36-226 **Introduction to Probability and Statistics II** **Spring 2006**

SYLLABUS AND COURSE POLICIES

Instructor:

Oded Meyer
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Office Hours:

Formal hours will be announced soon. In addition, however, I am happy to meet with you whenever I am in my office and available, or by appointment.

Course Web Page:

`http://www.stat.cmu.edu/~meyer/226/`

Teaching Assistants:

Michaela Serban	mserban@stat.cmu.edu
David Salamon	dsalamon@andrew.cmu.edu

(All TA office hours will be held in Student Center 219.
Times - TBA on the course web page)

Lectures:

Monday, Wednesday, and Friday 9:30-10:20, Hamerschlag Hall B131.

Required Text:

Mathematical Statistics with Applications, **6th edition**,
Wackerly, Mendenhall and Scheaffer (required).

Prerequisite:

A solid understanding of calculus.
Successful completion of either 36-225, 36-217, or 21-325.

OVERVIEW

In recent years, the growth of statistics has made itself felt in almost every phase of human activity. Statistics no longer consists merely of the collection of data and their presentation in charts and tables (descriptive statistics) - it is now considered to encompass the science of basing inferences on observed data and the entire problem of *making decisions in the face of uncertainty* (inferential statistics). This covers considerable ground since uncertainties are met when we flip a coin, when a drug company evaluates the efficacy of a new drug, when an actuary determines life expectancy, when a quality control engineer accepts or rejects manufactured products, when a teacher compares the abilities of students, when an economist forecasts market trends, when a newspaper predicts an election, and so forth.

It would be presumptuous to say that statistics, in its present state of development, can handle all situations involving uncertainties, but new techniques are constantly being developed and modern statistics can, at least, provide the framework for looking at these situations in a logical and systematic fashion. In other words, statistics provides the formalisms that are needed to study situations involving uncertainties.

This course, using the probability theory developed in a mathematical probability class, such as36-225, deals with the basic ideas and methods of analyzing data and making inferences about an unkown population based on information contained in a sample. We will study the formalisms behind frequently used statistical methods, and develop a link between statistical theory and practice. In addition, we will emphasize the application of statistical methods and the interpretation and the analysis of data.

OBJECTIVES

1. To introduce the basic ideas and methods that underlie the mathematical theory of statistics.
2. To develop and use methods for summarizing and evaluating numerical data.
3. To develop skills in the applications of statistical methods to problems in the sciences and the social sciences, including specification of models, assessment of model assumptions, and interpretation of results.
4. To learn to use a statistical package, e.g., MINITAB, to analyze data.

LECTURES

Lectures meet Monday Wednesday and Friday in Baker Hall A51. You are strongly encouraged to attend lectures on a regular basis. Note that the lectures will cover some material that **is not covered in the text** (or covered in a slightly different order). Only the **combination** of class lectures, homework sets, in-class exercises and your own reading will give you full exposure to the material and prepare you adequately for examinations.

HANDOUTS

Handouts will be distributed at the entrance to the lecture hall when you enter for class. In case you lose a handout or miss a class extra handouts will be available on the carousel to your **left** as you enter the Baker Hall 132 suite.

HOMEWORK

• Homework will be assigned each Friday (posted on the website by 5:00 PM) and will be **due** the following **Friday BEFORE class starts.**

- Assignments turned in after class starts and before 12 noon will be accepted but will be panelized 15 points.
- Assignments turned in after 12 noon and before 3:30 will not receive any points, but will be corrected in order to give you feedback on your work.
- No assignment will be accepted after 3:30.

• It is OK to discuss assignments with other students **but the written solutions to homework problems must be your own and not copied from someone else.** In order to avoid misunderstandings, you should let us know when you are working with a classmate on a homework assignment. Simply write "Worked with (name)" under your name.

• **You should always show all of your work**. You will not receive credit for simply writing down a numerical answer, even if the calculations seem simple enough to do in your head. Showing the method of solution is as important as the correct answer.

• Assignments are designed to take on average about 6 hours to complete. Please start homeworks early so that you can get help if you need it.

• Your worst homework grade will be dropped before computing your total – this is partly meant to cover cases in which you are too ill, too busy, or too tired to complete the homework. This also covers students who register for the course after the semester has begun. **Note: The last assignment cannot be dropped!**.

