

**STA 7334**

**SYLLABUS**  
**Limit Theory**

**Fall 2023**

Instructor: Malay Ghosh

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Course Objective: Often in statistics, exact derivation of distributions and exact inference is extremely difficult, if not impossible. Asymptotic theory is needed to handle such situations. The objective of STA 7334 is to present a body of general techniques which have been found useful in asymptotic theory. Many of the results we are going to derive in this course will find applications in asymptotic theory of parametric inference, nonparametric inference, categorical data, survival analysis, etc.

Course Policy: A student's grade will be determined from the homework (70%) and a Final Examination. (30%).

Course Outline:

1. Preliminary Tools and Foundations.
2. The Basic Sample Statistics.
3. Transformations of Given Statistics.
4. U-Statistics.
5. Asymptotic Theory of Maximum Likelihood Estimation.
6. Asymptotic Theory of Likelihood Ratio Tests.
7. Asymptotic Normality of Posteriors.
8. Edgeworth Expansion and Saddlepoint Approximations.

Prerequisite: STA 6467

Textbook: Lecture Notes of the Instructor.

References:

1. DasGupta, A. : Asymptotic Theory of Statistics and Probability. Springer, New York.
2. T.S. Ferguson: A Course in Large Sample Theory. CRC Chapman & Hall, Florida.
3. E.L. Lehmann: Elements of Large Sample Theory. Springer, New York.
4. P.K. Sen and J. M. Singer: Large Sample Methods in Statistics: an Introduction With Application. CRC Chapman & Hall, New York.
5. R.J. Serfling: Approximation Theorems of Mathematical Statistics. Wiley, New York.
6. T.S. Ferguson: A Course in Large Sample Theory. CRC Chapman & Hall, New York.:wq
7. B.L.S. Prakasa Rao: Asymptotic Theory of Parametric Inference. Wiley, New York.
8. C.R. Rao: Linear Statistical Inference and Its Applications. 2nd Edition. Wiley, New York.
9. H. Cramer: Mathematical Methods of Statistics. Princeton University Press.