Course Syllabus

	Course	STAT 4352.001
	Course Title	Mathematical Statistics
	Professor	Yun Wei
	Term	Spring 2025 (January 21, 2025-May 9, 2025)
	Meetings	MW 2:30 pm–3:45 pm @ SCI 3.230

Professor's Contact Information

Office Location	FO 2.604D
Email Address	yun.wei@utdallas.edu
Office Hours	MW 4:00 pm – 5:00 pm / by appointment

TA Contact Information

Office Location	BE 3.302
Email Address	mahmuda.jahan@utdallas.edu
Office Hours	Wed 12:00 pm -2:00 pm

General Course Information

Pre-requisites,	STAT 4351, MATH 2418, MATH 3351
Textbook	Lecture notes will be provided.
Suggested Textbooks	1.Hogg and Craig, Introduction to Mathematical Statistics, 8th Ed. Prentice Hall. (https://minerva.it.manchester.ac.uk/~saralees/statbook2.pdf) 2. Statistical Inference (Chapman & Hall/CRC Texts in Statistical Science), George Casella and Roger Berger 3. https://web.stanford.edu/class/archive/stats/stats200/stats200.1172/index.html#
Important Dates	First day of class: Jan 22, 2025 Last day of class: May 7, 2025 Midterm: March 3, 2025 (the same location/time of the regular class) Final exam: May 7, 2025 (the same location/time of the regular class) Final exam will be cumulative. Homework: weekly on Mondays (due next Mondays at 11:59 PM Central Time for full credit) No class: 3/17, 3/19 (Spring break)

Course description and learning outcome

- Mathematical statistics is a core course in the field of statistics. Once the data-generating model is established with assumptions, usually aided by domain scientific knowledge, our goal is to extract information from the model and the data by inferring meaningful parameters of the population through estimation and hypothesis testing. Mathematical statistics enables us to assess and compare methods of inference based on certain criteria.

- We will study some basic elements of mathematical statistics: estimation and hypothesis testing. In the first half of the course, we study methods of estimation and their (asymptotic) properties, such as unbiasedness and consistency. Among various estimation methods, we learn how to derive the method of moments estimator (MME) and the maximum likelihood estimator (MLE). While introducing the exponential family, which generalizes many useful distributions, we learn about the sufficiency and completeness of a statistic for parameters. We will learn that MLE is an asymptotically efficient estimator under certain distributional assumptions (Cramer-Rao lower bound). The second half of the course is concerned with hypothesis testing. We study statistical decision theory and learn admissible decision rules (Bayes or minimax rule). We prove that the likelihood ratio test becomes the uniformly most powerful test under certain circumstances (The Neyman–Pearson lemma). The asymptotic distribution of test statistics (Rao or Wald statistics) and their properties will be examined. If time allows, we will explore the concepts of linear regression and Bayesian inference.

Course Policies

Class Attendance	Regular class attendance is assumed, and anything that is missed because a student is not in class is the student's responsibility. Refer to the Student Code of Conduct..
Grading (credit) Criteria	Attendance: 10% (If absent, provide the proof of the reason.) Homework: 30% (Homework will be mostly weekly, One lowest homework mark will be dropped) Midterm: 20% Final exam: 40% The course grade is based on the overall course score: A+ 98-100; A 93-97.9999; A- 90-92.9999; B+ 87-89.9999; B 83-86.9999; B- 80-82.9999;

	C+ 77-79.9999; C 73-76.9999;C- 65-72.9999; D+ 60-64.9999; D 55-59.9999; D- 50-54.9999; F 0-49.9999
Make-up Exams	No make-up exam will be given unless there is a documented emergency.
Extra Credit	Special assignments will/may be assigned. TBA
Late Work	No late homework will be accepted.
Classroom Citizenship	You are encouraged to ask questions and participate in discussions in the class. The use of cellphones is not allowed during class, so make sure your cellphone is on silent, and that you are not texting, reading emails, playing games, etc.
Comet Creed	*This creed was voted on by the UT Dallas student body in 2014. It is a standard that Comets choose to live by and encourage others to do the same:* *"As a Comet, I pledge honesty, integrity, and service in all that I do."*
Accommodations for Students with Disabilities	Please review the section within the UT Dallas Syllabus Policies and Procedures webpage.
Academic Support Resources	Please visit the Academic Support Resources page to view the University's academic support resources for all students.
UT Dallas Syllabus Policies and Procedures	Please visit the Syllabus Policies page to view the University's policies and procedures segment of the course syllabus. Please review the catalog sections regarding the credit/no credit or pass/fail grading option and withdrawal from class.

Course Access and Navigation

This course can be accessed using your UT Dallas NetID account on the eLearning website. Please see the course access and navigation section of the Getting Started with eLearning webpage for more information. To become familiar with the eLearning tool, please see the Student eLearning Tutorials webpage.

UT Dallas provides eLearning technical support 24 hours a day, 7 days a week. The eLearning Support Center includes a toll-free telephone number for immediate assistance (1-866-588-3192), email request service, and an online chat service.

The descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.