Capstone Project

Capstone Project (25% of Final Exam Grade)

Purpose: This project is to provide you with an opportunity to pull together statistical concepts you learned in this course and apply them in a real-world context. You are to form a hypothesis, design a study, collect the data (using either an observational study or a controlled experiment), describe the data, and make conclusions using the data.

Topics: A list of topics is provided for you to choose from. If you choose to pursue a different topic, the topic will need to be approved before you begin collecting data.

Group Size: You may work alone or in a group of up to three students. Students in your group do not have to be in your class period, however, they should have Mrs. Lanigan as a teacher.

Proposal: To get your project approved, you must be able to demonstrate how your study will meet the requirements of the project. In other words, you need to clearly and completely communicate your hypotheses and how you will collect the data so the conditions for significance testing will be satisfied. If your proposal isn’t approved, you must resubmit the proposal until it is approved. **Your group proposal is due by 1:20 pm on Friday, May 11th.**

Poster: You will represent your findings on a poster. The following components should be included on your poster:

* Introduction of Project:
	+ Question/topic you are trying to answer
	+ Identify your population and sample of interest
	+ State your hypotheses
* Data Collection:
	+ Method of data collection is clearly identified (observational study or experiment)
	+ Describes efforts to reduce bias, variability, confounding variables
* Graphs and Summary Statistics:
	+ Minimum of ONE appropriate graph used to display data
	+ Appropriate summary statistics provided (i.e. mean, standard deviation, proportions, or observed/expected values)
* Statistical Analysis:
	+ Conduct a significance test (ALL WORK SHOWN)
* Reflection:
	+ Limitations to your conclusions
	+ What you would do to improve the study next time

**Your poster will be due at the** **beginning of class on Monday, May 21st**. Late project submissions will result in a lower grade.

Capstone Project

Capstone Project Proposal – Due by 1:20 pm Friday, May 11th

Group Members: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. What is your topic?
2. Identify your null and alternative hypotheses.

(Ex: If I was conducting a study to see whether Oreo Double Stuff really have double the filling, I would use:

H0: Double Stuff Oreos have double the frosting as regular Oreos.

Ha: Double Stuff Oreos have less than double the frosting as regular Oreos.)

1. What/who is your population?
2. What data will you be collecting? Make sure your sample size, *n*, satisfies conditions for significance testing.
3. How will you collect your data? Be specific!!!

Circle one: Observational study Experiment

Teacher Approval Initials: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Capstone Project

Capstone Project Rubric

The Capstone Project will count as part of your final exam grade for this course. The following rubric will be used. Any late projects will result in a lower grade.

|  |  |  |  |
| --- | --- | --- | --- |
| **Final Project** | **4**  | **2** | **0** |
| **Introduction** | All of the following are included:* Clearly states question/topic of interest
* Clearly identifies the population
* Clearly identifies the sample
* States hypotheses in symbols and words
 | Missing one or two of the following:* Clearly states question/topic of interest
* Clearly identifies the population
* Clearly identifies the sample
* States hypotheses in symbols and words
 | Missing three or four of the following:* Clearly states question/topic of interest
* Clearly identifies the population
* Clearly identifies the sample
* States hypotheses in symbols and words
 |
| **Data Collection** | All of the following are included:* Method of data collection is clearly identified
* Describes efforts to reduce bias, variability, confounding variables
 | Missing one of the following:* Method of data collection is clearly identified
* Describes efforts to reduce bias, variability, confounding variables
 | Missing all of the following:* Method of data collection is clearly identified
* Describes efforts to reduce bias, variability, confounding variables
 |
| **Graphs and Summary Statistics** | All of the following are included:* Appropriate graph included
* Graph is neat, clearly labeled, and easy to analyze
* Appropriate summary statistics are included
 | Missing one of the following:* Appropriate graph included
* Graph is neat, clearly labeled, and easy to analyze
* Appropriate summary statistics are included
 | Missing two or three of the following:* Appropriate graph included
* Graph is neat, clearly labeled, and easy to analyze
* Appropriate summary statistics are included
 |
| **Statistical****Analysis** | * Correct significance test chosen
* Test statistic and *P-*value are calculated correctly
* Conclusion is correct based on decision made from the significance test
 | * Correct significance test chosen
* Error made in calculation of test statistic or *P*-value OR in the conclusion made based on the decision resulting from the significance test
 | * Wrong significance test chosen OR no significance test conducted
 |
| **Reflection** | All of the following included:* Identifies a minimum of one limitation in the study
* Identifies improvements to be made on a follow-up study
 | Missing one of the following:* Identifies a minimum of one limitation in the study
* Identifies improvements to be made on a follow-up study
 | Missing all of the following:* Identifies a minimum of one limitation in the study
* Identifies improvements to be made on a follow-up study
 |
| **Overall Presentation** | All of the following included:* Proposal submitted and approved by due date
* Poster is well organized, neat, and easy to read
* Poster is visually appealing
 | Missing one of the following:* Proposal submitted and approved by due date
* Poster is well organized, neat, and easy to read
* Poster is visually appealing
 | Missing two or three of the following:* Proposal submitted and approved by due date
* Poster is well organized, neat, and easy to read
* Poster is visually appealing
 |

Overall Grade: \_\_\_\_\_\_\_\_\_\_\_\_\_

Comments:

Topics to Choose (Note: You may do something else, with teacher approval!)

* Is there are difference between gender and music genre preference?
* Does a golfing disc travel more than 10 feet farther than a regular Frisbee?
* Do more than 60% of students wear sandals (or flip flops)
* Are birth months equally likely?
* Is the average difference in heights between males and females more than 2 inches?
* Are more than 5% of students color blind?
* Do Skittles follow the expected pattern claimed by M&M/Mars Company?
* Is the average wait time for any Hartland drive-thru more than 4 minutes?
* Do students make more than 60% of their free throw shots?
* Do males and females own different types of cars?
* Does the average class at HHS have less than 25 students?
* Do less than 40% of students own I-Phones?
* Is there a difference in grades (A, B, C, D, E) based on hours spent in extracurricular activities per week (less than 10 hours, between 10 and 20 hours, more than 20 hours per week)?
* Are double stuffed Oreos really double stuffed?
* Are less than 18% of students left handed?