Instructor: Dr. A. Sen  
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Delivery Method: **Online** (via Zoom: link will be provided on Moodle course page).

Office Hours: (via Zoom: link will be provided on Moodle course page) Thursdays, 17:00-18:00 & Fridays, 14:00–15:00; questions by email anytime; **please send email from your email account, not from Moodle.**

Prerequisite: STAT 250; STAT 349 previously or concurrently.

Description: Derivation of standard sampling distributions; distribution of order-statistics; estimation, properties of estimators; Rao-Cramer inequality, Rao-Blackwell theorem, maximum likelihood and method of moments estimation, Neyman-Pearson theory, likelihood ratio tests and their properties.

Text: *Introduction to Mathematical Statistics*, 8th Edition, by R.V. Hogg, J.W. McKean and A.T. Craig, Pearson, 2019. *(However, 6th or 7th Editions are also ok).*

The digital version of the textbook will be available at: [https://www.bkstr.com/concordiastore/home](https://www.bkstr.com/concordiastore/home)

Note: Students should order textbooks as early as possible, especially for print versions in case books are backordered or there are any shipping delays.

Final Grade: The final grade will be based on the higher of (a) or (b):

a) Assignments (about 4) 10%, midterm exam (FRI., 23 OCT. 2020) 20% and final exam 70%.

b) Final exam 100%.

Assignments and exams will be take-home and posted on Moodle; once posted, assignments will be due in 2 weeks (tentative), midterm in 3 hours (tentative), final: to be decided.

If the grading scheme for this course includes graded assignments, a reasonable and representative subset of each assignment may be graded. Students will not be told in advance which subset of the assigned problems will be marked and should therefore attempt all assigned problems.

Note:
- All assignments should be done independently.
- MAST 672/881 students will be given additional assignment/exam problems.

Topics:
1. Distribution of functions of several random variables (distribution function and change of variable techniques), sampling distribution of mean and variance of a sample from Normal ($\mu$, $\sigma^2$) distribution: Sec. 2.2, 2.7.


4. Sufficiency, minimal sufficiency, completeness, UMVUE, Rao-Blackwell and Lehman-Scheffe theorems: Sec. 7.2 - 7.8.

5. Hypothesis testing [6th Edition: Sec. 5.5, 6.3 6.5, 7th Edition: Sec. 4.5, 6.3, 6.5].

6. (time permitting) Bayesian inference [6th Edition: Sec. 11.2.1 – 2, 7th Edition: Sec. 11.2.1 - 4].
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**Disclaimer:** In the event of extraordinary circumstances beyond the University’s control, the content and/or evaluation scheme in the course is subject to change.