

SW 203 Statistics for Use

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| Instructor: | Dr. P. Rahman |
| Office: | Class room |
| Office hrs: | Before or after class (and by appointment) |
| E-mail: | mailto:prahman@ccc.edu |
| Meetings: | Saturdays, March 28 to June 6: Loop Campus |
| Text: | Recommendation given in class |
| Competencies Offered | PW-F, S-2-X, HC-E, WW: Can use Descriptive Statistics to organize and interpret data and describe patterns and processes using numerical measures. Use Minitab to construct graphs and do data analysis |

LEARNING EXPERIENCE:

This course will begin with an overview on Statistics. The class focus is on graphical presentation of data and various numerical descriptive measures used to analyze data. We will learn to use inferential Statistics and apply it to sampling theory, confidence intervals for means and proportions, and tests of hypothesis. We will also learn how linear regression can be used to find a predictor model.

The class session will include lecture, discussion and collaborative learning. Although attendance is not mandatory, I would highly recommend that you attend all class sessions. In my experience, students who attend all the sessions have an easier time in the course than students who don't.

SPECIFIC LEARNING OBJECTIVES:

- the ability to **apply and interpret** the results of a variety of **statistical techniques**, including both exploratory and inferential methods
- **organize** and **interpret** data using descriptive statistics including frequency distributions, mean, median, mode, standard deviation and other descriptive measures
- an **understanding** of many of the **fundamental ideas of statistics**, such as variability, distribution, association, causation, sampling, experimentation, confidence, and significance;
- a **critical perspective** with which to **analyze and assess statistical arguments** such as one encounters in the popular press as well as in scholarly publications;
- an **understanding** in the use of **inferential statistics** topics such as sampling theory, confidence intervals, and hypothesis testing as applied to probability distributions prediction equation using correlation and regression

COURSE PRINCIPLES:

The following principles guide my teaching of this course and may help you to understand what I think the course is about:

1. **Statistics is not number-crunching.** Contrary to its popular perception as a black box collection of arcane magic tricks, statistics involves much more than numerical computations. The emphasis of the course will be on understanding statistical concepts and on interpreting and communicating the results of statistical analyses. In other words, you will be expected to learn to construct and analyze numerical arguments. In contrast to most mathematics courses, we will be using phrases such as "there is strong evidence that ..." and "the data suggest that ..." rather than "the exact answer is ..." and "it is therefore proven that ...". To alleviate the computational burden, we will often use the computer program Minitab to perform calculations and produce visual displays.
2. **Statistics involves the analysis of genuine data.** Supporting my contention that statistics is applicable in everyday life and in most fields of academic endeavor, you will analyze genuine data from a wide variety of applications throughout the course. Many of these data sets involve information that you will collect about yourselves and your peers; others will come from sources such as almanacs, journals, magazines, newspapers, and books. The contexts for these data will span a wide variety of subject matter; most should be of interest to a general audience.
3. **Understanding results from investigation and discovery.** As opposed to passively taking notes while I lecture, you will spend the vast majority of class time actively engaged with the material. You will work through activities carefully designed to lead you to discover fundamental statistical ideas for yourself. You will be encouraged to work collaboratively with a partner on most of these activities, and some will require the use of the computer. My role during class time will be to mill about the classroom, answering your questions and prodding you toward a better understanding of the material. I will also lead class discussions and present explanations where appropriate.

PREREQUISITES:

There are no formal prerequisites for this course. Certainly, no prior knowledge of statistics is expected. The mathematical level of the course is that of intermediate algebra. Although we will use computers, you need not have prior familiarity with them. I will provide you with instructions concerning the use of the computer and the statistical analysis package Minitab. What you **do** need to bring to the course are an open mind for tackling quantitative questions in a conceptual manner and a willingness to participate actively in class.

CONTENT:

- Class 1/2:** SUMMARIZING DATA GRAPHICALLY
A. Introduction
B. Displaying Distributions – Qualitative Variables
C. Displaying Distributions – Quantitative Variables
- Class 2/3:** SUMMARIZING DATA NUMERICALLY
A. Introduction
B. Measuring Centre
C. Measuring Variation or Spread
- Class 4/5:** HOW TO MEASURE UNCERTAINTY WITH PROBABILITY
A. Introduction
B. What is Probability?
C. The Language of Probability

D. Random Variables

Class 5/6: USING MODELS TO MAKE DECISIONS

- A. Modeling Discrete Variables
- B. Modeling Continuous Variables

Class 7/8: MAKING DECISIONS WITH CONFIDENCE (Chapter 10)

- A. Making Decisions- Hypothesis Test about a Population Mean
- B. Making Decisions- Hypothesis Test about a Population Proportion
- C. Confidence Interval for a Mean
- D. Confidence Interval for a Proportion

Class 9: RRGRESSION ANALYSIS (Chapter 7)

- A. Scatter Plots
- B. Simple Linear Regression
- C. Finding the Least Squares Regression Line
- D. Correlation: How strong is the Linear Relationship?

Class 10: ANALYSIS (Chapter 13)

- A. The Chi – Square Statistic
- B. Test of Goodness of Fit
- C. Review

EVALUATION:

There will be 8 take-home exams, 4 computer problems and a final. The problems on all the exams will be similar to homework problems and problems worked out in class. Of the 8 exams, one with the least score will be dropped. The take-home exams, the computer problems and the final will count as follows towards the final grade.

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| TAKE-HOME: | 50% |
| COMPUTER PROBLEMS | 10% |
| FINAL | 40% |

There will be no make-up exams.

The final grade will be based upon the following distribution.

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| 90 to 100 | A |
| 78 upto 90 | B |
| 65 upto 78 | C |
| 50 up to 65 | D |

Students will be expected to adhere to the University's guidelines on academic integrity found in the Students Handbook.

Top ten suggestions for success in this class

10. Come to class.
9. Ask questions.
8. Use office hours.
7. Don't get behind.
6. Don't get overconfident.
5. Work together.
4. Read carefully.
3. Write well.
2. Have fun!
1. Think!!