

# Math 448 Mathematical Statistics.

## Fall 2015

	Section 01	Section 02
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<b>Meeting time:</b>	MWF 8:00-9:30	
<b>Location:</b>	LH 003	FA 246
<b>Office hours:</b>	MW 3:00-4:00 F 10:00-11:00	MW 3:30-5:00

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

## Prerequisites

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Math 447 with a grade of C or better. Probability is the foundation of developing statistical inference. There will be a *probability aptitude test* (referred to as the PAT below) at the beginning of the course. Please review materials in Math 447 as early and as thoroughly as possible, especially if you took Math 447 semesters ago. Lack of aptitude in probability may increase the difficulty in the current course.

## Learning Objectives

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1. Understand the fundamental idea of statistical inference; conduct standard inferences including point estimation, confidence interval and hypothesis testing.
2. Derive, evaluate and compare point estimators and confidence intervals. Apply statistical inference to simple linear regression models.
3. Use statistical software (R) to manipulate data, conduct simple statistical inferences, conduct simple linear regression analyses, simulate data, etc.

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

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

- This is the course text. Most if not 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 USD, and for the hard cover version 315 USD (as of 2014). Amazon has the hard cover book at price of 247 USD. You may also try to rent the textbook from providers such as Amazon.

## Online resources for R

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R is chosen to be the statistical software used in the current course. There are many online resources where the students can learn the basics of R.

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

Please install R before the beginning of the semester. In addition to R, some may find RStudio to be handy.

Downloads:

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

## Computing Homework

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- [Computing Homework Assignments!](#)
- [\(Archive\) Solution for Math 448 Computing Homework \(Fall 2015\)](#)

## Grading

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Components	Dates	Points	Time allowed
Quiz & homework	Daily	200	Quiz: 10-20 minutes/day if given
Probability Aptitude Test (PAT)	Sep 09	40	40 minutes
Software assignments		40	
Test 1	Oct 2	160	90 minutes
Test 2	Oct 26	160	90 minutes

Test 3	Nov 23	160	90 minutes
Exam	TBD	240	120 minutes
<b>TOTAL</b>		<b>1000</b>	
* Attendance Bonus		5-20	
* Missing more than 12 classes (including three waivers)		<b>F</b>	

## Quiz and homework

At the end of each class session, the instructor can choose to administer a quiz or to collect the homework assigned at the last class session.

1. All problems in the quiz will be graded.
2. When homework is collected, the instructor will check whether all the problems have been finished. The instructor may choose to randomly grade a subset of problems for the whole or a subset of the student body.
3. A score between 1 to 10 will be given to each quiz or collected homework in each class session.
4. The lowest three scores among all scores over the semester will be dropped when the final grade for the quiz/homework component is calculated.
5. All the scores will be posted at the blackboard.
6. No make-up shall be arranged for quizzes.
7. A student who did not take the quiz or submitted the homework will receive 0 for the date. This is counted as an *absence*. See [Class Attendance](#) below.

## Attendance Bonus

Attendance is partially mandatory, enforced by the daily quiz/homework. Full attendance will be rewarded as follows:

- Up to three waivers can be granted only if the student gives advance notice. The student needs to send an email to the instructor with the date that an absence is expected. No reason or proof is needed. The waivers are intended for the students to attend job interviews and other matters.
- 20 bonus points will be added if the student has attended all the class sessions (except those that are waived).
- 10 bonus points will be added if the student has attended all but one class sessions (except those that are waived).
- 5 bonus points will be added if the student has attended all but two class sessions (except those that are waived).

## Class Attendance

Following the academic policy listed in the University Bulletin and the faculty-staff handbook, the instructor will *NOT* grade exams of any student missing more than 25% of the quiz/homework. The final grade will be an *F* if a student misses more than 25% of the quiz/homework. In particular, faculty-staff handbook, VII.B.2. stipulates that

instructors have the right to deny a student the privilege of taking the final examination or of receiving credit for the course, or may prescribe other academic penalties if the student misses more than 25 percent of the total class sessions. Excessive tardiness may count as absence.

For Fall 2015, missing 12 classes will lead to an F.

## Calendar

Week	Monday	Wednesday	Friday
1	Aug-31	Sep-02	Sep-04
2	Sep-07	Sep-09: PAT	Sep-11
3	Sep-14	Sep-16	Sep-18
4	Sep-21	Sep-23	Sep-25
5	Sep-28	Sep-30	Oct-02: Test 1
6	Oct-05	Oct-07	Oct-09
7	Oct-12	Oct-14	Oct-16
8	Oct-19	Oct-21	Oct-23
9	Oct-26	Oct-28: Test 2	Oct-30
10	Nov-02	Nov-04	Nov-06
11	Nov-09	Nov-11	Nov-13
12	Nov-16	Nov-18	Nov-20
13	Nov-23: Test 3	Nov-25	Nov-27
14	Nov-30	Dec-02	Dec-04
15	Dec-07	Dec-09	Dec-11
16	Dec-14		

42 class sessions (39 regular sessions + 3 full exam sessions) \* 1.5 hours = 63 hours.

- Sep 11: Course add and drop/delete deadline.
- Oct 30: 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

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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 allowed for quizzes and tests.

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## Disciplines

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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.

## How to succeed in this course

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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. 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. Too many easy materials make people boring.
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.

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