Mathematics F371: Probability
Section F01, Fall 2015

Instructor: John Rhodes, `j.rhodes@alaska.edu`, 102 Chapman, 474-5445

Office Hours: M 10:00-11:00, T 2:00–3:00, R 10:00-11:00, and by appointment

Course website: `http://www.dms.uaf.edu/~jrhodes/M371.html`

Prerequisites: Math 202, with a grade of C– or better

Credit Hours: 3.0

Text: Wackerly, Mendenhall, Scheaffer *Mathematical Statistics with Applications*, 7th ed.

Class Meetings: T,R 11:30-1:00, Chapman 106

In-class Exams: (Tentative) Oct. 13, Nov. 17

Final Exam: 10:15 a.m.-12:15 p.m., Thursday, Dec. 17

Course Overview and Goals:

The discipline of probability first arose in analyzing games of chance, and that connection is still prominent in the popular perception of the field. However, it is more broadly a mathematical approach to modeling situations where there is some sort of uncertainty — the outcome of some process may not be exactly predictable, but still be expected to exhibit enough regularity that we can probabilistically describe it. The "process" could be a card game, a medical study, the performance of an electronic component, or many other things.

Probabalistic modeling requires understanding some basic logical rules for manipulating probabilities, as well as knowing the features of a collection of the most common "probability distributions" that arise in practice. Once probabilistic modeling is understood, it becomes the underpinnings for statistical inference. Statistics takes collected data and combines it with an assumed probabilistic model to infer things.

In this course we study the basics of probability theory. In particular, we'll study descriptive statistics, counting principles, laws of probability, discrete and continuous random variables, probability distributions, sampling distributions, and the Central Limit Theorem. This corresponds to chapters 1–7 of the textbook.

While this course is valuable on its own, with MATH 408 Mathematical Statistics it forms a year-long sequence. This semester focuses on how things work in an ideal world (random variables, density functions, distributions) where underlying processes are known. MATH 408 then teaches you how to estimate quantities of interest for processes that are not known using the probabilistic models we developed.

Using statistical software packages is an important skill to acquire, and can help in building insight. You should expect some assignments that require access to a computer, using freely accessible packages.

Mechanics of the course:

Class meetings: The class will be run as an interactive lecture. That means that while I will be presenting material at the board, and you will be taking notes, I will also be asking for suggestions, ideas, and questions about the material as we go along. I don't expect correct answers, but I do expect you to be actively following and participating.

I'll begin each class by asking if any questions have come up from the last lecture or most recent homework. Please use this opportunity to get clarification on any points of confusion; your classmates will appreciate you asking the questions.

Class attendance is expected, although I will not formally take roll. If you must miss a class, you should get notes from another student.

Homework: Homework will be assigned daily, and, unless otherwise noted, is due at the next TUESDAY class meeting. Assignements will be a mixture of problems from the book, and computer exercises. To stay current, you should start the assignment before the next class meeting. I encourage you to work with others on all homework, but you must produce your written solution independently. I will check to see that you turn in all assigned problems, but only a subset of them will be graded in detail. I will not allow any late homework that has not been cleared ahead of time or is not due to a genuine emergency (e.g., death in the family, a medical problem with a doctor's note).

Exams: The two midterm exams are not cumulative; they will cover only material since the last exam. The final is cumulative, but will emphasize material after the second midterm. All exams are closed book, with no notes allowed. No make-up exams will be given without prior approval, except in extreme circumstances (e.g., family death, documented illness).

Missed examinations without prior approval will result in an 'F' on that exam. No make-up exams will be given except in extreme circumstances. Notifying me by email or a note that you will miss an exam is generally not sufficient for advance approval; if possible, you must speak with me to be excused.

Calculators: I have no strong feelings on whether you use a calculator when doing homework. As long as you are sure you have the skills to do all calculations by hand, it is fine for you to use technology as a time saver. However, *no calculators will be allowed on any examinations.* This will ensure that testing conditions are equal for everyone.

Grades: Your performance will be evaluated based on 20% written homework, 25% midterm exam 1, 25% midterm exam 2, 30% final exam.

Course grades will be determined according to the following cutoffs:

$$A : \geq 90\%, \quad B : \geq 80\%, \quad C : \geq 70\%, \quad D : \geq 60\%,$$

with $+/-$ for the top and bottom few points in each range. I reserve the right to move the cutoff points downward. Note that you are not in competition with your peers – everyone in the class may get an A, or everyone may get an F.

University and Department Policies: Your work in this course is governed by the UAF Honor Code. The Department of Mathematics and Statistics has specific policies on incompletes, late withdrawals, and early final exams which can be found at

`http://www.dms.uaf.edu/dms/Policies.html`.

If you have any disabilities that I should know about, you should bring them to my attention soon so that we can work with the Office of Disability Services to set up any necessary accommodations.

Tentative Schedule

Week 0-1	Sept. 3, 8, 10	Chapter 1, 2
Week 2	Sept. 15, 17	Chapter 2
Week 3	Sept. 22, 24	Chapter 2
Week 4	Sept. 29, Oct. 1	Chapter 3
Week 5	Oct. 6, 8	Chapter 3
Week 6	Oct. 13, 15	EXAM 1, Chapter 4
Week 7	Oct 20, 22	Chapter 4
Week 8	Oct. 27, 29	Chapter 4
Week 9	Nov. 3, 5	Chapter 5
Week 10	Nov. 10, 12	Chapter 5
Week 11	Nov. 17, 19	EXAM 2 , Chapter 6
Week 12	Nov. 24	Chapter 6, THANKSGIVING
Week 13	Dec. 1, 3	Chapter 6, 7
Week 14	Dec. 8, 10	Chapter 7