Course Description

The primary job of statisticians is to look at data gathered from a sample and use it gain quantitative insights into the population from which the sample was drawn. In this course, we will study estimation (trying to determine what the average, say, of a population might be, based on the sample data) and inference (trying to evaluate whether particular claims about the population are true, based on information in the sample data). A key idea in statistics is not just to estimate the population quantity from the sample data, but also to quantify the uncertainty in the estimate.

The course covers the fundamentals of statistics for operations research analysts, including point estimation (method of moments, maximum likelihood); confidence intervals; tests of hypotheses for one- and two-sample problems; multiple comparisons; goodness-of-fit and contingency tables; and, nonparametric hypothesis tests.

Upon completion of the course, you will be able to appropriately summarize data and use that data to make inference about the population from which it was drawn.

Prerequisites

OA3101, MA1115, or MA3110 (or equivalent).

Required Course Materials

Textbook. The course text is Mathematical Statistics with Applications by Wackerly, Mendenhall, and Scheaffer (7th edition).

Software. We will predominantly use R, a powerful open-source statistical software tool, for course labs. However, you will also get an introduction to JMP.

Supplementary Texts

For those who would like a lighter introduction to the material, see The Cartoon Guide to Statistics by Gonick and Smith.

Office Hours

Fridays between 1500 and 1600 (tentative), to be held in a classroom (TBD).

Grading

Grades will be determined by homework, quizzes, exams, and class participation as follows.

Final Exam. The final exam will be a two-hour, in-class, cumulative exam covering all the material from the class. The final exam will count as 35 percent of your grade.

Interim Exams. There will be two interim exams at approximately one-third and two-thirds of the way through the quarter. Each will be a 50-minute, in-class exam and each will count for 20 percent of your grade.
Probability Quiz. There will be one probability quiz covering the material from OA3101 that is crucial to OA3102. It will count for 5 percent of your grade.

Homework. Homework will make up 15 percent of your grade. There will be a variety of assignments from the text and from the labs. I will review the assignments and grade them simply as submitted, incomplete, or not submitted.

- “Submitted” means the assignment was turned in on time and a reasonable attempt was made to solve and answer all the problems. “Submitted” assignments will receive full credit.
- “Incomplete” means the assignment was submitted with missing solutions or no real attempt was made to solve one or more problems. “Incomplete” assignments will receive half credit.
- “Not submitted” means no assignment was submitted, the assignment was turned in after the deadline, or the submitted solutions were too weak/poor to count as incomplete. “Not submitted” assignments will receive zero credit.

Students are strongly encouraged to attempt to do all the problems and turn in all the homework. Not only will this directly improve your grade via the homework score, but doing the homework is vital to doing well on the exams.

Class Participation. Class participation will count for 5 percent of your grade. Class participation consists of being engaged during the lectures and presenting in the labs.

Course Outline

The planned topics for each week of the course are listed below. Specific due dates will be announced in class.

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<td>Sampling Distributions and the CLT</td>
<td>7.1-7.3, 7.5</td>
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Labs

The labs are scheduled for two hours. They will consist of about 50 minutes of lecture/demonstration followed by 50 minutes of group exercises. Labs will also have individual exercises, to be completed as homework after the lab period, and that will, along with the group exercises, be graded. Lab homework will be due the following week at the start of the next lab period.

Late Submission Policy

Unless arrangements have been made in advance, late homework submitted within 24 hours of the due date will automatically be graded “incomplete” (half credit); homework submitted after that time will not receive any credit.

Homework Collaboration Policy

Collaboration can help you understand and learn the material. Hence, you are encouraged to discuss homework problems with your peers, but homework assignments must be written up individually. If two or more assignments are submitted that are excessively similar they will be marked either as incomplete or not submitted depending on the degree of similarity.

My recommendation is that, if you collaborate with your peers, do it verbally and in a general fashion. Then, when you are ready to write up the solutions, do it by yourself. Not only will this ensure that your homework doesn’t look like anyone else’s, but it will also help you learn and prepare for the exams.

Academic Integrity & the NPS Honor Code

Academic integrity on the part of U.S. and international officers and civilians participating in NPS programs is an important aspect of professional performance. The provisions of NAVPGSCOLINST 5370.1C of the Academic Honor Code will be strictly enforced. Academic dishonesty of any type will not be tolerated in this class. The penalty for cheating is a failing grade in the course.

Miscellaneous Notes

• The key to success in this course is doing exercises and problems. You simply cannot do well without doing and understanding the homework problems.

• When you hand in lab assignments, keep in mind the difference between a printout and a write-up. I’m not interested in wading through a print-out of your entire lab session. Rather, you should submit concise write-ups that directly answer the questions asked and that contain only the relevant R output that is relevant to your answer.

• I will be using Sakai for announcements and postings. Please check the site regularly.