

MATH 376 — Probability and Statistics

Spring 2008

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Web Page: <http://mathcs.holycross.edu/~soares/index.html>
Office Hrs: Mon. 12:00 – 1:00 pm, Wed. 1:00 – 2:00 pm, Thu. 12:00 – 1:00 pm and by appt.
Prereq: Math 375.

Required Text: *Mathematical Statistics with Applications*, 6th ed. by D. Wackerly, W. Mendenhall, and R. Scheaffer. A copy of my lecture notes (red binder), updated weekly, will be kept on reserve in the Science Library. They are for reference only; do not remove them from the library!

Goals: With our knowledge of random variables and probability distributions, we will apply these concepts to estimation methods and hypothesis testing. This will help us make statistical inferences of the behavior of populations based upon the data contained in a random sample. Regression analysis will be used to derive statistical relationships between random quantities.

Content: We will cover selected sections of Chapters 7–13 of the text. Topics include sampling distributions, point estimates, confidence intervals, efficiency and sufficiency, hypothesis testing, linear models and least squares estimation, regression, and analysis of variance.

Format: Most classes will be lecture style, however certain classes may involve collaborative learning exercises and/or computer labs (using the software package MATLAB) to explore particular aspects of the subject. Students will work in small groups of two. We will use the computer lab in Swords 219. Your Novell username and password will allow you to log on to the Sunray workstations. Enthusiastic class participation is always required of all students.

Homework: There will be weekly homework assignments consisting of 10–20 problems from the text. Homework is due at the beginning of class on Fridays and will be graded and returned within one week's time. A subset of these problems (most likely the even numbered ones) will be graded. Homework not handed in on the due day receives a grade of zero. I repeat, no late homework will be accepted; however everyone gets one "late-excuse," which allows the student to hand in the late assignment within one week from its original due date. If you will not be in class on a particular Friday, make sure the assignment is given to me sometime on Thursday, or placed under my office door Thursday night. The only exception to this rule is if you were sick and have obtained an adequately documented excuse from me or your Class Dean.

Exams: Exams will be graded and handed back within one week's time. You must be present for all exams, as makeups are given only if an adequately documented excuse is first obtained by the student from me or your Class Dean. The in-class exams are tentatively scheduled for Wednesday February 20th, Wednesday March 19th, and Wednesday April 16th.

Grading: The weekly homework assignment of problems from the text will count towards 20% of the course grade. The collaborative learning/computer lab exercises will count towards 15% of the

course grade. The three in-class exams will each count towards 15% of the course grade. There will be no final exam. Instead, each student will complete a final project due on the last day of classes, April 29th. Details regarding the content and scope of the project will be given later in the semester. It will be worth 20% of the course grade.

Academic Honesty: The Department of Mathematics & Computer Science adheres to the College's policy on Academic Honesty (<http://www.holycross.edu/catalog/>, page 12). In addition, the Department has formulated its own statement, intended to amplify the College's policy, as well as to precisely state our expectations of students and faculty with regard to cheating, plagiarism, etc. You are required to uphold this policy. Anyone who violates this policy will receive a grade of zero for that assignment or exam, and may incur further disciplinary action involving the College.

Tips for Success:

- *Attend the lectures, actively participate and ask questions*

I work hard to prepare coherent, structured lectures and will put forth every effort to assist you in learning the material. But this is no use to you if you do not attend class. During certain class periods, we will collectively work through problems together. This will mean minimum lecture on my part and maximum participation on your part.

- *Do your homework regularly*

You will find it impossible to begin your homework the night before it is due. You will need time to think carefully about the questions, what they are asking, and how to figure out the solutions. In office hours, I am notorious for not telling you how to solve a given problem. Instead, I will give hints and ask you questions to lead you in the right direction. You will be required to "sweat through" the material, but I promise that once you adjust to this learning style, you will find it to be an invaluable asset.

- *Work with your peers*

The best way to learn mathematics is to *do* mathematics. This means mastering the material so that you could explain it to your classmates. A common adage amongst mathematicians is, "You don't really learn a subject until you can teach it." Mimicking an algorithm is insufficient; a strong student is able to follow and propose arguments as to why a methodology is/is not working.

- *Come to office hours*

If you do not understand a particular topic, then come see me in office hours as soon as possible. Waiting only makes things worse. I will not come seek you out to give you help. You must take the initiative to ask for it. Office hours work best in groups, so that we can all learn together and from each other's mistakes. The format is simple; I sit while you (and everyone else) works through the problem in question at the blackboard. It's actually fun!

- *Show all of your work*

In this class, the details are vital and I will be a stickler in my grading. You'll be required to carefully justify each step, so show all of your work on homework and exams. Without showing all of the details, one will not receive full credit for a correct answer. I am less concerned with your obtaining the correct answer and more concerned with the process by which you obtained your solution.