

BSTA 622 Statistical Inference II
Fall 2021

Content:

This course focuses on theoretical statistics. We will cover a medley of classical statistical inferential methods, including the method of estimating equations, the asymptotic theory for maximum likelihood estimation, the generalized method of moment estimation, and inference by influence functions. This course will emphasize concepts, methods and theories, rather than applications. Successful completion of this course will provide you with a foundation in probability-based statistical inference.

Intended Audience:

The course is designed for Biostatistics Ph.D. students in their 2nd year or beyond. Students are required to complete Probability I (BSTA 620) and Inference I (BSTA 621) before taking this course. Exceptions may be made with permission of the instructor.

Instructor:

Jing Huang, PhD

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Office Hours: Wednesdays 3:30-4:30pm by appointment.

TA:

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Office Hours: TBD

Class Schedule:

Mon and Wed 1:45-3:15pm in Blockley Hall 235.

Textbooks:

Recommended, not required, textbooks:

Theory of Point Estimation, by E.L. Lehmann and G. Casella, Springer

Elements of Large-Sample Theory, by E.L. Lehmann, Springer

Asymptotic Statistics, by A.W. van der Vaart, Cambridge

Theoretical Statistics, by D. Cox and D. Hinkley, Chapman and Hall

Grading:

Homework: 40%. We will have 3-6 homework assignments. You are encouraged to discuss your homework among classmates, but each should write up his/her own assignments.

Midterm: 30%

Final exam: 30%

Both midterm and final exams will be closed book.

Tentative Schedule

Date		Topics	
Sep	1	Mathematics Primer	
	6	Mathematics Primer	
	8	Unbiased estimation and Unbiased estimating functions	
	13	Unbiased estimation and Unbiased estimating functions	
	15	Unbiased estimation and Unbiased estimating functions	
	20	Statistical Information	
	22	Statistical Information	
	27	Statistical Information	
	29	Large Sample Theory	
Oct	4	Large Sample Theory	
	6	Asymptotic Theory of Estimation	
	11	Asymptotic Theory of Estimation	
	13	Asymptotic Properties of the MLE	
	18	Asymptotic Properties of the MLE	
	20	Midterm review	
	25	Midterm	
	27	Asymptotic Properties of the MLE	
	Nov	1	Asymptotic Properties of the MLE
		3	Generalized Linear models
8		Generalized Linear models	
10		Examples	
15		Generalized Method of Moments	
17		Generalized Method of Moments	
22		Influence Functions	
24		Influence Functions (no class, self-study at home)	
29		Likelihood Functions (conditional, profile, plug in)	
Dec		1	Likelihood Functions (conditional, profile, plug in)
	6	Likelihood Functions (composite, partial)	
	8	Final Review (Last lecture)	
	13	Reading day	
	15	Final Exam	