

MATH 110 — Exploring Data Using Statistics

Fall 2010

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Office Hrs: Mon. 3:00 – 4:00 pm, Tue. 11:30 – 12:30 pm, Wed. 12:00 – 1:00 pm and by appt.
Prereq: High school algebra.

Required Text: *Introduction to Statistics and Data Analysis, Enhanced Review Edition, 3rd ed.* by R. Peck, C. Olsen, and J. Devore. This book has been bundled with WebAssign, which is an on-line homework facility. The bundled items are available at the Holy Cross Bookstore (ISBN13 978-0-538-78029-2 or ISBN10 0-538-78029-0). If you get the book from a source other than the Holy Cross Bookstore, be sure you also get the WebAssign access code card, as WebAssign is required for the course. A copy of my lecture notes (red binder), updated weekly, will be on reserve in the Science Library. They are for reference only; do not remove them from the library!

Goals: To understand the role of statistics and the data analysis process. How can data be collected sensibly and meaningfully? How can we describe it? To learn about bivariate data and relationships between variables. To understand sampling distributions and their role in estimation and hypothesis testing. How to mine large data sets, extract the information we need, and create predictive models.

Content: We will cover selected sections of Chapters 1-11. Topics include data collection, data descriptions, data mining, probability, random variables, sampling distributions, estimation, and hypothesis testing.

Format: Most classes will be lecture style, however certain classes may involve computer labs (using the software packages Microsoft Access and/or Excel) to explore particular aspects of the subject. Attendance on these days is mandatory. Students will work in small groups using the computer lab in Haberlin 136. Enthusiastic class participation is always required of all students.

Homework: There will be weekly on-line homework assignments consisting of 15–25 problems using WebAssign (www.webassign.com). These problems are like those found in the text. Homework assignments will usually be due on Thursdays by 8 am. Homework not completed by the due date receives a grade of zero. I repeat, no late homework will be accepted.

Exams: Quizzes and exams will be graded and handed back within one week's time. You must be present for all quizzes and exams, as makeups are given only if an adequately documented excuse is first obtained by the student from me. Quizzes, given at the beginning of class on Fridays, will consist of approximately two or three problems, related to the material in that week's homework. The in-class semester exams consist of 4-6 problems and are meant to test your ability to synthesize and assemble those concepts that you have learned from your homework assignments and reading. The questions will not necessarily be like the homework and quiz problems. They are designed to test your knowledge and thinking skills. The cumulative final exam will test your ability to synthesize your knowledge of the entire course and show what you've learned.

Tentative quiz dates are 9/10, 9/17, 9/24, 10/8, 10/22, 10/29, 11/5, 11/19, and 12/3. Tentative exam dates are 10/1 and 11/12. The final exam date is to be determined.

Grading: The total of the weekly Webassign homework will count towards 10% of the course grade. The computer lab assignments will count towards 10% of the course grade. The in-class quizzes will count towards 15% of the course grade. The two in-class semester exams will each count towards 20% of the course grade. The final exam will count towards 25% of your course grade.

Academic Honesty: The Department of Math & Computer Science adheres to the College's policy on Academic Honesty:

<http://www.holycross.edu/catalog/academic-honesty-policy.pdf>

The Department has also laid out it's own policy on Academic Integrity:

<http://academics.holycross.edu/mathcs/academicintegrity>

You are required to uphold these policies. Violations will result in a grade of zero for that assignment or exam. Further disciplinary action from the College may result.

Homework Guidelines: Weekly homework assignments will be posted on WebAssign and will be due on Thursdays by 8:00 am. Here are some guidelines to follow while doing your assignments, for our mutual benefit:

- Read over the assignment as soon as it's posted. Print out a copy of it if you wish.
- First try to do each problem on paper. If you run into problems, you can ask for hints from WebAssign or do some Practice Problems similar to one you are having trouble with. Enter the answers when you think you have found the correct solution. If you made an error, you may get additional tries at correctly solving the problem.
- Start the assignment early (i.e. the day it is posted). This will allow you ample time to consult with me if you get stuck on some problems. If you start the assignment on the day before it is due, you will be very unhappy! If you come to me with a question, please print out the problem you were working on. We will find a similar problem in the text to practice with. After your question is resolved, you can then go back and finish your problem.

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, with the goal of teaching you how to think.
- *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 whiteboard. It’s actually fun!

- *Show all of your work*

“The devil is in the details,” is the common expression. 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 quizzes, 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.