AMATH 482: Computational Methods for Data Analysis (Winter 2021)

Live Lecture Time:	MWF 9:30 - 10:20 am
Zoom Room:	See Canvas
Course Slack Channel:	Invite at this link
Instructor:	Jason Bramburger, jbrambur@uw.edu
Teaching Assistant:	Roman Levin, rilevin@uw.edu
Office Hours:	TR 10:30 am - 12:00 pm, or by appointment
Course Website:	Canvas
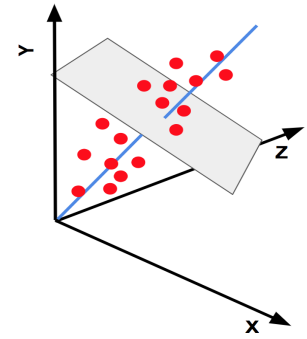
Course Content

Exploratory and objective data analysis methods applied to the physical, engineering, and biological sciences. Brief review of statistical methods and their computational implementation for studying time series analysis, spectral analysis, filtering methods, principal component analysis, orthogonal mode decomposition, and image processing and compression.

Instruction

Due to the ongoing COVID-19 pandemic, this course will be entirely online until further notice. Lectures will be held on Monday, Wednesday, and Friday at 9:30-10:20 am PST. I will provide notes for each lecture that will be available before the class. During class we will work through examples in MATLAB and discuss the content of the notes. Recordings of the lectures will be posted on Canvas under the 'Pages' tab following the live lecture and will remain available until the end of the course. At the top of this page there is also an invitation to the course slack channel where you can ask questions to myself and other students.

Textbook

Data-Driven Modeling & Scientific Computation: Methods for Complex Systems & Big Data by J. Nathan Kutz. The textbook is not required but is a great reference to have for the future. The content of this course is completely contained within Part III of the textbook. The relevant sections are contained in the Course Notes posted on the course Canvas page.

Prerequisites: AMATH 301; either AMATH 352, MATH 136, or MATH 308.

Grading and Homework Write Ups: Your grade in this course will be completely determined by homework. There are no exams. There will be 5 homework assignments throughout the quarter that will be equally weighted (each worth 20% of your grade). No grades will be dropped. Assignments will be posted to Canvas. A separate document with detailed instructions about homework submissions and grading will be posted on Canvas.

Replacing Lowest Assignment Grade: I am a co-organizer of the *Data-Driven Methods in Science and Engineering* seminar here at UW, which hosts one hour talks from leading researchers in the field of data analysis and machine learning. The seminar takes place every second Friday at 9:00 am PST, with videos of the lecture being posted to our YouTube channel shortly after. I am giving you the opportunity to replace your lowest nonzero assignment grade with your second lowest assignment grade in the course if you provide a brief (one paragraph) write-up detailing the content of each talk in your own words. These write-ups are due the Sunday following the original talk at 11:59 pm PST and can be submitted through the assignments tab on Canvas. There are a total of five (5) talks in the winter quarter and you must complete a write-up for every talk to replace your lowest assignment grade. To join the mailing list for the talks, please sign up using this google form.

Computing Policy: MATLAB will be used heavily in this course so you will need access to it. MATLAB licenses for students can be obtained for free from UWare. If you do not have a computer that can run MATLAB, you

can rent a computer from the Student Technology Loan Program.

Accommodations for Students with Disabilities
If you need accommodations for classes, assignments, or exams, please contact me and Disability Resources for Students. Website: https://depts.washington.edu/uwdrs/.

Diversity and Inclusion Statement
I strive to create a learning environment for you that supports a diversity of thoughts, perspectives, and experiences, and honours your identities. To help accomplish this:

- If you have a name and/or set of pronouns that differ from those that appear in your official UW records, you are encouraged to let me know.
- If you feel your performance in the course is being impacted by your experiences outside of class, please come talk with me.
- I am still in the process of learning about inclusion, diverse perspectives, and identities. If something was said in class (by anyone, including me) that made you feel uncomfortable, please talk to me about it.
- As a participant in course discussion and problem-based sessions, you should strive to honour the diversity of your classmates.

Religious Accommodation Policy
Washington state law requires that UW develop a policy for accommodation of student absences or significant hardship due to reasons of faith or conscience, or for organized religious activities. The University of Washington policy, including information about how to request an accommodation, is available at Faculty Syllabus Guidelines and Resources. Accommodations must be requested within the first two weeks of this course using the Religious Accommodations Request form available at this link.

Additional Course Policies

- All announcements will be posted on the course webpage and/or the Slack channel. Be sure your Canvas notifications are turned on, and you check Canvas and/or Slack periodically.
- I am here to facilitate your learning; let me know if you have questions! I can always be reached by e-mail, and can schedule additional office hours.