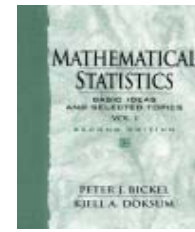


ST794-001
Advanced Statistical Inference -
II
Spring Session, 2009
 (a pdf version of syllabus)



Course: [ST794: Advanced Statistical Inference - II](#)
Time: TH from 10:15 to 11:30 a.m.
Place: 232 [Daneils Hall](#)

Instructor: [Sujit Ghosh](#)
Email: ghosh@stat.ncsu.edu
Telephone: 515-1950
Office: 220C [Patterson Hall](#)
Office hours: Tue/Thu 3:00 - 4:00 p.m. or by appointment

TA: Jiangtao Duan
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Office: Statistics Tutorial Center, Bureau of Mines 110
Office hours: Wednesday 3:00 - 5:00 p.m. or by appointment

Class links: [Lectures & Assignments](#) | [Ask a question](#) (use Message board)

Course prerequisite: [ST793](#) and **corequisite:** [ST778](#)

Text: Jun Shao (2003). *Mathematical Statistics, 2nd Edition*. Springer Verlag. (ISBN:0387953825)

Homework: Homework will normally be assigned (as indicated on the [homework page](#)) at the end of class on Thursdays. Unexcused late homework will not be accepted. The final homework average will be computed after dropping the two lowest grades.

Examinations: Examinations will be closed book and closed notes. However students will be permitted to bring one 8.5 by 11 inch sheet of notes to the midterm exam and two to the final exam. The final exam will be cumulative, but weighted toward the materials covered after the midterm.

Exam schedule:

Midterm exam	Tuesday, Mar 10	10:15-11:30 a.m.	In-class	Syllabus: Sections 2.1-2.3, 3.1, 3.2, 4.1, 4.3
Final exam	Tuesday, May 5	8:00-11:00 a.m.	In-class	Syllabus: All of above + Sections 5.1 and additional notes

Course objectives:

This course is the second semester of a two-course sequence, ST793-4, covering a medley of advanced statistical inferential methods. The objective of this course, ST794, is to develop an advanced-level understanding and working knowledge of statistical inference. The course provides an introduction to the rudiments of statistical inference for population parameters based on a general decision theoretic framework covering estimation and test of hypothesis. Some nonparametric methods will also be introduced. Concepts, methods and theory are emphasized, rather than applications. Successful completion of this course will provide you with a foundation for understanding probability-based statistical inference material presented in other courses.

Students taking the course will have completed both [ST793](#), and [ST778](#).

Syllabus: In ST794 we shall complete the following concepts.

- Statistical Models: Parametric, Nonparametric, Semiparametric, Identifiability, Exponential family, Location-scale family and Mixture distributions
- Principles of Mathematical Statistics: Sufficiency, Completeness, Ancillarity, Invariance

Asking questions: If you have questions about lectures, homework assignments, exams, procedures or any other aspect of the course please log onto <http://courses.ncsu.edu/st794/>, and click on "Message Board". Then click on "Post New Topic", enter your question in the Message box, and click on "Submit Message". You will receive a response from me or another student. Everyone in the class will be able see your question and the response.

Anonymous mail: If you wish to send me an anonymous suggestion or reminder, send email to st794-001-sup@wolfware.ncsu.edu. The system will remove mail headers, but you must remember to remove your signature and other identifying information.

Grading System: Final grade will be based on:

$$\text{Final Semester Score} = (2x\text{HW} + \text{CP} + 8x\text{ME} + 9x\text{FE})/20$$

where HW is the homework average (out of 100) after dropping the two lowest scores, CP is based on class participation and ME and FE are the scores (out of 100) on the midterm and the final exams, respectively. Grades will be assigned on the +/- scale.

Auditing: Auditors are expected to attend class regularly and submit homework on the same schedule as the other students. The final grade for auditors (AU or NR) will be based on their final homework average after dropping the two lowest scores. An average homework score of 75 or better is required for an AU.

Policy on Academic Integrity: The University policy on academic integrity is spelled out in [Code of Student Conduct](#). For a more thorough elaboration see the [NCSU Office of Student Conduct website](#). For this course group work on homework is encouraged. However copying someone else's work and calling them your own is plagiarism, so the work you turn in should be your own.

Students with Disabilities: Reasonable accommodations will be made for students with verifiable disabilities. In order to take advantage of available accommodations, students must register with [Disability Services for Students \(DSS\)](#), 1900 Student Health Center, CB# 7509, 515-7653.

