ASEN 5044 Fall 2023 Schedule (Updated 2023-08-23)

Instructor: Professor Penny Axelrad

TTh 10-11:15 AM, AERO 111 or classroom recordings

Readings & assigned homework problems are in Simon, Optimal State Estimation (Be sure to update w/notes from posted Errata)

Week	Date	Topic	Section	Assignments
1	8/28/23		**Linear Dynamical Systems**	
	8/29/23	L1. Introduction		
	8/31/23	L2. Linear Algebra Refresher		
2	9/4/23			
	9/5/23	L3. State Space Models for Linear Systems		Q1 Due
	9/7/23	L4. Time Domain Solutions for LTI Systems: Matrix Exponential		
3	9/11/23			Q2 Due
	9/12/23	L5. Nonlinear Systems & Linearization		
	9/14/23	L6. Discrete Time Linear State Space Systems		HW1 Due
4	9/18/23			Q3 Due
	9/19/23	L7. Stability and Observability		
	9/21/23	L8. Introduction to Probability	**Probability**	HW2 Due
5	9/25/23			Q4 Due
	9/26/23	L9. Random Variables, Conditional Probabilities		
	9/28/23	L10. Expectiation Operator and Expected Values		HW3 Due
		OL1. (Optional) Sampling and Exp. Value Approx		
6	10/2/23			
	10/3/23	L11. Sums of RVs, Gaussian Distributions		
	10/5/23	L12. Joint Distributions, Covariance, Correlation		HW4 Due
		OL2. (Optional) Conditional pdf's and Bayes' rule		
7	10/9/23			
	10/10/23	L13. Linear Gaussian Transformations		
	10/12/23	L14. Intro to Stochastic Processes		Midterm1 Due (HW1-4)
8	10/16/23			Q5 Due
	10/17/23	L15. Stochastic Processes - White Noise		
	10/19/23	L16. Stochastic Linear CT and DT Models		
		OL3. (Optional) Bayes' Rule for Gaussian Random Vec.		
9	10/23/23		**Estimation**	Q6 Due
	10/24/23	L17. Batch Least Squares		
	10/26/23	L18. Recursive Linear Least Squares		HW5 Due
		OL4. (Optional) Maximum Likelihood		
10	10/30/23			Q7 Due
	10/31/23	L19. Prediction, Filtering, Smoothing		
	11/2/23	L20. Kalman Filter		HW6 Due
		OL5. (Optional) General Bayes Filter		
11	11/6/23			
	11/7/23	L21. KF Gain and Steady State Behavior		
	11/9/23	L22. KF Consistency NEES & NIS		HW7 Due
		OL6. (Optional) Bayesian Derivation of KF		
12	11/13/23			
	11/14/23	L23. KF Tuning/Consistency Tests		
	11/16/23	L24. Linearized KF		Midterm2 Due (HW5-7)
13	11/20/23	FALL BREAK		
14	11/27/23			
	11/28/23	L25. Extended Kalman Filter (EKF)		
	11/30/23	L26. EKF Initialization and Tuning		HW8 Due
15	12/4/23			Q8 Due
	12/5/23	L27. Unscented Kalman Filter (UKF)		
	12/7/23	L28. Overview of Nonlinear Filters		
16	12/11/23		**Final Project Completion**	
	12/12/23	Open OH for Project Questions		
	12/14/23	Open OH for Project Questions		
	12/16/23	(SATURDAY Final Exam Week)		Final Project Report Due

Aug 28 First Day of Classes
Sep 4 Labor Day (No classes)
Sep 6 Last add date
Sep 13 Drop date no penalty
Nov 3 Last date to W
Nov 20-24 Fall Break
Dec 14 - Last day of classes
Dec 16 - Final Project Due