

# MATH 5431: Advanced Mathematical Statistics I

## Course outline

### Instructor:

**Xinzhou Guo**

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**Office** Room 3433.

**Office hours:** By appointment.

**Course descriptions:** This course is concerned with the theory of statistical inference in point estimation. Tentative topics include:

sufficiency, ancillary statistics, completeness, UMVU estimators, information inequality, efficiency, maximum likelihood estimators (MLE), asymptotic efficiency, quantile, M-estimation, U-statistics, jackknife and bootstrap, average risk optimality, Bayes estimator, minimaxity and admissibility.

### Intended Learning Outcomes

Upon successful completion of this course, students should be able to:

- Gain a deeper understanding of statistical principles
- Be able to choose the optimal estimators under different scenarios
- Understand pros and cons of different statistical models
- Solve real problems using statistical models and statistical packages.

### Assessment:

**Mid-term:** 30% or 0%.

**Final:** 70% or 100% whichever is higher.

### Main References:

- *Mathematical Statistics* by Jun Shao.
- *Theory of Point Estimation* by Lehmann and Casella, Springer.
- *Statistical Inference*, by G. Casella and R. L. Berger.