CAPSTONE PROJECTS: MATH1530
WHAT IS A CAPSTONE PROJECT?

- A multifaceted assignment that serves as a culminating academic and intellectual experience for students

- Capstone projects are designed to encourage students to think critically, solve challenging problems, and develop skills such as oral and written communication, technology skills and teamwork.
OUR GOALS FOR CAPSTONE PROJECT:

- Demonstrate how large data sets can be analyzed and what information they can reveal
- Assist students to develop critical thinking skills as applied to statistics
- Teach students how to use statistical software like StatCrunch and Statdisk
- Reinforce the need for students to use proper written and oral communication in reporting statistical results
- Create a more transferable experience of statistics
THE GEN ED GOALS

- Students are able to use mathematics to solve problems and determine if results are reasonable.
- Students are able to use mathematics to model real-world behaviors and apply mathematical concepts to the solution of real life problems.
- Students are able to make meaningful connections between mathematics and other disciplines.
- Students are able to use technology for mathematical reasoning and problem solving.
- Students are able to apply mathematical and/or basic statistical reasoning to analyze data and graphs.
The Capstones:

- Youth Smoking Crisis:
  Adapted from data and article in “Journal of Statistics Education” by Michael Kahn, Wheaton College.

- Ricci vs DeStephano:
  Adapted from data and article in “Journal of Statistics Education” by Weiwen Miao, Haverford College.

  Ricci v. DeStefano was about disparate impact of firefighters’ promotion exams in New Haven, Connecticut. A statistical analysis of the test scores of both Lieutenant and Captain exams indicates that there is significant difference between the average test scores of minority and majority applicants. The case is one of “reverse discrimination” which was decided by the US Supreme Court.

- Police Involved Deaths:
  Created from data compiled by Fatal Encounters a 501(c)3 organization.
GENERAL STRUCTURE OF THE CAPSTONES:

- Broken into “tasks” which are directly aligned to the Triola text chapters.
- Require students to use statistical software due to the large size of the data sets.
- Can facilitate the introduction of group work inside the classroom.
- Evaluated using rubrics which are tight enough to assure uniformity in grading across faculty members.
CONDUCTING A CAPSTONE PROJECT: DAY ONE

- Introduce the Capstone topic using the video link provided.
- Provide additional explanation about the project topic and why it is interesting and relevant.
- Explain that the project is a vehicle for learning to use statistical technology with a large data set.
- Select small groups carefully, incorporating student requests to work with certain people. (However, emphasize that all members of a group will be accountable for their own work.)
- Require that all students *turn in the Capstone project assignments as individuals*. Responses should be in the individual’s own words, not an agreed upon group response. The group may, however, discuss all aspects of the Capstone assignments together.
CONDUCTING A CAPSTONE:

- Class days are scheduled to help students acquire the needed technical skills to successfully work through the Capstone assignments.

- During Capstone class days encourage student groups to discuss the meaning of assigned tasks and how to successfully complete them. Assist them with the tasks, but encourage the students to make an effort to understand the tasks and determine how to proceed.

- Sorted data sets are often needed on individual tasks. These have been provided in the file for each Capstone. However, students can, and probably should, sort the data on their own. This intermediate process gives them a better understanding of the mechanics of doing statistics.
Evaluating a Capstone:

- Insist on answers which incorporate correct English grammar and vocabulary when a written response is required.

- Consider allowing students to evaluate all the members of their group at least once using the rubric provided.

- Use the individual rubric provided to grade the submitted, written answers to the Capstone tasks.