

# Course Information for STAT:7190 “Mathematical Basics for Mathematical Statistics” Fall 2024

## Instructor

Dale Zimmerman, a.k.a. “Dr. Z,” 217 Schaeffer Hall, Office phone 5-0818, Home phone 351-0520, E-mail dale-zimmerman@uiowa.edu

## Class Hours and Location

Our class will meet in 214 MLH on Tuesdays, 9:30 – 10:20 am for most of the semester, but not after the Thanksgiving break.

## Office (Drop-in) Hours

Conducted in person at 1:00 – 3:00 pm Tuesdays and 2:00 – 3:00 pm Thursdays, or by appointment.

## Department Information

Department of Statistics and Actuarial Science, 241 Schaeffer Hall, Phone 335-2082, Webpage [www.stat.uiowa.edu](http://www.stat.uiowa.edu)

## Department Executive Officer

Professor Kung-Sik Chan, 241 SH, Phone 335-0712, E-mail kung-sik-chan@uiowa.edu

## Objective of the Course, from the Department’s Perspective

This is a new, never-before-offered course that was initiated by the DEO of the Department of Statistics & Actuarial Science in response to recent experiences of students and instructors in the Department’s mathematical statistics courses. We found that many more students in those courses now than in the past lack the basic mathematical skills to succeed, and we are trying to do something about it.

## Objective of the Course, from a Student’s Perspective

To make sure you are ready to handle the mathematical statistics courses required by your major, and if not, to either quickly take remedial steps or change majors.

## Class Meetings

Each class meeting will consist of a lecture (for about 30 minutes) in which Dr. Z reviews a basic mathematical topic or two, followed by in-class time (about 20 minutes) on a worksheet to practice skills related to those topics. The lecture material will be presented via slides, which will be made available on the course ICON webpage by noon on Mondays (the day before our class meetings).

## Grading, Homework, Exams, etc.

The grading in this class will be S/U (Satisfactory/Unsatisfactory), and will be determined purely on the basis of attendance and reasonable engagement in class. There will be no homework assignments and no exams, and the in-class worksheets will not be graded. There is no textbook and there will be no reading assignments.

## Attendance

To obtain an S grade, you must turn in all or all but one worksheet by the end of each class.

## Tentative List of Topics

1. Different types of numbers and infinity
2. Sets, types of sets, and elementary set algebra
3. Elementary arithmetic and algebra (in particular, summing and multiplying fractions and dividing fractions by fractions, expanding  $(a + b)^2$  and  $(a + b)^3$ , factoring  $a^2 - b^2$ , additive and multiplicative manipulation of equations and inequalities, factorials)
4. Summation and product notation (rules; using the rules to show that  $\sum_{i=1}^n (x_i - \bar{x}) = 0$ , derive computational formula for the sample variance, show how linear transformations of data affect sample mean and sample variance, etc.; sums of squares)
5. Logarithms and exponentials (rules, using the rules together with summation and product notation)
6. Sequences, limit of a sequence, and infinite series (rules for limits of sums and products of sequences, geometric series, infinite series representation of  $e^x$ )
7. Differentiation (differentiability, rules for derivatives of sums and products, the chain rule, L'Hopital's rule, Taylor series, optimization by setting the first derivative equal to 0)
8. Integration (definition of definite integral as a limit of Riemannian sums, Fundamental theorem of calculus, change of variable technique, integration by parts)
9. Multivariable calculus (double integrals, partial derivatives, Jacobian)
10. How to read mathematics, good study habits, etc.

## Administrative Home

The College of Liberal Arts and Sciences (CLAS) is the administrative home of this course and governs the policies and procedures for its courses. Graduate students, however, must adhere to the academic guidelines set by the Graduate College.

## Electronic Communication

University policy specifies that students are responsible for all official correspondences sent to their standard University of Iowa e-mail address (@uiowa.edu). Students should check this account frequently. (Operations Manual, III.15.2. Scroll down to k.11.)

## Academic Honesty and Misconduct

Plagiarism and any other activities when students present work that is not their own are academic fraud. Academic fraud is a serious matter and is reported to the departmental DEO and to the Associate Dean for Undergraduate Programs and Curriculum. Instructors and DEOs decide on appropriate consequences at the departmental level while the Associate Dean enforces additional consequences at the collegiate level. See the CLAS Student Academic Handbook.

### Making a Suggestion or a Complaint

Students with a suggestion or complaint should first visit the instructor, then the course supervisor, and then the departmental DEO. Complaints must be made within six months of the incident. See the CLAS Student Academic Handbook.

### Accommodations for Students with Disabilities

The University of Iowa is committed to providing an educational experience that is accessible to all students. A student may request academic accommodations for a disability (which include but are not limited to mental health, attention, learning, vision, and physical or health-related conditions). A student seeking academic accommodations should first register with Student Disability Services and then meet with the course instructor privately in the instructor's office to make particular arrangements. Reasonable accommodations are established through an interactive process between the student, instructor, and SDS. See <http://sds.studentlife.uiowa.edu/> for more information.

### Understanding Sexual Harassment

Sexual harassment subverts the mission of the University and threatens the well-being of students, faculty, and staff. All members of the UI community have a responsibility to uphold this mission and to contribute to a safe environment that enhances learning. Incidents of sexual harassment should be reported immediately. See the UI Comprehensive Guide on Sexual Harassment at

<http://www.uiowa.edu/~eod/policies/sexual-harassment-guide/index.html>  
for assistance, definitions, and the full University policy.

### Reacting Safely to Severe Weather

In severe weather, class members should seek appropriate shelter immediately, leaving the classroom if necessary. The class will continue if possible when the event is over. For more information on Hawk Alert and the siren warning system, visit the Public Safety web site,

<http://www.uiowa.edu/~pubsfty/intlinks.htm>

### Nondiscrimination in the Classroom

The University of Iowa is committed to making the classroom a respectful and inclusive space for all people irrespective of their gender, sexual, racial, religious or other identities. Toward this goal, students are invited to optionally share their preferred names and pronouns with their instructors and classmates. Expressions of hate and bigotry directed at individuals or identities are not acceptable. For more information, contact the Office of Equal Opportunity and Diversity, [diversity@uiowa.edu](mailto:diversity@uiowa.edu) or visit [diversity.uiowa.edu](http://diversity.uiowa.edu).