STAT GU4203 Probability Theory
Sections 006 Syllabus – Fall 2015

Syllabus is subject to change. Make sure you have the latest version. You can always find the most current version on CourseWorks.

Instructor: Dr. Banu Baydil
E-mail: bb2717@columbia.edu . Imperative: Use the subject STAT GU4203 in all your e-mails, otherwise delays in response/no response is possible. (E-mail is monitored Monday through Friday 7:30am - 8:30pm and is answered on a first come first serve basis.)

E-mails with questions whose answers can be found in the syllabus or in the sent CourseWorks announcements will not be answered individually. If multiple students ask the same question, an announcement through Courseworks will be sent in place of individual responses.

Lectures: Attendance is mandatory. For lecture times and location see
http://www.columbia.edu/cu/bulletin/uwb/sel/STAT_Fall2016.html

Instructor Office Hours &Location: MW 8:55pm-9:30pm, 310 Fayerweather

Course TA, Office Hours &Location:
Bridget Lynn Ratcliffe, blr2147@columbia.edu
T 12:00pm-2:00pm, W 3:00pm-5:00pm SSW (School of Social Work) 10th floor (Statistics Dept.) lounge/Room1025 (check both), SSW is on Amsterdam Avenue, between 121st and 122nd streets.

Required Text Books: Probability and Statistics, Fourth Edition, M. H. DeGroot and M. J. Schervish, Publisher: Pearson (2012), (ISBN-13) 978-0321500465.
Note: Many suggested problems will be drawn from this text, so the correct edition is required.
+ Material covered in class (which might not necessarily be in the slides posted).

For students not familiar with the material on part 1 of the pre-course assessment: Probability and Statistics for Engineering and the Sciences. 9th Edition. By Jay L. Devore. ISBN: 1305251806. Chapters 1-5. A copy of the 9th edition is made available on Mathematics Library reserve.

Prerequisites: This course assumes that you have a working knowledge of Calculus (single and multi-variable).

Course Description: A calculus-based introduction to probability theory. A quick review of multivariate calculus is provided. Topics covered include random variables, conditional probability, expectation, independence, Bayes' rule, important distributions, joint distributions, moment generating functions, central limit theorem, laws of large numbers and Markov's inequality.

Assessment Measures:

1) <u>Exams</u>**:** Two exams (including the final) will be administered. The exams will cover material from the beginning of the semester. All material covered will have equal weight in the final exam.
Some of the questions in the exams will be chosen from the exercises in the book, in suggested problems and worksheets. You can take a one-side hand-written notes on a 8in x 11in page during the exams.
Exams are scored out of 100 points, however they might contain extra credit problems.
Midterm exam will count towards 35% and final exam will cover towards 45% of your final grade.

> Exam Dates: Wednesday, October 5, 2016, in class.
> Wednesday, October 19, 2016, in class.

Make-up policy for all the exams: : If you have a valid document such as a doctor's report for missing the midterm exam or an official excuse from the school, your final exam score will also count for the missed midterm exam.

Taking the final exam is mandatory, and failing to do so, might lead to a failing grade.

- Grade appeals: Grade appeals can be made to your TA, during TA office hours, within a week after the exams are handed back in class. The exams are graded based on a structured grading rubric. You are encouraged to go over your mistakes and clarify with the TA any grading issues that might arise, as well as any points that might be raised on your exam sheet. A word of caution: Exams might be scanned before they are given back to the students.

These exams will help you improve your ability in remembering, understanding, applying and analyzing factual, conceptual and procedural knowledge of the material covered in the lectures over the semester.

How to prepare best for the exams: The more exercises you solve, the more likely you are to succeed in the exams. Statistics is learned by doing and not just by reading. A word of advice is to start working at first on simpler problems, like a warm-up exercise you would do before going out for running, and then working your way through more advanced problems in the book. As you work through the concepts/methods/techniques think about how you would refer to/describe that concept/method/technique when talking to someone without using the given name of that concept/method/technique. Also think about how that concept/method/technique can be used in your field of study and major.

2) <u>Homework</u>: There will be assigned suggested problems, however they will not be collected. Solutions will be posted periodically, and it's your responsibility to practice these problems in a timely manner, check your answers and meet with the course TA to clarify any questions you might have.

3) <u>Attendance</u>: **Attendance is required** for the lectures. From time to time there will be unannounced/ announced in class work/quizzes given and attendance will be taken during the lecture. From time to time, you will need to complete JiTT's (Just-in Time Teaching activity) before lectures. Each one of these is likely to take around 15-20 minutes. The total of all these participation activities will make 20% of your grade. There will be no make-ups or excused absences for missing in class work/quizzes/ attendance or JiTT's. However, you can miss one lecture due to unexpected circumstances without penalty.

4) <u>Final Letter Grade</u>: Catalog ranges will be used. The instructor reserves the right to change the cut-offs for grade distribution based on the overall average of the class.

Use of Technology in the Course: CourseWorks Online Course System
Class announcements will be made in CourseWorks. You are expected to check CourseWorks course page regularly. A copy of the most recently updated syllabus will be on CourseWorks. Occasionally, there will be other course related handouts posted in CourseWorks. Lecture slides will be posted on Courseworks, however, blackboard lectures will not be posted on Courseworks.

Students with learning disabilities, test or math/statistics anxiety: If you have a learning disability, contact the instructor as early as possible. If you have any extenuating circumstances at any time during the course, contact the instructor as early as possible. Before bringing the disability forms for signature, make sure all information is filled in INK, such as: Your name/Uni/Phone Number, Course Name/Course Number/Section Number/, instructors name, TA Name/e-mail, exam dates/start times.

Academic Dishonesty: Cheating in any form is unacceptable. Standard school policies will be enforced in the case any student is caught cheating. In addition, if you get caught cheating during an exam, you get a score of zero from that exam and are strongly encouraged to withdraw from the course. You are encouraged to check The Columbia University Undergraduate Guide to Academic Integrity at https://www.college.columbia.edu/academics/academicintegrity

How to get the best out of this course in general:
Do not miss the first 5 and the last 5-10 minutes of the lectures.
Try in general not to miss any of the lectures.
Briefly read through the material to be covered during the next lecture in advance, ask questions during the lectures if you don't understand something.
At the end of each lecture write down one thing you've learned during that lecture, one question you still have in your mind about the material covered during that lecture and one thing you need to see covered before the exam. Share your reflection with the instructor and if you feel comfortable share your reflection with your classmates before and after the lectures and/or outside the classroom.
Solve regularly at varying levels of difficulty as many problems as you can.

Tentative Schedule:

Week 1	Chapter 1	Intro to Probability
Week 2	Chapters 1-2	Intro to Probability & Conditional Probability
Week 3	Chapters 2-3	Conditional Probability & Random Variables/Distributions
Week 4	Chapters 3-4	Random Variables/Distributions & Expectation
Week 5	Chapters 4-5	Expectation & Special Distributions
Week 6	Chapters 5-6	Special Distributions and Large Random Samples
Week 7	Chapters 6 &12	Large Random Samples & Simulations
Week 8	Chapter 12	Simulations