Northern Michigan University - Winter 2016
MA 171 – Introduction to Probability and Statistics
Section 01 – 10344
3803 West Science
Mon. and Weds. 5:00 p.m.

Instructor: **Pat Jennings**
Office: *by arrangement*
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Email: **pjenning@nmu.edu**
                   Note: the best way to contact me is by email. Be sure to leave your phone number so that I can call you back

Office Hours: **Mon Weds 6:40 to 7:30** (In the classroom)
                    Other times by appointment

Course Content: The course consists of a study of the methods of elementary probability and statistics. Some time is devoted to finding probabilities for both discrete and continuous probability functions, and discussing the role probability plays in estimation and decision making. The main emphasis of the course, however, is on methods of describing data, finding sampling estimates and testing hypotheses. Throughout the course, applications are stressed as is the interpretation and understanding of the statistics and methods used.

This course satisfies the Formal Communication Studies requirement. This course is designed to introduce students to the ways in which information and ideas are expressed using a communication system other than English. Such courses should foster the student's ability to conceptualize and communicate in an orderly, rational manner. Characteristics of a communication system include: 1) possession of a grammar; 2) operation from an established set of rules; 3) reasoning properties such as deduction, inference drawing and problem solving. This includes courses in languages and those in which the central focus of the course is on statistics, computers or formal logic.

Text: Elementary Statistics, A Step by Step Approach, Sixth Edition, Allan G. Bluman (2010 McGraw Hill)

There is also an optional student manual that you may purchase, but it is not required.

A university issued laptop computer is required. Familiarity with *Microsoft Excel* is required for this course. Basic *Excel* functions that are necessary for this course will be demonstrated in class.

Tutoring: There is *Math Lab* that will be available for tutoring. I will email you the schedule after the semester starts.

Computer: An NMU email account is required. Note that, if you use the NMU web based email, your old messages are deleted periodically. I will be sending you emails periodically throughout the semester so you are responsible for reading your email in a timely manner and saving any important information, such as test answer keys.

I will assume that everyone in the class has an NMU issued Thinkpad, or something equivalent. *You will be required to use Microsoft Excel in this class.* (If you have a Thinkpad, it should already be installed) and you should have the 2007 or 2010 version.

Since Microsoft Excel is widely used in business and industry, we will primarily be using it in this class. You do not need to bring your laptop to every class (except for Chapter Tests), however, I will provide instructions on how to use Excel for certain statistical functions. If you do not bring your laptop to class, you should write down the instruction and then try them on your own after class.

I will email you *Excel* files that are used in class. I suggest that you set up *Microsoft Outlook* to use your NMU email account. (Note that, if you use the default web based email, your messages are automatically deleted after three weeks) I will show you how to set up *Outlook* in class.

Survey: Since this is a course in statistics, we will be using the results of a survey of all of the students in the class (as well as results from previous classes) Please complete the survey and send it back by the end of the first week of class. We will only be using the cumulative results of the survey and none of your individual responses will be used. Instructions on how to complete the survey will be emailed to you.

Prerequisites: MA 103 or MA 104 or MA 111 or satisfactory score on the Math Placement Exam. You should be familiar with basic algebra and graphing a straight line. If you do not feel comfortable in this area, please talk to me on the first day of class.

Grading: Grades will be weighted according to the following:

Chapter Tests	70%
Quizzes	10%
Final Exam	20%

The final grade will be a weighted average of the above corresponding to the following scale:

Grade	Range
A	93 – 100
A-	90 – 92.9
B+	87 – 89.9
B	83 – 86.9
B-	80 – 82.9
C+	77 – 79.9
C	73 – 76.9
C-	70 – 72.9
D+	67 – 69.9
D	60 – 66.9
F	less than 60

There will be no other grades given. Incompletes will be pursuant to University policy.

The final exam is scheduled for **Monday, April 25** at **4:00 pm**

Chapter Tests: All chapter tests will be given during class and you will have an hour to take each test. There will be a minimum of 5 chapter tests, but there may be more, depending on how the class goes. If it turns out that there are more than 5 tests, I will drop the lowest test score.

All chapter tests will be closed book and open notes. You may use only your own notes, now someone else's. You may use your laptop for tests. However, you may only use Excel, TI Interactive, and any documents that I send you by email. You may not use any resources online. Note that for some tests, I will email you a data file before the test.

Quizzes: Quizzes will be given once or twice a week, unannounced, usually spontaneous, and cannot be made up under any circumstances. The easiest way to pass a quiz is to show up in class. If you miss only one or two quizzes, it will not significantly affect your grade, but, missing most of them will. You are encouraged to work with your classmates on the quizzes and I will come around and help you.

