PSTAT 120A. Probability and Statistics I  
UC Santa Barbara. Winter Quarter 2016

**Instructor:** Andrey Sarantsev  
**Time and Place:** 9:30am-10:45am Monday, Wednesday, Isla Vista Theater 2  
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**Office:** South Hall (SH) 5501  
**Office Hours:** 2:00pm-3:00pm Monday, 1:00pm-4:00pm Tuesday

**Teaching Assistant:** Bret Holladay  
**Section 43547:** 11:00am-11:50am Tuesday, Humanities and Social Sciences Building (HSSB) 1214  
**Section 43554:** 12:00pm-12:50pm Tuesday, Girvetz Hall (GIRV) 2112  
**E-mail:** holladay@pstat.ucsb.edu  
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**Office Hours:** 3:00-4:00pm Monday, 1:00pm-2:00pm Thursday

**Teaching Assistant:** Javier Zapata  
**Section 43562:** 1:00pm-1:50pm Monday, Girvetz Hall (GIRV) 2115  
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**Office:** South Hall (SH) 5431Q  
**Office Hours:** 11:00am-12:00pm Monday

**Teaching Assistant:** Shuyan Dong (Annie)  
**Section 43570:** 3:00pm-3:50pm Tuesday, Humanities and Social Sciences Building (HSSB) 1227  
**E-mail:** dong@pstat.ucsb.edu  
**Office:** South Hall (SH) 5432S  
**Office Hours:** 4:00pm-5:00pm Tuesday

**Teaching Assistant:** Katherine Ozorio  
**Section 72363:** 9:00am-9:50am Tuesday, Humanities and Social Sciences Building (HSSB) 1223  
**E-mail:** katherineozorio@pstat.ucsb.edu  
**Office:** South Hall (SH) 5432W  
**Office Hours:** 5:00pm-6:00pm Tuesday

**Syllabus.** This course covers foundations of Probability.

1. Combinatorics: permutations, arrangements, binomial coefficients and their properties; Pascal’s triangle  
3. Conditional probability and Bayes’ formula  
4. Discrete and continuous random variables: expectation, variance, distribution  
5. Common discrete and continuous distributions: Bernoulli, binomial, Poisson, geometric, negative binomial, normal, exponential, uniform  
6. Central Limit Theorem and applications  
7. Markov’s and Chebyshev’s inequalities. Law of Large Numbers  
8. Generating functions and moment generating functions  
9. Basic statistics: estimation, confidence intervals, hypotheses testing, Bayesian statistics
Prerequisites. Calculus (including multivariable calculus).

Textbook. The official textbook for this course is Jim Pitman, *Probability*. However, homework assignments will not contain references to this book.

Homework. Each homework assignment is due on Wednesday, starting from the second week. Late homework will not be accepted for any reason. There are 7 assignments, in weeks 2, 3, 5, 6, 8, 9, 10. It should be hand-written. Each assignment will be graded and returned to you within a week on your section. Some homework assignments also contain Python problems. Instructions on how to use Python are available on Gauchospace.

Midterms and the Final Exam. There are two midterms, on Wednesday lectures in weeks 4 and 7 (January 27 and February 17). They are cumulative. The Final Exam is on Wednesday, March 16, 8:00-11:00am. This exam is also cumulative (covers all course). You can have a standard note sheet: 8.5x11 inches, handwritten, two-sided. You do not need to submit it after the midterm. You will need a calculator: TI-30XIIS. Each midterm will be handed back to you on the next section. Re-grade requests can be made during the following week. The final will be graded during the break and will be available from the beginning of the Spring Quarter.

Grading Scheme. It is preliminary and is subject to change. The class will be graded in relative terms, not on the absolute scale. You are allowed to drop one homework assignment.

- 15% all homeworks together (except the dropped one)
- 25% each midterm
- 35% Final Exam

Make-Ups. Late homework will not be accepted for any reason. In case of observance of religious holidays or participation in UCSB-sponsored activities, arrangements must be made at least 2 days in advance for and exams. You will be required to provide documentation for your absence. Make-up exams will not be given. If you miss an exam due to unavoidable, compelling, and well-documented circumstances, your other exams will be weighted more heavily.

Registration. Please ask your TAs and Sarah Anderson, South Hall (SH) 5607A. Also, please email me (with your student ID) and then I will temporarily add you to Gauchospace. The place in the class is not guaranteed.

Class Philosophy. There are two vital rules for success in this classroom.

1. THE HOMEWORK IS THE KEY. In mathematics, breakthroughs in learning rarely occur while reading the text or attending lecture. Mathematics is truly learned when you completely solve a problem yourself and understand the underlying concepts and tools so as to be able to apply them to related problems. The lecture, tutorial sessions, and office hours are valuable tools in guiding you towards learning and discovery, but ultimately the concepts and solutions must be absorbed, understood, and applied by you alone. Treat each problem as an exam question and ask yourself, ”Can I answer this question without any help and do I understand the underlying principles that this problem conveys?” If your answer is no to either of these question (or if you hesitate at all), then you need more studying and practice.

2. ASK FOR HELP. Many students will hit a wall at some point during the course. Some cant handle the large workload, while others find difficulty with specific concepts in the course. When these times arrive remember to ask for help. Come to the instructor’s or TA’s office hours, ask your classmates for help, and/or visit the student counseling center. You can also send me emails; I usually answer them quickly. You are never more than a step away from getting help. These are just a few of your options. Please find help earlier rather than later.