

Math 448 Introduction to Probability and Statistics II.

Fall 2014

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If you need to reach me, please e-mail qiao@math.binghamton.edu.

Please include [Math448] in the subject line of your email, or your email may not be read promptly.

Prerequisite

Math 447 (grade C or above). Probability is the foundation of statistics. There will be a probability aptitude test (referred to as the PAT below) scheduled on Sept. 15. Please review the materials in Math 447 as early and as thorough as possible. Failure to display adequate aptitude in probability may lead to difficulty in the current course.

Learning Objectives

1. Point estimation, confidence intervals and hypothesis testing.
2. Linear regression model.
3. Basic statistical software - R. Data input and manipulation. Plots. Model and formula. Simulation.

This course is a 4-credit course, which means that students are expected to do at least 12.5 hours of course-related work or activity each week during the semester. This includes scheduled class lecture/discussion meeting times as well as time spent completing assigned readings, studying for tests and examinations, preparing written and computing assignments, and other course-related tasks.

Required Textbook

Mathematical Statistics with Applications (7th ed.) by Wackerly, Mendenhall, and Scheaffer.

- This is the course text. All homework assignments will come from this book.
- A customized soft cover version used at BU is available from the University Bookstore. The custom book and the hardcover book are equivalent for the purpose of this course except that the former is offered at an affordable price, while the complete version may have a higher resell value. Students may choose whichever one to purchase.

In the University Bookstore, the list price for the soft cover version is

\\$167, and for the hard cover version \\$315 (as of 2014). Amazon has the hard cover book at price of \$247. You may also try to rent the textbook from providers such as Amazon.

Online resources for R

1. The Undergraduate Guide to R
2. R tutorial by Kelly Black

Downloads:

- R - mirror hosted at UC Berkeley.
- R Studio - a more user friendly platform for R.

Class Attendance

Attendance is partially mandatory, enforced by the daily quizzes. Following the academic policy listed in the University Bulletin, the instructor will *NOT* grade exams of any student missing more than 25% of the quizzes. The final grade will be an *F* if a student misses more than 25% of the quizzes. See more details in the Grading section below.

For the semester of Fall 2014, missing more than 8 quizzes without an advance notice will lead to an F.

Grading

- Quizzes (including PAT) (32 %), three tests (45 %, with 15% each) and a final exam (23 %).
- There are 31 regular quizzes scheduled, one in each class session. No quiz is scheduled for a class session that is immediate after a test. Each quiz will be graded on the scale from 0 to 10.
- The Probability Aptitude Test (PAT) scheduled on Sept. 15 should be treated as a special “large” quiz and will be graded on the scale from 0 to 40.
- If you miss an exam, test or quiz, your score for that exam, test or quiz will be a zero.
- The lowest three **regular** quiz grades will be dropped when the final total grade is calculated. Hence only 28 out of the 31 quizzes are counted.
- In addition, three waivers can be granted for absences from quiz **only** with an advance notice. You may use them for interviews, sickness, or personal affairs. No proof is needed to request a waiver. You may include expressions such as [waiver], [absence] or [immunity] in the subject of the email so that your request can be noted properly.
- **Bonus points:** If a student finishes all the quizzes (after excluding up to 3 waivers), 15 bonus points will be added to his/her grade.
- **Bonus points:** If a student finishes all but one quiz (after excluding up to 3 waivers), 5 bonus points will be added to his/her grade.

- Waivers are used for the sole purpose of determining the eligibility of the bonus points. Please distinguish it from the "dropping the three lowest grades" rule. For examples,
 1. Student A has missed three quizzes but she has requested three waivers. As she has finished all but the three quizzes that she requested waivers, she will get the 15 bonus points. The grades for the quizzes that she missed will be zero. But since the three lowest quiz grades are dropped, her grade will not be negatively affected.
 2. Student B has two quizzes missing and he did not request any waiver. The two zeros will be dropped anyway, along with the lower grades for the quizzes that he took. But he will not receive the 15 or 5 bonus points.
 3. Student C has seven quizzes missing and she requested three waivers. She will not receive bonus points. Three of the zeros will be dropped. But there are still four zeros what will go to her final grade. In this case, whether she requested waivers at all does not make any practical difference since either way she cannot get the bonus points.
 4. Student D has missed 12 quizzes. Whether or not he has requested waivers for these absences, he will receive an *F* in the course because he missed more than 25% of the quizzes.

