

# PERSONALIZING STATISTICS

Nancy Rivers  
Wake Technical Community College

# DISCLAIMER

- ⦿ This project is for an introductory statistics class for liberal arts majors
- ⦿ Apologies to statistics purists
- ⦿ My course goal: Enable my students to be informed consumers of statistics
- ⦿ Not a rigorous coverage of statistics

# WHAT IT IS...

- ⦿ A semester long statistics project
  - Individual or group option
- ⦿ Covers the majority of material covered in our MAT 151/A course
- ⦿ Broken into 5 major Parts; Each part is broken into Tasks
- ⦿ Counts as 20% of their course grade (10% from mini-projects and other assignments, 5% from online quizzes, 3 tests are 15% each, final 20%)

# PERSONALIZING???

- ⦿ Students are allowed to choose a focus topic
  - something that they believe will hold their interest throughout the semester
- ⦿ They identify two quantitative variables related to their focus
- ⦿ Good sampling techniques are stressed, but allowances made for limited time and funds
- ⦿ They collect 30 data values for each of these variables - 2 quantitative data sets

# PERSONALIZING STATISTICS

## AN INTRODUCTION TO THE PROJECT

- ◉ To aid in your understanding of statistics - its usefulness and applicability to you and your interests - you will be engaged in a course long project. This project will be broken into many parts. I encourage you to approach this with the attitude of producing meaningful statistics of interest to you and others who share your enthusiasm for your chosen topic.

# PERSONALIZING STATISTICS PROJECT RUBRIC AND SCHEDULE

Personalizing Statistics Project Rubric			Points Possible	Due Date
<b>Part 1</b>	<b>Descriptive Statistics</b>			
Task 1	Focus and 2 quantitative data sets identified		10	August 22/23
Task 2	Population clarified, sampling technique chosen, detailed data gathering plan		10	August 29/30
Task 3	Data submitted as prescribed		10	September 12/13
Task 4	Initial write-up		100	September 26/27
<b>Part 2</b>	<b>Linear Regression</b>			
Task 1	Scatter plot and correlation coefficient		30	September 19/20
Task 2	Linear regression model, residuals and predictions		30	September 19/20
Task 3	Addition to write-up		30	October 10/11
<b>Part 3</b>	<b>Binomial and Normal Probability</b>			
Task 1	Writing probability questions		30	October 17/18
Task 2	Answering probability questions		30	October 24/25
Task 3	Reflection on writing probability questions (rework of initial write-up)		30	October 31/November 1
<b>Part 4</b>	<b>Inferential Statistics</b>			
Task 1	Confidence intervals		30	November 7/8
Task 2	Hypothesis testing		30	November 19/20
Task 3	Inferential statistics addition to the write-up (write-up - second revision)		30	November 30
<b>Part 5</b>	<b>Presentation</b>			
Task 1	Media component		50	November 30
Task 2	Information conveyed in presentation		50	December 5/6
			500	

# PART I

- ◉ Task 1: Identify focus and two quantitative variables
- ◉ Task 2: Clearly identify population, sampling technique and provide detailed plan for data gathering
- ◉ Task 3: Gather data - 2 data sets with 30 data values in each
- ◉ Task 4: Write-up of project work to date, includes descriptive stats, frequency distribution table and histogram

# PERSONALIZING STATISTICS

## PART I TASK 1

- ◉ Determine the focus of your study and identify two quantitative variables (include units) for which you will collect data related to this focus. You must have **30 data values in each data set**. Neither data set can be the years associated with the data in the other data set. You should select a focus and data sets that are truly of interest to you as you will be working with this project for the next four months. It is better to choose continuous quantitative variables; however, discrete quantitative variables that can take on a wide range of values will work.



# PERSONALIZING STATISTICS

## PART I TASK 2

- ◉ Task 2:
- ◉ Clearly identify your population:
- ◉
- ◉ Which sampling technique will you use?
- ◉ Layout your detailed plan for gathering your data:

## PART 2

- Task 1: Create Scatter Plot using both data sets, calculate correlation coefficient, assess correlation
- Task 2: Fit a linear regression equation to data, calculate predicted values and residuals, create residual plot, assessment of appropriateness of linear regression model and make an appropriate prediction
- Task 3: Addition of modeling work to the write-up

# PART 3

- Task 1: Writing probability questions
  - 4 binomial probability
  - 4 normal probability
  - 4 inverse normal
  - 3 Central Limit Theorem
- Task 2: Editing probability questions and answering them
- Task 3: Reflection on question writing and rework of write-up

# PERSONALIZING STATISTICS

## STUDENT FEEDBACK ON QUESTION WRITING

- "The most important thing I acquired from writing these problems was a sort of icing on a cake feeling. I understood these questions from class, but writing them up, piecing them together, and distinguishing them from each other all on the same page really brought about a more in depth compliment of their individual specialties than I ever thought was possible." --- Tully

# PERSONALIZING STATISTICS

## STUDENT FEEDBACK ON QUESTION WRITING

- "I would much rather leave the question writing to a professional, and just focus on being able to answer them and know WHY the answer came out right, or wrong. I do think that writing the questions helped me to be able to identify them on the test, although not perfectly." --- Karrie

# PART 4

- ⦿ Task 1: Confidence Interval generation and interpretation for a mean, a variance and a standard deviation and computation of minimum sample size for a proportion
- ⦿ Task 2: Hypotheses Testing of a proportion, a mean, and a standard deviation
- ⦿ Task 3: Second revision of write-up; Add to write-up work on confidence intervals and hypothesis testing

# PART 5

- ◎ Generation of a visual/media component for a presentation of the project
  - Individuals can use poster(s) but nothing hand written. Must be computer generated.
  - Groups must have digital visual - Power Point, video, Prezi, Mindmap, etc.
- ◎ Presentation of project
  - Emphasis on presentation of:
    - data gathering
    - findings
    - conclusions

# CHANGES BEING CONSIDERED

- ⦿ Course will be taught in 12 weeks in Spring - condensing/cut-back necessary?
- ⦿ Putting student survey online
- ⦿ Any suggestions?



# OPEN FOR USE

- ◉ Files are available at <http://tinyurl.com/personalizingstatistics>
- ◉ [https://docs.google.com/folder/d/0B8\\_hA4SNUhRVeXI5RmpRWldDazQ/edit](https://docs.google.com/folder/d/0B8_hA4SNUhRVeXI5RmpRWldDazQ/edit)
- ◉ You are welcome to use as is or download and edit to fit your needs
- ◉ Please, keep footer giving credit unless you make substantial revisions
- ◉ Please, provide feedback so that I can continue to improve the project as I do it as well.

# CONTACT INFORMATION

- ◉ Nancy Rivers
- ◉ [njrivers@waketech.edu](mailto:njrivers@waketech.edu)
- ◉ (919)532-5564
  
- ◉ Files are available at  
<http://tinyurl.com/personalizingstatistics>  
OR at  
[https://docs.google.com/folder/d/0B8\\_hA4SNUhRVeXI5RmpRWldDazQ/edit](https://docs.google.com/folder/d/0B8_hA4SNUhRVeXI5RmpRWldDazQ/edit)