SYLLABUS – MATH 7601 –Fall 2017
Statistics for Teachers
Thursday 4:30-6:30
Room 109 Dunn Hall
Instructor: Dr. Dale Bowman
Office: 357 Dunn Hall
ddbowman@memphis.edu
Office hours: MW 3-4pm or by appointment

Hybrid course: Please note that this course is a hybrid course meaning that it is a blend between an on-site class and an on-line class. We will meet for 2 hours on-site and the remaining hour you will spend on on-line activities.

PREREQUISITE: MATH 1530 or MATH 4611 or MATH 4614 or MATH 4635 or Permission of Instructor

Textbook:
We will be using an online textbook available on TopHat**.** Your instructor will provide you with the information you need to access this text.
Statistical Reasoning for Everyday Life **by Bennett, Briggs and Triola, Pearson publishing**

Topics Covered:
We will be exploring the basic concepts of statistics in this course while comparing and contrasting a traditional teaching approach that includes on-line homework with a flipped classroom approach.

In the traditional approach, the instructor will lecture during class time and you will be expected to work on-line homework (included with the Bennett, Briggs and Triola text, for more information see Required materials below.) The flipped classroom approach will require you to read an article and watch a video before coming to class. You will be given a quiz at the beginning of class over the material you were to read/watch. During class, we will engage in hands on activities designed to reinforce the concepts you have learned. Every topic will be introduced either with a traditional approach or the flipped approach.

Part I:

This section of the course will lay the foundation for why the study of statistics is important to everyone and provide some basic tools that consumers of statistics can use to judge the validity and quality of statistical information they receive. Emphasis will be on developing the concepts of random sample, designed experiments, observational studies, good survey practices, and looking for misleading components of an analysis. Topics include:

Observational studies
Experiments
Data ethics
Measurement mistakes

Sampling methods
Confounding variables
Percentages in statistics
Level of measure
Data types – discrete and continuous

Part II:

In this section of the course you will learn to draw and interpret various graphs and learn which type of graph is appropriate for the type of data you have. You will also learn about measures of central tendency and variation and learn which measure is most appropriate for the level of measure of your data (nominal, ordinal, or numerical. This section is important in order for you to be able to perform exploratory data analysis on data you collect in order to understand what level of measure you have and what sort of further analysis might be most appropriate. Topics include:

Histograms
Frequency distributions
Graphs – bar graphs, pie charts, line graphs, stemplot
Numerical descriptions of data
Measures of central tendency – mean, median, mode
Measures of variation – five number summary, standard deviation

Part III:

This section of the course will focus on the various ways of defining probability and the rules that all probability assignments must follow. We will learn to compute probabilities for common models such as tossing a coin and rolling a die. The concepts of sample space, events, mutually exclusive events, independent events and conditional probability will be discussed. Also discussed will be the assignment of personal probabilities and why these are often distorted and how and why our intuition can vastly differ from true probabilities. Properties of the normal distribution will be discussed as well as standardizing values and obtaining probabilities associated with the normal distribution. In addition concepts of correlation and best-fit lines for prediction will be discussed, including correlation versus causation. It is essential that you gain an understanding of the material in this section in order to understand the results of any analysis you choose to perform on your data. For this section there will be supplemental material to that presented in the textbook. Topics include:

Normal distribution
Central limit theorem
Statistical significance
Probability
Risk
Expected values
Correlation

Part IV: Inference

In this section various types of analysis are discussed. The type of analysis that is appropriate depends on what you want to do with your data – whether estimate an unknown quantity or test a hypothesis. The type of analysis also depends on what level of measure you have in your data. We will discuss concepts such as the p-value which will rely heavily on the previous section's material, as well as how to set up a hypothesis test – which should be null and which should be alternative, and we will compute some confidence intervals and learn the correct interpretation of our results. This section is important in that it will demonstrate some basic concepts and techniques that will allow you to start thinking about appropriate analysis. Topics include:

Variation in samples
Estimating means
Estimating proportions
Confidence intervals
Hypothesis testing
Meta-analysis

REQUIRED EQUIPMENT:

The textbook, *Statistical Reasoning for Everyday Life*, is required and will come with an online access code that will allow the student to do the on-line homework assignments. Internet access will be required for on-line homework assignments. The login site for the online homework ishttp://www.pearsonmylabandmastering.com/northamerica/mystatlab/ Information about signing onto mystatlab will be given by your instructor.

A TopHat account is required with access to the material prepared specifically for the University of Memphis. Information on accessing this material will be given to you by your instructor.

REQUIRED EXCEL LABS:

There will be 5 excel labs during the semester. Since we will be using **Excel** for these labs, you need to download and install Microsoft Office on your own personal devices free of charge at http://memphis.edu/getoffice Each lab will be during scheduled class time for this course. Each lab will have an assignment for the student to turn in. Labs cannot be made up so it is very important that you not miss any labs.

IN-CLASS EXERCISES, ACTIVITIES AND ASSIGNMENTS

During the flipped sessions most class time will be spent with the students engaged in hands-on exercises and activities used to reinforce the main topics that we will cover. Students will receive credit for their participation in these in-class assignments. If a student misses a class, a grade of 0 will be recorded for the in-class activity assigned that day. For this reason, it is very important for students to attend class.

RESOURCES AVAILABLE TO THE STUDENT:

Free tutoring help is available through the Educational Support Program (ESP) in Dunn Hall room 143. Go to the Department of Mathematical Sciences' web page at

www.msci.memphis.edu to find the hours of operation. The math department has made it a priority to have at least one graduate student studying statistics available at all times. This is a wonderful resource that is free to you. Take advantage of it or make arrangements to visit your instructor for more help.

EVALUATION:
There will be one in class test plus a final exam worth 100 points each. In addition, there will be daily in-class exercises, assignments or activities and on-line homework assignments that will count a total of 200 points. The excel labs will count a total of 100 points towards the final grade. The total possible number of points is 500. The students grade in the course will be based on the percentage of the possible 500 points obtained according to the following scale.

90-100% - A
80 - 89% - B
70 – 79% - C
60 – 69% - D
Below 60% - F

No makeup tests will be given. If you must miss a test for any reason, your final exam grade may be used to replace the test missed if approved by the instructor. If you miss more than one test you will receive a zero on each test missed after the first. If you miss the final exam you will receive a grade of zero on the final exam. Each in-class assignment is to be completed during the scheduled class time. If a student is not in class to participate in the assignment, the student will receive a grade of zero on that assignment. No replacement grades will be possible for any in-class activity. On-line homework will have a due date clearly displayed. No late homework will be accepted. **It is very important that you do not miss any tests or homework assignments or excel labs.**

STUDENT DISABILITY POLICIES ACOMODATION AND SERVICES: Information available at www.memphis.edu/sas

ACADEMIC MISCONDUCT: The University policy is available at www.memphis.edu/studentconduct/miscondut.htm

The professor reserves the right to make any necessary changes to the information provided in the syllabus during the semester.