| Components | Dates | Points | Time allowed |
|---------------------------------|----------|-------------|------------------------------|
| Quiz | Daily | 280 | 10 minutes/day * (31-3) days |
| Probability Aptitude Test (PAT) | Sept. 15 | 40 | 40 minutes |
| Test 1 | Sept. 29 | 150 | 90 minutes |
| Test 2 | Oct. 24 | 150 | 90 minutes |
| Test 3 | Nov. 17 | 150 | 90 minutes |
| Exam | Dec. 15 | 230 | 120 minutes |
| TOTAL | | 1000 | |

Dates for Quizzes, Tests and Exam

| <i>Monday</i> | <i>Wednesday</i> | <i>Friday</i> |
|--|------------------|---------------------|
| | 9/3 | 9/5 |
| 9/8 | 9/10 | 9/12 |
| <u>9/15 PAT</u> | 9/17 | 9/19 |
| 9/22 | 9/24 | 9/26 |
| <u>9/29 Test 1</u> | 10/1 | 10/3 |
| 10/6 | 10/8 | 10/10 |
| 10/13 | 10/15 | 10/17 |
| 10/20 | 10/22 | <u>10/24 Test 2</u> |
| 10/27 | 10/29 | 10/31 |
| 11/3 | 11/5 | 11/7 |
| 11/10 | 11/12 | 11/14 |
| <u>11/17 Test 3</u> | 11/19 | 11/21 |
| 11/24 | 11/26 | 11/28 |
| 12/1 | 12/3 | 12/5 |
| 12/8 | 12/10 | 12/12 |
| <u>12/15 final exam</u> 12:50-14:50 at SW321 | | |

- Regular quizzes: dates in bold-face.
- PAT, Tests & Exam: dates underscored.
- No class: dates stroke-through.

Homework Assignment

- Homework will be assigned after each class session and be posted at <http://blackboard.binghamton.edu/>.
- Homework assignments will **not** be collected. Students are welcome to discuss the homework with the instructor during office hours. There is a solution manual on the market which provides detailed solutions to half of the questions.

Quiz

- Quizzes will be given at the end of a class session.
- Quiz problems are chosen from previous homework assignments either in exactly same forms or with some modifications. It is highly recommended that a student finishes homework by him- or herself.
- Quizzes are always **closed-booked**.
- No make-up is given for quizzes.

Some Deadlines

- Sept. 12: Course add and drop/delete deadline.
- Oct. 31: Course withdraw/change grade option deadline.

Note that a “Pass” grade in the “Pass/Fail” grade option does not count toward math degrees. If you are a math major, it is not advised to change the grade option to “Pass/Fail” unless you are ready to retake the course at a later time.

Make-ups

If you need to take a make-up, if possible, an advance request should be given. Checkable written proof to justify the request should be given.

In order to minimize the need for make-up exams and the stress of dealing with multiple exams, within the first two weeks of the semester, all students must check the exam schedules of other courses they are taking and make sure that there is no major conflict. The exam dates may be changed accordingly only if the instructor determines necessary.

Academic Dishonesty

Students found cheating will be reported to the Provost Office following the academic procedure listed in the University Bulletin. Laptop and electrical communication devices cannot be used in a quiz, test or exam. Calculator in a cellphone cannot be used. Calculators are in general not allowed.

Calculators are in general not allowed. If you are used to using calculators, you should practice on homework problems without using a calculator.

Disciplines

No laptop usage in classroom. Text messaging should be minimal. Late arrivals, early departures, cell phone conversations, eating and drinking, etc., are inappropriate behaviors. According to the Faculty-Staff Handbook, the instructor may ask those who, in the instructor's judgment, have seriously impaired the class's ability to achieve the objectiveness of the course, to leave the classroom.



Video



Video

How to succeed in this course

1. Read the book once, **before** class!
2. Do not try to study by reading the book many times. Come to the class and listen to the lecture. Be proactive in class. Ask 'why?'. Focus on the motivations.
3. Don't solve a question by matching it to a formula in your memory. To understand statistical procedures is much easier than to memorize (and search for) these formulas.
4. Do practice more on probability skills. You need them.
5. Don't be ashamed for low quiz grades. To be challenged is part of the life and is a very good way of study.
6. Do not skip class! You may never be able to make it up. The nature of the course decides that materials are built one upon another.
7. This is not a "read the book three times the night before the exam \Rightarrow get an A" class.

From:

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