• **Solutions** will usually be available at the following lecture or posted on the course web page. The solutions will provide you with examples of what a complete answer should look like. *Read them.*

EXAMS

• There will be TWO MID-TERM EXAMINATIONS. Examinations are **tentatively** scheduled for 7:00–9:00 p.m. on the evening of **Monday, February 20** and for 7:00–9:00 p.m. on the evening of **Monday, April 10**. These examinations will be closed-book-and-closed notes, except that you may use one 8 1/2" by 11" sheet of paper with whatever formulas, facts or explanations you find helpful.

• A student who misses an examination because of a medical reason must provide *documented* evidence of medical incapacitation to Professor Meyer. Other reasons for missing an examination must be discussed with Professor Meyer as soon as possible *before* the day of the examination. Each case will be considered on an individual basis. **There are no make-up exams**.

• There will also be a cumulative FINAL EXAMINATION. The day and time for the final exam are determined by the registrar and can not be changed. **Travel plans for the end of the semester are made at your own risk.**

COURSE GRADE

The lowest homework grade will be dropped. The remaining homework grades will be used to compute your homework average. The homework average will contribute 20% to the course grade. Each midterm will contribute 25% each towards the final grade. The final examination will contribute 30% towards the final grade.

Summary:

Homework	20%
2 midterm exams	25% each
Final Exam	30%

ACADEMIC INTEGRITY

CMU students are expected to follow the ethical guidelines and cheating and plagiarism policies defined in the *Student Handbook* at http://www.heinz.cmu.edu/pdf/handbook/ms01-02.pdf. This material is available in hardcopy and on the CMU web site. Please read it carefully! You will be held accountable for violations of these guidelines and policies that come to my attention. While we encourage you to be helpful to your classmates and to even work together, you must understand that the work you turn in must be your own. Any student who turns in work for credit that is identical, or similar beyond coincidence, to that of another student may face appropriate disciplinary action at the department, college, or university level. *Cheating and/or plagiarism will not be tolerated.*

OFFICE HOURS

The purpose of office hours is to provide you with an opportunity for additional conversation, guidance or help. We look forward to meeting with you and getting to know you during our office hours. Come early with questions and problems. If you wait until the last minute before an assignment is due, you may not get the quality help that you need.
If you have problems related to an assignment, you must come prepared when you seek advice or help from me or the TAs. The more specific your question and the more documentation of your attempted solution the better able we will be to help you. Statements such as "I don't get it" or "I am clueless" are not specific, are not helpful, and do not reflect well on your effort.

REGRADES

• Although we strive for consistency and accuracy in grading, we know that some inter-grader variability is inevitable and that grading mistakes can occur. These mistakes can help you or hurt you. You should focus on the overall quality of your work, and not waste energy in minor grading arguments that ultimately have no significance or material consequences. Since you will be evaluated on your achievements throughout the semester, your overall performance will be accurately assessed.
• We will gladly correct all errors in tabulation or overlooked material.
• Please note that it is not our responsibility to guess your intentions or to imagine how your unstated assumptions, ambiguities or omissions are to be interpreted. We only grade what is given to us; not what is to be inferred or assumed.

• Requests for regrades based solely on your opinion that too many points were deducted for an incorrect answer will not be considered. All assignments and exams are graded using a common grading scheme so that the same number of points are deducted for the same incorrect answer.
• All regrading requests must be accompanied by a **written statement** carefully highlighting and explaining the items you feel were misgraded.
• All regrades requests must be submitted to Prof. Meyer **within one week** of when the assignment or examination is returned.

USE OF EMAIL

• Please be advised that sending email to me or a TA does not shift any responsibility from you to us; you are still responsible for the on–time, high quality completion of assignments.
• Please Do not send complicated HW questions or requests to us via email. These types of communications should be done in person.

STUDY TIPS

1. Read your lecture notes over within 24 hours of lecture (or at least once before the next lecture).
    - Highlight or make marginal notes for important words and concepts. This will help fix ideas and will help you to actively learn the material. This review takes about 20-30 minutes and really yields a large return.
    - Re-do examples yourself, step by step, with pencil and paper. Examples often look easy when explained in class, but often turn out to be much harder when you try them yourself.
    - Write down questions about things you do not understand. Bring these questions to lecture, recitation and to office hours and ask them.
2. **DO HOMEWORK PROBLEMS**. Actively doing problems is the *only* way to learn the material.
    - Start early. Do not leave assignments until the night before they are due.
    - Try doing the problems yourself before discussing them with other people.
3. *Use office hours* productively. Ask thoughtful questions about things that you do not understand.
4. *Review solutions* to assignments and exams. Just because you do not lose points on a homework question does not necessarily mean you fully understand the question and answer.