DSC 423: Data Analysis and Regression
Assignment 10: Experimental Design

Your submission must include your name and student ID. Your submission must include the honor statement: "I have completed this work independently. The solutions given are entirely my own work." Your submission must be submitted as a PDF.

1. (10 points) An economist is interested in the effect of the rising price of gas on drivers. He puts an add on the radio, "Call 1-800-GAS-PUMP, and let me know what you think about the costly price of gasoline." This is obviously a terrible way to conduct a survey. Identify three ways bias could enter the study.

2. (10 points) Yvette is a young banker. She and all her friends carry cell phones and use them heavily. Last year, two of Yvette's acquaintances developed brain tumors. Yvette wonders if the tumors are related to use of cell phones. Explain why the experience of Yvette's friends does not provide good evidence that cell phones cause brain tumors.

3. A manufacturer of food products uses package liners that are sealed at the top by applying heated jaws after the package is filled. The customer peels the sealed pieces apart to open the package. What effect does the temperature of the jaws have on the force required to peel the liner? To answer this question, the engineers prepare 60 pairs of pieces of package liner. They seal five pairs at each of 250 F, 275 F, 300 F, and 325 F of three different types of liner (A, B, C). Then they measure the peel strength of each seal.
   a. (5 points) Identify the experimental units or subjects
   b. (5 points) Identify the factors
   c. (5 points) Identify the treatments
   d. (5 points) Identify the response variables
   e. (5 points) Write the regression model for this experiment.
   f. (5 points) Is this a Randomized Block Design? Explain.