STA 7334
Section 5949

Limit Theory

Fall, 2010

Course Information

Time: T 10:40 – 11:30 a.m.
R 10:40 – 12:35 a.m.

Location: 230 FLO (Griffin-Floyd Hall)

Instructor: Dr. Brett Presnell

Office: 220 FLO

E-mail: presnell@stat.ufl.edu

Office Hours: See instructor's web page.

Phone: (352) 273-2989

Web Page: http://www.stat.ufl.edu/~presnell

Text: A. W. van der Vaart. *Asymptotic Statistics.* Cambridge University Press, 2000.

Course Content and Objectives

This course will cover the fundamental tools and concepts of asymptotic statistics. Topics will include a review of some relevant probability theory, the delta method, and limit theory for quantiles, M-estimators (including maximum likelihood estimators), and U-statistics. Other topics will be chosen from among the following: density estimation, asymptotic relative efficiency of tests, L-statistics, generalized estimating equations, von Mises differentiable statistical functionals, Edgeworth expansions, saddlepoint approximations, the jackknife, and the bootstrap.

Grading

Grades will be based on regular homework assignments (1/3) and on two exams (1/3 apiece). Tentative dates for the exams are October 7 and November 18. Please see the guidelines for homework problems on the next page of this syllabus.

Prerequisites

STA 6467 or permission of instructor.

Supplementary References

You may find it useful to consult any of the following books.

BILLINGSLEY, P. (1999). *Convergence of Probability Measures.* 2nd ed. John Wiley and Sons.

DASGUPTA, A. (2008). *Asymptotic Theory of Statistics and Probability.* Springer.

FERGUSON, T. S. (1996). *A Course in Large Sample Theory.* Chapman & Hall.

LEHMANN, E. and ROMANO, J. P. (2006). *Testing Statistical Hypotheses.* 3rd ed. Springer.

LEHMANN, E. L. (1999). *Elements of Large-Sample Theory.* Springer-Verlag.

SEN, P. K. and SINGER, J. M. (1993). *Large Sample Methods in Statistics: An Introduction with Applications.* Chapman & Hall.

SERFLING, R. J. (1980). *Approximation Theorems of Mathematical Statistics.* Wiley, New York.

Guidelines for Homework and Exams

(with thanks to Ian McKeague)

1. Write neatly. Do not be overly concerned about saving paper: write on only one side of each page, do not crowd your writing, and make it large enough so that it can be read without eyestrain. If a problem continues over several pages, write *(continued)* at the bottom of the page and write the problem number and *(continued)* at the beginning of the next page.

2. Mathematics is prose. Each statement should be a sentence, generally with a subject, object, and verb. End an equation with a punctuation mark if it is at the end of a sentence. An $=$ sign can operate as a verb. Never start a sentence with a mathematical symbol or other notation.

3. Do not use unnecessary words—use notation to cut down on tedious repetition.

4. Do your exploratory work on scratch paper and do NOT turn it in with your final solution. If you are asked to prove something for all finite n, special cases (e.g., $n = 1$, $n = 2$) are considered exploratory, unless they are the beginning of an induction argument.

5. The Good Samaritan Rule: when you need to use a standard result, mention its *name*, and not a theorem number. If the result has no name, but appears in the textbook for the course, then you may refer to it by number. Otherwise, then you should state the result, at least in outline (and include a proof if it is not a standard result from class or from real analysis). Don't assume the reader knows what you are about to do—it is often helpful to outline the steps of your solution before plunging into details.

6. For exams, start each problem on a separate sheet of paper; write your name at the top right-hand corner of the first sheet.

7. For homework problems, write out the question before giving the solution. Answer the problems in the order in which they were assigned. Staple the sheets of paper together (and do not write near the upper left-hand corner of the page where the staple will go).

8. If you introduce some notation which was not specified in the problem, you must define or specify it. A common mistake is to use an ϵ without initially saying "Let $\epsilon > 0$."

9. Your work will generally be more readable if you use displayed equations rather than embedding long equations in the text.

10. Each step of your solution needs to be justified, either by naming a standard result, or filling in the gap by a separate argument. If you are unable to fill the gap (or do any part of the problem), say so explicitly; this is far better than writing down a specious argument.

11. If you are stuck on a homework problem, ask me for a hint. You have nothing to lose by asking for a hint, but you do have something to lose by handing in incomplete work.

12. Do not copy. Your solution must reflect your own work.