Fall 2024

ECE 664 - APPLIED ADVANCED CONTROL SYS

Biao Cheng

ECE664 Applied Advanced Control Systems Fall, 2024

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

Required Background:
1. Knowledge of signals/systems representations and analyses.
2. Concept of block diagrams and feedback control systems.
3. MATLAB/Simulink programming skill.

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