

Math 421-01: Probability Theory

TTh 1:00 – 2:40 PM; DA 307

Fall 2019

Professor: Dr. Catherine Crawford

Contact Information: DA 209C, 630-617-3479, crawford@elmhurst.edu

Office Hours: Monday 1:30 – 3:00 PM; Tuesday 3:00 – 4:00 PM; Wednesday 9:00 – 10:00 AM; or by appointment

Webpage: <http://crawford.elmhurst.edu>

Course Description: Combinatorics, introduction to probability from a set-theoretic point of view, functions of random variables, expected value, generating functions, jointly distributed random variables and the Central Limit Theorem. Prerequisite: Math 251 Multivariate Calculus and Math 301 Discrete Math.

Student Learning Outcomes: Upon successful completion of this course, students should be able to:

1. Understand the concepts of sample space, events and compute the probability and conditional probability of events, and use Bayes' Rule.
2. Understand concepts of discrete and continuous random variables and correctly use common discrete and continuous probability distributions.
3. Calculate expected value, variance and covariance of random variables.
4. Apply techniques for distributions of functions of random variables such as transformations, moment-generating functions, and the Central Limit Theorem.

Required Text: Hogg, Tanis, and Zimmerman, *Probability and Statistical Inference*, 10th ed.

Grading: Your final letter grade are computed from four components, weighted as follows:

Homework/Seminar	16%	<i>Tentative* Homework Dates: 9/5, 9/19, 9/26, 10/10, 10/17, 10/31, 11/14, 11/21</i>
Quizzes	8%	<i>Tentative* Dates: 9/12(Thu), 10/24(Thu), 11/26(Tue)</i>
2 Exams (22% each)	44%	<i>Tentative* Dates: 10/3, 11/7</i>
Final Exam (cumulative)	32%	Tuesday, December 10, 1:00-3:00 PM
	100%	

Excessive and consistent disruptions (e.g. tardiness, leaving class for drinks or the restroom, cell phones, etc.) may result in lowering your grade up to one full letter grade. **All cell phones must be turned completely off and put away.** Having a cell phone out during an exam or quiz will result in an automatic 0 grade for the exam or quiz.

Homework: Although homework problems will typically be assigned every class, I will not be collecting it each class (see homework dates above). **You must be disciplined to keep up with the assigned homework and it is your responsibility to do it in a neat and organized manner.** The due dates for homework may change or additional Homework/Worksheets may be collected – you will be given advance notice. **On homework due dates, you will turn in all of the assigned homework requested for that week.** I will grade a few problems for accuracy and supporting work – usually no credit is given for answers only. The remaining ungraded problems may be observed to assess effort and affect the grade. You may turn in the homework by **4:30pm** the next **day** (unless otherwise noted) without penalty. It will be docked 10% each calendar day thereafter for a maximum of 3 additional days. You may turn in homework in-person, under my door, or via email (*pdf file*) by the given deadline. (Homework submitted after 12:00 pm on Fridays through the weekend must be submitted via email.) **You will not be allowed to turn in homework after the total 1+3 = 4 days extension.** A zero will be recorded for each missed homework. For every 3 homework (and worksheets graded as homework), I will drop 1.

Seminar: You are required to attend one of the math seminars typically held Wednesdays 4:00-5:00 PM in CS 213 and hand in a 1-2 page Summary/Evaluation Paper. **The seminar paper must be submitted on Blackboard.** The guidelines for attending and writing the paper are given on Blackboard. The seminar paper will count as one homework and cannot be dropped.

The remaining homework scores and the seminar grade will count as 8% of your grade.

* Dates subject to change at my discretion. Advance notice will be given.

Quizzes: Quizzes will typically be given during the first 15-20 minutes of class. *You will not be allowed to take a quiz early or late for any reason.* Additional quizzes may be given with advance notice. A score of zero will be recorded for each missed quiz. Your lowest quiz grade will be dropped. Occasionally I may assign a lab or a project that will typically be done outside of class. Each lab or project will count as one quiz, however *you will not be allowed to drop a lab or project grade.* The total points of your remaining quizzes and any labs/projects will count 16% of your grade.

Exams and Exam Replacement Policy: You must take all exams in class on the announced dates (*subject to change at my discretion*). **No make-up exams will be allowed.** You will have the option of replacing your lowest exam score with your final exam percentage (if this is to your benefit), *so there is no need for make-up tests.* *You will not be allowed to take an exam early or late for any reason.* If you miss any exam(s), your final percentage will serve as the score for the missed exam(s). Only the missed exam score(s) will be replaced. The final exam score cannot be replaced.

Policies and Academic Integrity: You are expected to adhere to the Elmhurst College Code of Academic Integrity as found in the Student Handbook available on the College website. For example, *obtaining or attempting to use unauthorized materials or information or unauthorized help from another person or source is considered cheating.*

- Test and quizzes, whether take-home or in-class, are to be your own work unless otherwise stated.
- Calculators and notes are not allowed on quizzes and tests unless otherwise stated. If calculators are allowed, you may not store any notes or unauthorized programs on the calculator.
- Having a cell phone out during an exam or quiz will result in an automatic 0 grade for the exam or quiz.
- **You may work with others on your homework and are encouraged to do so.** But you must turn in your own homework unless specifically stated as group work requiring one submission.
- Individual projects should be your own work. All group members should make quality contributions to group projects.

Learning Center Academic Support: The Learning Center offers services to support the academic performance of all Elmhurst College students. Sessions are structured to promote principles of self-regulated learning and academic management. Areas of peer tutoring include math, statistics, writing, biology, chemistry, kinesiology, psychology, and political science. Additionally, assistance with special test preparation (e.g., ACT, SAT, GRE, and TAP), academic reading/study strategies, and academic coaching is available. For more information, contact Emmi McAdams, Tutoring Coordinator, at emmim@elmhurst.edu, 630-617-5376, or Susan Roach, Learning Center Director, at susan.roach@elmhurst.edu, 630-617-3155. The Learning Center is located on the main floor of the A.C. Buehler Library.

Access and Disability Services: Elmhurst College will make reasonable accommodations for students with disabilities based on the presentation of appropriate documentation. If you believe that you have a disability that may impact your work in this course, contact Linda Harrell, ADS Coordinator, at disability.services@elmhurst.edu or 630-617-6448. The ADS office is located on the main floor of the A.C. Buehler Library. *Classroom accommodations must be renewed each term.*