

**MAT 222, Elementary Probability and Statistics**  
**Fall 2010 (TTH Section)**

**Course Description:** This is the second course in the Probability and Statistics sequence Mat 221-222 designed for most academic majors. Topics to be covered include estimation, hypothesis testing, inferences involving two populations, Chi-square tests, regression analysis, and ANOVA.

**Text:** Introduction to the Practice of Statistics, by David S. Moore and George P. McCabe, 6<sup>th</sup> Edition. Chapters 6 through 13 will be covered.

**Prerequisites:** MAT 221.

**Calculators:** You will need a calculator to do the computations that will arise throughout the course. No specific calculator is required, but the TI 83 graphics calculator is highly recommended.

**Cell Phones:** All electronic devices other than the calculator should be turned off and put away during class. Calculators on cell phones are not to be used on tests or quizzes.

**Homework:** Homework assignments for each chapter are given on the last page of this syllabus. Homework may be collected; details will be announced in class later.

**Computer Lab:** There will be a computer lab session. The time and place of the lab session(s) will be announced in class. MINITAB, a statistical package, will be introduced and computer problems to use MINITAB will be assigned.

**Projects:**

- Each student is required to work on two group projects. The grade for the projects will count for 20% of the final course grade.
- The first project should be on the procedures and methods from Chapters 6 to 9 and the second project on Chapters 10 to 13. You need to use MINITAB for both projects.
- Three to four students will be grouped for each project. The groups for the first project will be formed in class on 9/28. The groups for the second projects will be formed in class on 11/11.
- First group meetings with the instructor for each project will be scheduled for the week of Oct. 4 and Nov. 15, respectively.
- You are responsible for designing the experiments, collecting the data, and analyzing the data using MINITAB. Your written reports on your analyses for each project will be counted 10% toward your final grades.

**Grading:** There will be four tests and no final. Each test will count 20% toward your final grade. The remaining 20% will be based on the two projects. Final grade will be given according to the following scale:

A (93-100)   A- (90-92)   B+ (87-89)   B (83-86)   B- (80-82)  
C+ (77-79)   C (73-76)   C- (70-72)   D (60-69)   F (0-59)

**Academic Honesty:** All cases of academic dishonesty will be reported to the Office of the Dean. There is no tolerance for cheating and other immature and immoral behavior.

**Students with Disabilities:** Students who may need special consideration because of any sort of disability should make an appointment to see the instructor during office hours.

**Instructor and Course Supervisor:** You should inform your instructor of any problems you have with this course. Problems not satisfactorily resolved with your instructor should be brought to the attention of the course supervisor (listed below).

Professor Pinyuen Chen  
229 Physics Building  
443-1577  
email: [pinchen@syr.edu](mailto:pinchen@syr.edu)

**MAT 222 Tentative Schedules (TTh Section)**

	<b>Tuesday</b>		<b>Thursday</b>	
<b>August/September</b>	31	6.1-6.2	2	6.3-6.4
	7	6.4	9	7.1
	14	7.2	16	7.3
	21	Review	23	Test 1
	28	8.1	30	8.2
<b>October</b>	5	9.1	7	9.2
	12	9.3	14	Review
	19	Test 2	21	10.1
	26	10.2	28	11.1
<b>November</b>	2	11.2	4	Review
	9	Test 3	11	12
	16	12	18	13
	23	13	25	Thanksgiving
<b>December</b>	30	Review	2	Test 4
	7	Projects	9	Projects

## **Learning Goals**

Students will be expected to

- 1) use and understand basic mathematical notation;
- 2) select and apply an appropriate mathematical model for certain elementary probabilistic problems;
- 3) do basic hand calculations with accuracy;
- 4) use appropriate hardware and/or software related to certain probability distributions.

## **Academic Integrity**

The Syracuse University Academic Integrity Policy holds students accountable for the integrity of the work they submit. Students should be familiar with the Policy and know that it is their responsibility to learn about instructor and general academic expectations with regard to proper citation of sources in written work. The policy also governs the integrity of work submitted in exams and assignments as well as the veracity of signatures on attendance sheets and other verifications of participation in class activities. Serious sanctions can result from academic dishonesty of any sort.

For more information and the complete policy, see <http://academicintegrity.syr.edu>

## **Disability**

Students who may need academic accommodations due to a disability are encouraged to discuss their needs with the instructor at the beginning of the semester. In order to obtain authorized accommodations, students should be registered with the Office of Disability Services (ODS), 804 University Avenue, Room 309, 315-443-4498 and have an updated accommodation letter for the instructor. Accommodations and related support services such as exam administration are not provided retroactively and must be requested in advance."

For more information about services and policy, see [Office of Disability Services](#)

**Syracuse University**  
**Office of Disability Services**  
**804 University Avenue Room 309**  
**Syracuse, New York 13244-2330**

**Phone: Voice: (315) 443-4498**

**TDD: (315) 443-1371**

**E-Mail: [odssched@syr.edu](mailto:odssched@syr.edu)**

## **Homework Assignments:**

### **Chapter 6**

Section 6.1: 6.10, 6.11, 6.12, 6.13, 6.17, 6.19, 6.25

Section 6.2: 6.53, 6.56, 6.57, 6.58, 6.59, 6.64, 6.65

Section 6.3: 6.95, 6.96

Section 6.4: 6.112, 6.113, 6.114.

