

Syllabus for MAT 327 Statistical Inference/MAT 782 Mathematical Statistics Spring 2020

Course Description MAT 327: *4 hours, 4 credits.* Introduction to the ideas and methods of probability and statistical inference for students in mathematics and the sciences. Topics include confidence intervals, tests of significance, chi-square tests of goodness-of-fit and independence, regression analysis, and analysis of variance. Students will be introduced to a standard computer statistical package. Prereq: MAT 176.

Course Description MAT 782: *4 hours, 4 credits.* Fundamental concepts of statistics. Point estimation, maximum likelihood estimators, hypothesis testing, confidence regions, t-test, analysis of variance, non-parametric tests, chi-square goodness-of-fit tests, correlation, regression analysis, and selected additional topics. Prereq: A course in probability.

Undergraduate vs. graduate course: The lectures will be the same, but the graduate coursework, project, and exams will be at a higher level, and graduate students must learn and make a presentation on non-parametric tests. Masters students must be enrolled in MAT 782 to receive graduate credit.

Textbooks:

- Intro Probability Theory and Mathematical Statistics notes by Penn State. Available at <https://online.stat.psu.edu/stat414/node/287/> and <https://online.stat.psu.edu/stat414/node/213/>
- Applied Statistics with R by David Dalpiaz. Available at <https://daviddalpiaz.github.io/>

The course readings and schedule are listed on the course webpage.

Grading:

The grading for the course will be based on:

Assignments*	20%
Project	15%
Midterm 1	15%
Midterm 2	15%
Final exam	35%

You must take and pass the final exam to pass the course.

* For students in MAT 782, the assignment grade will be made up of the weekly homework assignments (15%) and a presentation on non-parametric tests (5%).

Assignments: All code and plots must be submitted on Blackboard. Written homework can be submitted on paper during class or a (legible) photo of it can be uploaded to Blackboard. **No late homework is accepted.** Solutions to the homework problems should be written clearly, so that they could be understood by a fellow student. The lowest 3 homework grades will be dropped.

Project: In the semester-long project, you will analyze a data set of your choice. 10% of the project grade will be distributed during the semester for meeting milestones, while the remaining 90% of the project grade will be based on a presentation and evaluation of the final project.

Midterms: There will be two in-class midterms on Thursday March 5 and Tuesday April 21 in class.

Final exam: The final exam is required and will be on Tuesday May 19 from 3:45-5:45pm. You must pass the final exam to pass the course.

Use of Technology & Blackboard: Homework solutions and grades will be posted on Blackboard. The Blackboard system is provided by CUNY to all enrolled students. If you have not accessed Blackboard or are having difficulties, contact Blackboard Support in the Information Technology Division. You can also visit the Help Desk in the Computer Center (first floor, Carman Hall) in person. They can reset passwords and help with simple Blackboard issues.

Honor Code: You are encouraged to work together on solving the homework problems. However, you should write up the solutions on your own. You are responsible for knowing and following Lehman's academic integrity code (available from the Undergraduate Bulletin, Graduate Bulletin, or the Office of Academic Standards and Evaluations). All incidents of cheating will be reported to the Vice President of Student Affairs.

Accommodating Disabilities: Lehman College is committed to providing access to all programs and curricula to all students. Students with disabilities who may need classroom accommodations are encouraged to register with the Office of Student Disability Services. For more info, please contact the Office of Student Disability Services, Shuster Hall, Room 238, phone number, 718-960-8441.

Learning Objectives for MAT 327:

At the end of the course, students should be able to:

- 1) Understand the basic ideas and methods of probability and statistical inference.
- 2) Understand and compute confidence intervals.
- 3) Understand and apply tests of significance.
- 4) Understand and apply chi-square tests of goodness-of-fit and independence.
- 5) Understand and apply regression analysis.
- 6) Understand and apply analysis of variance.
- 7) Use a R to perform standard statistical analysis.