Reference material (Have requested these be on reserve at DH Hill Library):

Bickel, P. J. and Doksum, K. A. (2001). *Mathematical Statistics vol. I, 2nd Edition*. Prentice Hall

Lehmann, E. L. (1997). *Testing Statistical Hypotheses, 2nd Edition*. Springer Verlag

Lehmann, E. L. and Casella, G. (2001). *Theory of Point Estimation, 2nd Edition*. Springer Verlag

and Unbiasedness

- Statistical Decision Theory: Loss functions, Risk functions, Admissibility, Minimality, Bayes rules
- Information Criteria: AIC, TIC and BIC
- Non-parametric Methods: Empirical distribution, Empirical likelihood, Density estimation, Nonparametric regression

Last updated on: Jan 08, 2009

ST794 Advanced Statistical Inference - II Spring Session, 2009

Expect **frequent changes**

[ST794 Homepage](#) | | [Have a question?](#)

Lec	Date		Lecture coverage		Homework/Reading assignments
1	Jan 08	Th	Statistical Models and Identifiability	No HW	Section 1.2 of B&D(2001)
2	Jan 13	Tu	Exponential family, Location-scale family, Mixture distributions	No HW	Section 2.1 of Shao(2003)
3	Jan 15	Th	Sufficiency, Completeness and Ancillarity	HWO	Section 2.2 of Shao(2003)
4	Jan 20	Tu	Sufficiency and Completeness of special family of distributions	No HW	Section 2.2 of Shao(2003)
5	Jan 22	Th	Invariance	HW1	Section 4.2 of Shao(2003) and additional notes HW1 due on Jan 29
6	Jan 27	Tu	Unbiasedness	no HW	Section 3.1 of Shao(2003)
7	Jan 29	Th	Information inequalities	HW2	Section 3.1.3 of Shao (2003) and additional notes HW1 due today! HW2 due on Feb 5
8	Feb 3	Tu	U-statistics	HWS1	Section 3.2 of Shao(2003)
9	Feb 5	Th	The Projection method	HW3	Section 3.2.3 of Shao(2003) HW2 due today! HW3 due on Feb 12
10	Feb 10	Tu	Statistical Decision Theory: Admissibility and Maximality	HWS2	Section 2.3 of Shao (2003)
11	Feb 12	Th	Bayes decisions and estimators	HW4	Section 4.1 of Shao(2003) HW3 due today! HW4 due on Feb 19
12	Feb 17	Tu	Admissibility and Maximality (revisited)	HWS3	Section 4.3 of Shao(2003)
13	Feb 19	Th	Simultaneous estimation and shrinkage estimators	HW5	Section 4.3.3 of Shao(2003) HW4 due today! HW5 due on Feb 28
14	Feb 24	Tu	Worked out examples	HWS4	See additional notes
15	Feb 26	Th	Problem solving session for midterm Practice Problems	HWS5	Sections 2.1-2.3, 3.1, 3.2, 4.1, 4.3 of Shao (2003) HW5 due today!
16	Mar 3	Tu	Spring Break	No HW	No classes
17	Mar 5	Th	Spring Break	No HW	No Classes
18	Mar 10	Tu	Midterm Exam: 10:15-11:30 Syllabus: Lectures 1-13	midterm	No regular class
19	Mar 12	Th	Midterm exam solution	no HW	Midterm exam grade distribution
20	Mar 17	Tu	Nonparametric methods: empirical distribution functions	no HW	Section 5.1 of Shao(2003)
21	Mar 19	Th	Empirical likelihood	HW6	Section 5.1.2 of Shao(2003) HW6 due on Mar 26

22	Mar 24	Tu	Density estimation	no HW	Section 5.1.3 of Shao(2003)
23	Mar 26	Th	Nonparametric regression	HW7	Additional notes HW6 due today! HW7 due on Apr 2
24	Mar 31	Tu	Consistency	HWS6	Additional notes
25	Apr 2	Th	Rate of convergence	HW8	Additional notes HW7 due today! HW8 due on April 9
26	Apr 7	Tu	Stone's result	HWS7	Additional notes
27	Apr 9	Th	Application of Stone's result	HW9	Additional notes HW8 due today! HW9 due on April 16
28	Apr 14	Tu	Nonparametric estimation for censored data Lecture Notes - IV (LN-IV)	HWS8	Additional notes
29	Apr 16	Th	Nonparametric regression based on censored data	HW10	Additional notes HW9 due today! HW10 due on April 23
30	Apr 21	Tu	Worked our examples	HWS9	Additional notes
31	Apr 23	Th	Problem solving session Practice Problems	HWS10	Discussions and feedback HW10 due today!
FE	May 5	Tu	Final exam (2008) 8:00 to 11:00, 232 Daniels Hall		Syllabus: Lectures 1-30

Last updated on: January 8, 2009