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ECE 664 - APPLIED ADVANCED CONTROL SYS

Biao Cheng

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ECE664 Applied Advanced Control Systems Fall, 2024

Prerequisite: Undergraduate courses in control systems/signals & systems.

Required
Knowledge of signals/systems representations and analyses.
Background:
Concept of block diagrams and feedback control systems.

3. MATLAB/Simulink programming skill.

Instructor: Dr. Biao Cheng, Department of Electrical & Computer Engineering

Email: biao.cheng@njit.edu

Office Hours: TBD

A. Tentative Schedule:

Module	Date	Topic		
01	09/03 - 09/06	Introduction to Control Systems.		
02	09/07 - 09/13	Introduction to MATLAB & Simulink.		
03	09/14 - 09/20	Sampling and Reconstruction.		
04	09/21 - 09/27	Review of Z-Transform.		
05	09/28 - 10/04	Solution of Difference Equations.		
06	10/05 – 10/11	Coordinate Transformation & Delay Modeling.		
07	10/12 - 10/18	Discrete Time Control Systems.		
Midterm Exam	Friday, 10/25	6:00pm – 9:00pm ET.		
08	10/26 – 11/01	Discrete Time Control Algorithms I.		
09	11/02 – 11/08	Discrete Time Control Algorithms II.		
10	11/09 – 11/15	Practical Design Issues.		
11	11/16 – 11/22	Case Study.		
12	11/23 – 11/29	Summary and Review.		
Project Due	12/03 – 12/06	Tuesday, 12/03, submit presentation by 11:59pm.		
		Friday, 12/06, submit project report by 11:59pm.		
Final Exam	12/15 – 12/21	TBD		
B. Grading Scheme:	Midterm	Final	Assignment	Project
	25%	25%	20%	30%

C. Text: Lecture notes.

D. Reference:

- 1. Åström, Karl J., and Wittenmark, B. *Computer-controlled Systems: Theory and Design*. 3rd ed. Mineola, N.Y.: Dover Publications, 2011. ISBN: 978-0486486130 (eBook and Paperback)
- 2. Lewis, F., *Applied optimal control & estimation: Digital design & implementation*. Englewood Cliffs, N.J.: Prentice Hall. 1992. ISBN: 978-0130403612
- 3. Vegte, J., Feedback control systems 3rd ed. Englewood Cliffs, N.J.: Prentice Hall. 1994. ISBN: 978-0130163790

E. Important Dates:

Friday, 10/25 Midterm Exam

Tuesday, 12/03 Project presentation materials due by 11:59pm

Friday, 12/06 Project report due by 11:59pm

12/15 – 12/21 Final Exam

F. Required Software: MATLAB, MathWorks Inc. (free NJIT web site download: ist.njit.edu)

NJIT Honor Code will be upheld, and that any violations will be brought to the immediate attention of the Dean of Students.