STAT 7301 — Autumn 2014

Advanced Statistical Theory I

meetings:	MWF 9:10–10:05 in Enarson 0306 (map)
instructor:	Vincent Q. Vu (vqv at stat osu edu)
office hours:	M 10:15–11:15 in CH 325 or by appointment
web:	www.vince.vu/courses/7301

1 Overview

Statistics 7301 is a course on the fundamentals of statistical theory and is intended for second-year Ph.D. students in statistics. The course is based on chapters 1, 2 and 6 of the required book *Theory of Point Estimation* and supplemental notes provided by the instructor. The topics of the course include:

1. Fundamentals
    - Exponential families
    - Statistics, sufficiency, and completeness
    - Rao-Blackwell theorem
    - Fisher information
2. Methods of estimation
    - Unbiased estimation
    - Maximum likelihood
    - M-estimation
3. Asymptotic approximations
    - Consistency
    - Delta method
    - Asymptotic normality and efficiency
4. Nonparametric inference (*time permitting*)
    - Estimating the CDF and statistical functionals
    - Nonparametric regression
    - Density estimation

2 Textbook

The required book for the course is

- Lehman, E. L. and Casella, G.: *Theory of Point Estimation*, second edition. (errata)

It is meant to supplement the lectures and for most lectures there will be assigned reading, either from the book or from handouts provided in class. Additional reference material may be provided as the course progresses.

3 Prerequisites

Statistics 6802, or permission of the instructor, and concurrent enrollment in Statistics 7201. Mathematical analysis and probability theory are the primary tools of statistical theory. Students are expected to be able to read and write mathematical proofs.

4 Coursework & Grading

There will be homework, three in-class exams, and a final exam.

- 20% Homework (due Thursdays at 2:45pm)
- 20% Exam 1 (September 26)
- 20% Exam 2 (October 22)
- 20% Exam 3 (November 12)
- 20% Final exam (December 17, 8:00am - 9:45am)

Inform the instructor of any scheduling conflicts at least two weeks in advance.

4.1 Homework

Homeworks will generally be assigned on a weekly basis. You may hand them into me in class (before the due date) or in my office by 2:45pm. Late homework will not be accepted.

4.2 Exams

All exams are closed book. Each of exams 1–3 covers the material presented since the previous exam (approximately 3–4 weeks worth). The final exam is cumulative.

5 Academic Misconduct

Students are encouraged to work with others on the homework, however final solutions must be written on your own. Academic misconduct **will not be tolerated** and will be dealt with procedurally in accordance with university policy.

6 Accommodations for Students with Disabilities

If you have a documented disability, please register with the Office for Disability Services (ODS). After registration, make arrangements with me as soon as possible to discuss your accommodations so that they can be implemented in a timely fashion. If you have any questions about this process please contact ODS at (614) 292-3307.

7 Disclaimer

This syllabus is a approximate guide to the course content and dates, however the instructor reserves the right to deviate from the syllabus. Official announcements of changes will always be made in class and updated version of the syllabus will be maintained on the course webpage.