

University of Colorado Boulder  
SEN 5044  
Statistical Estimation for Dynamical Systems  
Fall 2018 Course Syllabus

## General Information

**Instructor:** Prof. Nisar Ahmed (Nisar.Ahmed@colorado.edu)

**Teaching Assistant:** Young-Young Shen (Youngyoung.Shen@colorado.edu)

**Lecture Time and Location:** Tues & Thur 11-12:15, ECCS 1B12. All lectures will be recorded and posted online via course website. Distance learning students may participate live through the Zoom meeting interface (see course website for instructions). For distance students who wish to attend live lectures, this course requires the use of the Zoom conferencing tool, which is currently not accessible to users using assistive technology. If you use assistive technology to access the course material, please contact the instructor immediately to discuss.

**Course website:** [canvas.colorado.edu](https://canvas.colorado.edu) (will be used for posting all recorded lectures, assignments, exams, and announcements/corrections)

**Instructor Office Hours:** ECAE 175, Tues 3 pm - 4:30 pm

**TA Office Hours:** Mon 3-4 pm, Seebass Conference Room (ECAE 153)

**Required Textbook (for readings and assignments, e-book version available on publisher website):**

Dan Simon, 'Optimal State Estimation: Kalman,  $H_\infty$ , and Nonlinear Approaches,' John Wiley and Sons, Inc., 2006, ISBN 9780471708582.

**Note:** [errata for the text can be found online here: link](#)

**Recommended supplements (for your own edification, not required):**

J. Crassidis and J. Junkins, 'Optimal Estimation of Dynamic Systems,' 2nd edition, Chapman and Hall, 2011 – available through CU library as an e-book: [link](#)

R. Stengel, 'Optimal Control and Estimation,' Dover, 1994, 9780486682006

## **Course Details**

**Description** This course will introduce students to the theory and methods

**pecial topic extra lectures:** for weeks 5-11, Prof. Ahmed will record/post extra lectures on Bayesian estimation theory. These extra lectures can be considered as a ‘mini-course’ to complement the main course material outlined above, and no pre-requisites will be needed to follow them (although they will build on previous course material and on each other). **Attendance at and viewing of these extra lectures is optional, but strongly recommended for Ph.D. students**, and is highly encouraged for others wishing to dive deeper into estimation theory.

**Grading, Assignments and Exams** Course grades will be determined on the basis of homework (20%), midterm 1 (25%), midterm 2 (25%), and a final project (30%).

Important things to note:

Students will be encouraged to work in pairs for the final project.

Weekly homework will be assigned, collected, and *partially graded*.





standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, color, culture, religion, creed, politics, veteran's status, sexual orientation, gender, gender identity and gender expression, age, disability, and nationalities. Class rosters are provided to the instructor with the student's legal name. I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records. For more information, see the policies on [classroom behavior](#) and [the student code](#).

All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the academic integrity policy of the institution. Violations of the policy may include: plagiarism, cheating, fab-