Process
New_Feedback_Value

What is PID Control?





Any question so far?

And let's be "Brainstorming" on
"Laplace Transformation
,Transfer Function, Control system"