Homework: You should work out a substantial number of exercises from the text that pertain to the sections that we are going over. However, textbook exercises will not be collected or graded. I will let you know which section of the text is covered in class, but I will not assign exercises from the text.

If you want me to go over a particular textbook exercise in class, please email me the page, section and exercise number so that I have a chance to review it. I will probably not go over any homework problem unless you email it to me first!

Study Habits   As a general rule, you should spend two hours on homework for every hour that you are in class. (This applies for all courses that you take in college) Since this is a 4 credit hour course, you should spend at least 8 hours per week on reading and homework assignments. If you have had an especially hard time with mathematics in the past, plan on spending at least 12 hours per week for this course.

Budget your time wisely! There is nothing worse than cramming for a test on Friday night when your friends are out having a good time. I recommend that you set a schedule for this course (as well as your other courses) and stick to it. Plan your schedule now.

Attendance: Other than the quiz grades, I will not be taking attendance for this course. Since you are making a financial investment in this course, it is to your advantage to put your best effort into learning the material that is presented by attending class regularly, keeping up with the homework, and asking for help if you do not understand something. If you are not able to attend class due to work commitments, child care, or some other reason, let me know and we can work out some reasonable arrangement.

Academic Honesty: You must do all of your own work. If you cheat, you will not learn the material, and if you get away with passing this course by cheating, you will have a very difficult and frustrating time in your later courses. Also, you will be constantly looking over your shoulder worried about getting caught, and that, in itself is not worth it. If you do get caught cheating on a test or other assignment, you will get an automatic **F** for this course, and you could be subject to other sanctions. This includes having someone else take your online test or plagiarizing the project assignment. The bottom line is, if you cheat, you are really cheating yourself out of time, money, and, possibly, your future career.

Disabilities: If you have a need for disability-related accommodations or services, please inform the Coordinator of Disability Services in the Dean of Students Office at 2001 C. B. Hedgcock Building (227-1700). Reasonable and effective accommodations and services will be provided to students if requests are made in a timely manner, with appropriate documentation, in accordance with federal, state, and University guidelines.

Course
Objectives: The course consists of a study of the methods of elementary probability and statistics. Some time is devoted to finding probabilities for both discrete and continuous probability functions, and discussing the role probability plays in estimation and decision making. The main emphasis of the course, however, is on methods of describing data, finding sampling estimates and testing hypotheses. Throughout the course, applications are stressed as is the interpretation and understanding of the statistics and methods used.

The student will:
• become familiar with basic probability and statistical methodology and terminology;
• learn how to present data graphically and be able to read and interpret such presentations;

• learn how to calculate estimates and other statistics, and interpret and compare statistics;

• find probabilities and understand the role of probability in statistical decision making;

• learn how to test a hypothesis and use statistical procedures to help make decisions; and

• be able to identify an appropriate statistical procedure to use in a given situation and identify when a procedure is improperly used.

Assessment of these course objectives will be through chapter tests, quizzes and the final exam

Course Content

(The numbers below do not necessarily correspond to the chapters in the textbook)

1. Methods for Describing Sets of Data
   o Types of data
   o Graphical methods for describing data
   o Measures of central tendency
   o Measures of variability and relative standing
2. Probability
   o Events, sample spaces and simple probabilities
   o Compound events and rules for calculating their probabilities
   o Conditional probability
3. Discrete Random Variables
   o Probability distributions for discrete random variables

- o Expected values
- o Binomial distribution
4. Continuous Random Variables
    - o Continuous probability distributions
    - o The normal distribution
    - o Approximating a binomial distribution with a normal distribution
5. Sampling Distributions
    - o Sampling distribution
    - o The Central Limit Theorem
6. Estimation and Tests of Hypotheses
    - o Point and confidence interval estimates and tests of hypotheses for:
        - ▪ A population mean: large and small samples
        - ▪ A binomial population proportion
        - ▪ A population variance
    - o Inferences about:
        - ▪ The difference between two means: independent samples
        - ▪ The difference between two means: dependent samples
        - ▪ The difference between two binomial proportions
7. Analysis of Variance
8. The Chi Square Test and Contingency Tables
    - o One dimensional count data
    - o Contingency tables
9. Simple Linear Regression
    - o Least squares model and assumptions
    - o Regression estimates and prediction
    - o Estimating and interpreting correlation
    - o Inferences about the slope and correlation