

SPRING 2018 MATH 628 Mathematical Theory of Statistics

Theory of point estimation and hypothesis testing with applications. Confidence region methodologies and relations to estimation and testing.

Content of the course is divided into the following units: Point Estimation, Interval Estimation, Testing Statistical Hypotheses, Chi-Square & Analysis of Variance Tests

Prerequisite: MATH 627 or equivalent. **Credit Hours:**3

CLASS HOURS: TR: 11:00 am – 12:15 pm, Room 454 Snow Hall

INSTRUCTOR: **Bozenna Pasik-Duncan**, Ph.D., D.Sc. (Habilitation) Professor of Mathematics, Courtesy Professor of EECS & AE, Affiliate Faculty of CCB & ITTC

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OFFICE HOURS: TR: 12:15 pm – 12:45 pm or 3:45 pm – 4:15 pm or by appointment

TEXTBOOK: Probability and Statistical Inference, R. V. Hogg/ E. A. Tanis, Ninth Ed. Chapters 6 through 10 with the selected sections will be covered.

CLASS POLICIES, PROCEDURES AND GRADING:

LECTURES: Members of the class are expected to attend the lectures, which will be used to explain new material, to work typical examples and to answer some questions. The course will cover selected material from the chapters mentioned above.

- There is a strict policy of **NO LATE HW (or any other assignment) and NO MAKE-UP EXAMS.**
- **Submission of EARLY HW must be justified.**
- **Assignments should be submitted in original hard-copy form, or else as carefully scanned PDFs; photographs of HW will *not* be accepted.**

HOMEWORK: Homework assignments (12 of them) will be given weekly on Thursdays. Assignments will be collected at the beginning of the lectures on the following Thursday.

Homework Grading Policies and Expectations

*Weekly assignments of HW will be collected at the beginning of class each Thursday.
The student's name and "Math 628, HW #..." need to be clearly stated on the front page of each submission.
Each problem is worth up to 2 points, with:
0 points for no solution or totally wrong approach
1 point for correct reasoning but the lack of details in justification or/and wrong calculation
2 points for correct reasoning with detailed justification*

Remarks: The focus of this course is on good understanding of mathematical statistics concepts; therefore arithmetic mistakes in this course are negligible, but I require that they be clearly marked. Grading has to be

done in such a way that a student will know clearly what was the reason for losing points. Different approaches to finding solutions are encouraged and promoted; therefore looking at posted online solutions while grading students' work is not recommended. I recommend looking at a student's full assignment and providing any general comments or recommendations such as "your presentation requires improvement or significant improvement" at the end of the assignment.

I expect to receive a weekly report/feedback from the grader. In this report I expect to see: the record of points, mean, median, the lowest and the largest value and the standard deviation the list of problems that left students with their concerns; in other words, which problems I should revisit to address students' lack of understanding

Graded assignments will be returned to students in class by the following Wednesday.

At the end of the semester I will expect to receive a cumulative distribution of points and percentages with the same distribution characteristics as for each individual assignment.

Students are responsible for collecting their graded HW assignments and for keeping them in their course portfolio as important evidence of their contributions.

EXAMINATIONS:

EXAM I: In Class, Thursday, February 22,

EXAM II: In Class, Thursday, March 29,

FINAL EXAM: Wednesday, May 9, 10:30 am-1:00pm,

GRADING SYSTEM:

Your grade in this course will be determined on a point system.

A maximum of **500 points** can be accumulated as follows:

Exam I = 100 pts, Exam II = 100, Final Exam = 100 pts, Homework = 100 pts, 5 Quizzes = 100pts

Attendance and Participation (short bio, in class workshops) = 25pt calculated as extra points

CHANGES: The instructor reserves the right to modify the schedule announced in this bulletin if the conditions arise during the semester which make such changes desirable.

Proposed topics for the Exam I:

Mini unit on Point and Interval Estimation: Unbiased estimators, Maximum Likelihood Estimators, Rao – Cramer Inequality, Efficiency of Estimators, Sufficiency of Estimators, Sample Mean and Sample Variance, Chebyshev's Inequality & Convergence in Probability, Confidence Intervals for Mean & Difference of Means, Confidence Intervals for Proportion, Basic Distributions that include normal distribution, t-distribution, chi-square distribution