

STA 4322-STA 5325 Mathematical Statistics January 10, 2023

Days/Time/Room: TuTh 1:20PM - 2:35PM FLEX

OSB 108

Instructor: Prof. Vic Patrangenaru **Office:** OSB 208

E-mail: vic@stat.fsu.edu

Office hours: TT 2:45pm-3:15pm

Text: 1. Statistical Inference, Second Edition, by George Casella and Roger Berger.

ISBN: 0534243126 (online as well)

2. Detailed Class Notes. Additional info to be given in class.

3.(advanced material) A Course in Mathematical Statistics and Large Sample Theory, by Rabi Bhattacharya, Lizhen Lin and Victor Patrangenaru, Springer, ISBN-13: 978-1493940301, ISBN-10: 1493940309 .

Teaching Assistant: Pengfei Lyu (plyu@fsu.edu)

Prerequisite: STA4321

Course description: This course is designed to give students a rigorous and logical account for Basic and Nonparametric Statistical Inference.

Upon completion of the course students should master basic concepts such as

- random sampling, statistical inference and sampling distribution, and state and use of basic sampling distributions.
- describing the main methods of estimation and the main properties of estimators, and apply them. Methods used include matching moments, percentile matching, and maximum likelihood, and properties include bias, variance, mean squared error, consistency, efficiency, and UMVUE.

- Construct confidence intervals for unknown parameters, including the mean, differences of two means, variances, and proportions.
- Testing hypotheses. Concepts to be covered include Neyman-Pearson lemma, significance and power, likelihood ratio test, and information criteria. Tests should include tests for mean, for variance, contingency tables, and goodness-of-fit.

After a review of material from STA4321, including sampling distributions related to univariate and multivariate normality, the chapters partially covered from the Statistical Inference textbook are:

- Chapter 5. Sections 5.4 Order Statistics, 5.5. Convergence Concepts
- Chapter 6. Principles of Data Reduction
- Chapter 7. Point Estimation
- Chapter 8. Hypothesis Testing
- Chapter 9. Interval Estimation
- Chapter 10. Asymptotic Evaluations

More advanced topics from the Mathematical Statistics and Large Sample Theory book partially covered are

- Chapter 6. Consistency and Asymptotic Distributions in Statistics
- Chapter 7. Large Sample Theory in Parametric Models

- Chapter 8. Section 8.3 Asymptotic Distribution Theory of Parametric Large Sample Tests

Attendance policy: Active attendance adds up to 5 bonus points. If you miss classes without an excuse, the extracredit is lost.

Grading: The course grade will be calculated on the basis of hw, to be submitted to the grader (30%), one TBA in class midterm exam (30%), and a final in class exam (40%) on Thursday, May 4th, 12:30 - 2:30 p.m. In class, students are expected to wear masks and being socially distanced. Due to the unusual circumstance of the pandemic, those who for any acceptable reason, cannot take the midterm exam in class during the regular schedule, can ask for an incomplete grade, and take the midterm exam following the FSU rules for removing the incomplete grade.

The course letter grade is based on the following final percentages scale

$$F < 60\% \leq D- < 63.3\% \leq D < 66.6\% \leq D+ < 70\% \leq C- < 73.3\% \\ \leq C < 76.6\% \leq C+ < 80\% \leq B- < 83.3\% \leq B < 86.6\% \leq B+ < 90\% \leq A- < 93.3\% \leq A$$

Honor Code: Students are expected to be uphold the Academic Honor Code as described in the FSU General Bulletin or in the FSU Student Handbook.

Disclaimer: This syllabus provides a general plan; deviations may be necessary.