

Course Information

Sta 6327. Section:

Time: Tue Period 3 MAT0013 Thu Period 6-7 UST0105

Instructor: Dr. Sayar Karmakar

Office: <https://uf1.zoom.us/j/97605846243>

E-mail: sayarkarmakar@uf1.edu

Office Hours: Wednesday 2.45-4.45 pm over zoom

Class mode: In-person

Exceptions:

- Mar 20 Class online.
- Apr 24: No class / Reserved if some class is missed due to university closing

Teaching Assistant: TBD Office: G FLo 218

E-mail: tbd@uf1.edu

Office Hours: TBD

Text: 2nd edition of Statistical Inference by Casella and Berger.

PS: Your primary study material should be your lecture notes. As a reference, we will use the 2nd edition of Statistical Inference by Casella and Berger. We will cover selected topics from Chapter 5 to Chapter 10, along with additional material not in the book.

Running list of topics: Indexed by lecture number

1. General statistical framework, fundamental principle of statistics
2. Sufficiency, Factorization theorem
3. Minimal sufficiency, Completeness, Basu's theorem
4. Order Statistics, Method of moments
5. Maximum likelihood estimation – definition
6. Maximum likelihood estimation – examples
7. Maximum likelihood example – linear model (derivation of MLE)
8. Maximum likelihood – linear model (derivation of distribution of MLE)
9. Maximum likelihood – linear model (derivation of distribution of MLE)
10. EM algorithm – Normal mixture example
11. EM algorithm – General form

12. Convergence of the EM algorithm
13. EM algorithm – Probit regression
Exam 1
14. Bayesian statistics – Introduction
15. Bayesian statistics – Examples
16. Bayesian statistics – Data Augmentation (DA) algorithm
17. DA algorithm – Probit regression example
18. DA algorithm – Normal mixture example
19. Uniformly Minimum Variance Unbiased Estimation (UMVUE) – Introduction
20. UMVUE – Function of complete, sufficient statistic
21. UMVUE – Conditioning on complete, sufficient statistics
22. UMVUE – Proofs
23. Cramer-Rao inequality
24. Cramer-Rao inequality (attainment of lower bound)
25. Hypothesis testing – Introduction
26. Likelihood ratio test
Exam 2
27. Likelihood ratio test – further examples
28. Size of a test and choice of cutoff for the rejection region
29. Randomized test functions, Binomial LRT
30. Power function and Most Powerful tests
31. Neyman-Pearson lemma – proof
32. Neyman-Pearson lemma – examples
33. Karlin-Rubin theorem, p-value
34. Confidence regions 1
35. Confidence regions 2
36. Revision of convergence concepts
37. Proof of CLT
38. Methods of establishing consistency, Consistency of MLE
39. Methods of establishing asymptotic normality
40. Asymptotic normality of MLE and Lyapunov CLT
Exam 3

Grades

- Three in class exams cover 30% each and homework problems cover 10%. No late homeworks are accepted
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B+	84 to < 88	A	91 to 100	A-	88 to < 91
C+	74 to < 77	B	80 to < 84	B-	77 to < 80
D+	64 to < 67	C	70 to < 74	C-	67 to < 70
E	< 55	D	60 to < 64	D-	55 to < 60

Exam dates

- The in-class (**non-cumulative**) exams are **tentatively** scheduled:

Exam 1: Feb 8

Exam 2: Mar 19

Exam 3: Apr 24

Policies

Students are responsible for all material covered in class. If you are absent, make arrangements with a classmate to borrow the notes and any handouts from them. Handouts will be distributed once and only once