### **Chapter 7**

Section 7.1: 7.15, 7.16, 7.17, 7.18, 7.19, 7.20, 7.21, 7.22

Section 7.2: 7.61, 7.62, 7.63, 7.64, 7.65, 7.66, 7.67, 7.68

Section 7.3: 7.98, 7.99, 7.100, 7.101, 7.102, 7.103

### **Chapter 8**

Section 8.1: 8.10, 8.11, 8.12, 8.13, 8.14, 8.15, 8.16, 8.19, 8.20

Section 8.2: 8.41, 8.42, 8.44, 8.45, 8.46, 8.49, 8.50, 8.51, 8.52, 8.53.

### **Chapter 9**

Sections 9.1-9.2: 9.7, 9.10, 9.11, 9.12, 9.17, 9.18, 9.19, 9.20, 9.21, 9.26, 9.27, 9.30, 9.31

Section 9.3: 9.40, 9.41, 9.42, 9.43 (MINITAB), 9.44, 9.45 (MINITAB)

### **Chapter 10**

Sections 10.1 – 10.2: 10.8, 10.9, 10.10 (MINITAB), 10.11, 10.12 (MINITAB), 10.13 (MINITAB), 10.14 (MINITAB), 10.15 (MINITAB), 10.18, 10.44, 10.47, 10.48, 10.49.

### **Chapter 11**

Sections 11.1-11.2: 11.7, 11.8, 11.12, 11.13, 11.14, 11.15, 11.16, 11.19, 11.22 (MINITAB), 11.23 (MINITAB), 11.29 (MINITAB), 11.30 (MINITAB), 11.32 (MINITAB), 11.33 (MINITAB).

### **Chapter 12**

Sections 12.1-12.2: 12.9, 12.10, 12.11, 12.12, 12.15, 12.16, 12.17, 12.23, 10.27, 12.38 (MINITAB), 12.39 (MINITAB), 12.51 (MINITAB), 12.52 (MINITAB)

### **Chapter 13**

Sections 13.1-13.2: 13.3, 13.4, 13.5, 13.6, 13.8, 13.13, 13.31 (MINITAB), 13.32 (MINITAB)

## **Two Projects**

There will be two projects for this course. Each project counts 10% toward your final grade. The class will be grouped into teams and each team should have 3 - 4 members. Students are encouraged to form their own teams. Each team will design, conduct, and analyze an experiment of how the theory and methods discussed in class are put into practice. Basically each team will be given a team grade for the projects. Under unusual situations, students will be given lower or higher grade than his/her teammates.

At first, you need to find your teammates and report to me who are in your team. Each team will be assigned a team number. You should do this by **September 28** for the first project and **November 11** for the second project. For those who do not have a team by then, the instructor will assign you to a team.

Once you have a team, your team should do the project in the following three stages. At the end of each stage, your team should make an appointment with your instructor to brief your project progress.

### **1. Planning Stage:**

This is where most of the actual thinking is done. Here your team should determine what kind of data is to be collected and how it is to be collected. Here you should also consider what specific analyses will be done in order to assure that data gathered are suitable for what you intend to do. As part of the planning phase, it must be determined what tests and estimates are appropriate to address the goal of the experiment. The specific form of the statistics used for testing and estimation usually depends on the distributional characteristics of the data. At this point you should determine precisely what population quantities you wish to estimate and what hypotheses you wish to test. If questionnaires are involved, they should be designed and written in this stage. If quantitative measurements are to be taken, you should know exactly what is to be measured and how the measurements will be taken. It is not easy to collect a truly random sample from a target population. But all statistical procedures we will learn require that the data are a random sample. All population elements must have an equal chance of being included in the sample. For example, standing outside SU Student Center cafeteria on Wednesday afternoon and selecting every tenth person entering will not give a random sample of SU students. Using random number tables and the SU Directory is much better as long as the target population is the full-time SU students.

**Your team should meet with your instructor at least once to discuss your ideas on the project during this stage. A topic should be chosen by your team and be approved by your instructor during this stage by October 8 Friday for the first project and November 19 Friday for the second project. The earlier you form a team, the earlier you can finalize your topic selection.**

### **2. Data Collection Stage:**

This stage is exactly what you might think. The sampling and measurement procedure that was designed in the first stage is actually carried out at this stage.

**Your team should meet with your instructor at least once during this stage. Your instructor will review your data by October 15 Friday for the first project and December 3 Friday for the second project.**

### **3. Data Analysis Stage:**

During this stage the estimates are computed and hypotheses are tested. A project report on the data analysis is written.

**The due day for the project report is October 29 Friday for the first project and December 17 Friday for the second project. All project reports should be submitted to the instructor through email.**

\*\*\* Some possible topics for the project:

1. Relationship between sex and degree of political liberalism or conservatism.
2. Relationship between SAT verbal and math scores and freshman GPA.
3. Health insurance plans that SU students, staff, and faculty participate.
4. SU faculty salary data. (different departments and colleges, different ranks, genders, age groups, ...)
5. Professional and/or college sport (football, basketball) data. For examples, the effectiveness of quarterbacks, the effectiveness of guards, the accuracy of the point spread, ....
6. Pulse rates of SU people (student, faculty, athletes, non-athletes, female, male, different age groups, ...).
7. Popular songs data (airplay time, sales of singles) from the music industry magazine *Billboard*.
8. Relationship between air bags and the types of automobiles.
9. The differences between various strategies for running bases in softball or in baseball.
10. A comparison of the Dow Jones Industrial Average and the S & P 500 index.
11. Volatility of NASDAQ market and NYSE market.
12. A comparison of the performances of stock mutual funds and the market as a whole.
13. The effectiveness of handedness on some capability or physical attribute.
14. Ability of people to estimate a physical quantity.