

STAT 8931 Advanced Topics
Empirical processes, nonparametric/high-dimensional function estimation,
causal inference
Charles Doss
Spring 2022 Syllabus

Course Description and Information

- Professor: Charles Doss (Email: cdoss@umn.edu, Office: Ford Hall 389)
- Lectures: Tuesdays and Thursdays, at 11:15am–12:30pm, Ford Hall 155
- Office Hours: TTh, 12:30pm–1:30pm, Ford 389
- Academic semester calendar:
 - Classes: Jan 17, 2023 – May 01, 2023 [formally May 10 is last day of spring semester]
 - Spring Break: Mar 6-10;
- Course webpage is on Canvas: canvas.umn.edu
- Description:

The course is built around topics in empirical process theory, in nonparametric regression/density estimation including via shape constraints (like monotonicity or convexity or log-concavity), and in causal inference. The latter statistical topics serve as motivation for the empirical process theory, which will be illustrated in part by applications to those topics. Concentration inequalities. Semiparametric statistics.
- Textbook(s) / course materials: we will draw from a possibly large variety of sources. One main one is *Weak Convergence and Empirical Process: with applications to statistics* by Aad van der Vaart and Jon Wellner, Springer, 1996.

A few others that we may draw from include

 - *Asymptotic Statistics* by Aad van der Vaart, Cambridge U. Press, 1998.
 - *Mathematical Foundations of Infinite-Dimensional Statistical Models*, Giné and Nickl,
 - *High-Dimensional Statistics: A Non-Asymptotic Viewpoint*, Martin J. Wainwright, 2019.
- Format: Lectures will be given in-person by the instructor (except on special limited occasions due to illness or travel in which case they may be delivered via zoom).
- Grading: TBD
- Presentation TBD: (probably) registered students will deliver a presentation on a paper or topic related to the course (approved by the instructor).
- Technology requirements: a UMN ID and email account (access to Canvas)

Further policies

- Integrity: Students must abide by the campus regulations and student conduct code; see <http://regents.umn.edu/policies/index>.

- Incompletes: Incompletes (I) are granted only when a student is forced to miss several weeks of class due to extraordinary circumstances such as documented illness or family emergency.
- Mental Health: Learn about Student Mental Health Resources at <http://www.mentalhealth.umn.edu>.
- Disability Accommodations: If you currently require Disability Services (DS) accommodations, please contact the professor as early in the semester as possible.
- Other University Policies:
The university has policies on Student Conduct (http://regents.umn.edu/sites/default/files/policies/Student_Conduct_Code.pdf), on Sexual Harassment (<http://regents.umn.edu/sites/default/files/policies/SexHarassment.pdf>), and on Equity, Diversity, Equal Opportunity, and Affirmative Action (http://regents.umn.edu/sites/default/files/policies/Equity_Diversity_EO_AA.pdf).