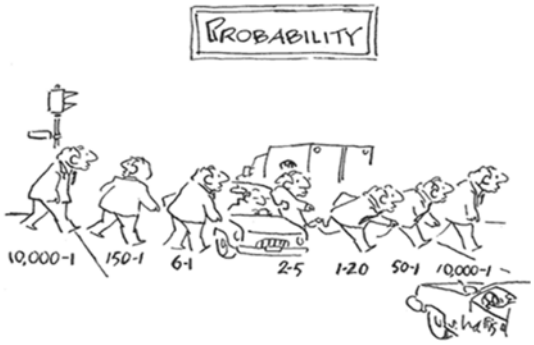
Math 163 Probability Theory

TR 12noon – 1:15pm (Sec 2), MQH 424
San Jose State University
Fall 2016



Instructor: Guangliang Chen
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Office hours: 2:30-4pm TR & by appointment
CANVAS: Homework/test scores and course-related documents are all posted in this site; please check regularly and let me know asap if there is any error in your record.

Catalog description
A 3-unit course covering the following topics: *probability axioms; random variables; discrete and continuous density/distribution functions; binomial, geometric, Poisson, gamma and normal probability laws; mathematical expectations, moment generating functions; limit theorems.*

- **Prerequisites:** Math 32 and Math 161A (with a grade of "C-" or better).
- **Technology requirement:** A scientific calculator is needed for some of the homework assignments (but not needed/allowed during exams).

Course learning outcomes
Upon successful completion of this course, students will be able to:

1. Gain in-depth understanding of all the fundamental concepts and results about probability
2. Demonstrate ability to state a problem accurately, articulate assumptions, and describe a method of solution.
3. Demonstrate ability to conduct independent investigation of mathematical concepts at the undergraduate level.
4. Demonstrate ability to extract relevant information from a practical problem and give a mathematical formulation of the problem.

Further, students should be fully prepared to take the first actuarial exam. Example exams may be found at http://www.beanactuary.org/exams/exam_sample.cfm. Interested students should be encouraged to register to take the exam which takes place shortly after the end of this course, which thus requires registration for the exam well before the end of the course. Further information on the exam and registration information may be found at http://www.beanactuary.org/exams/cbt.cfm. It is the experience of those who have taught this course that students earning an A/A- virtually always receive a passing score on the first actuarial exam, students earning a B/B+ often/usually pass the exam, and those with lower grades rarely pass the exam.

Required text and optional further readings

- **Textbook**: *A first course in probability*, 9th edition, Ross (2012). However, you may use an older version of the textbook for reading as long as you do the homework based on the 9th edition.
- **Further reading**: *Introduction to probability theory*, Hoel, Port & Stone (1972)

Course requirements and assignments
Weekly homework assignments, with their due dates, will be regularly posted on Canvas.

There will be two in-class midterm exams and a final exam (all in this classroom):

- **Midterm exam 1** (covering Chapters 1-3): Tuesday, September 27 (tentative date).
- **Midterm exam 2** (covering Chapters 4-6): Tuesday, November 8 (tentative date).
- **Final exam** (comprehensive): Dec. 19, Monday, 9:45am-noon (fixed by SJSU).

The exams are all closed-book and closed-notes, and no calculator will be allowed. Before each exam, a review sheet along with a list of practice problems or an old exam will be provided for you to practice, but the exams will be lecture-based. (Think of the lectures as the ``population'' while the practice problems represent only a random sample).

The scales used in this course will be as follows:

- Homework: 30 (15%)
- Midterm 1: 50 (25%)
- Midterm 2: 50 (25%)
- Final: 70 (35%)

Thus, the maximum possible total score is 200.

Grading Information

You may collaborate on homework but you must write independent solutions. Identical work will be treated as cheating and will result in a zero score for the homework (minimal penalty), and is subject to additional disciplinary actions from the University.

Late homework will not be accepted, however, your lowest score will be dropped.

No make-up exams will be given if you miss a midterm exam. If you have a legitimate excuse (e.g., illness or other personal emergencies), *with documented proof*, the weight of the exam will be incorporated into the final (i.e. your final will be counted 60% of your course grade).

You must show all your work for both homework and tests. Note that it is your work (in terms of correctness, completeness, and clarity), not just your answer, that is graded. Thus, correct answers with no or poorly written supporting steps may receive very little credit.

Extra credit may be earned several times during the semester, in different forms such as in-class group activity and bonus question on exams, at the instructor's discretion.

I expect to use the following cutoffs for assigning your course grade (but I may slightly adjust these percentages in order to better reflect the actual distribution of the class in the end):

- A+: >96%, A: 93-96%, A-: 89-92%
- B+: 85-88%, B: 80-84%, B-: 75-79%
- C+: 70-74%, C: 65-69%, C-: 60-64%
- D: 55-59%, F: <55%

Your responsibilities in learning

My duty as an instructor is to *disseminate knowledge* while being a *facilitator* to assist you learn in all possible ways. The ultimate responsibility of learning is upon the student, not on the instructor. That is, you must be an *active learner*, which means that you should

- **Attend all classes**: Class attendance is often strongly associated with course grade. If you stop coming to class or miss even a few classes, you will very likely receive a low grade, if not failing the course, in the end. Attendance, though not counted in the grade calculations, will be checked about once a week throughout the semester by the instructor to monitor attendance and identify struggling students.

- **Participate in-class discussions**: These are good opportunities to learn from different perspectives and gain a deeper understanding of the new concepts.
- **Read the textbook**: This is expected and can be highly beneficial to your learning. I use the textbook to supplement my lectures. It contains many details and good examples that cannot be covered in limited class time but often can help you better understand the material. Additionally, some assigned problems may require you to read certain parts of the textbook not covered in class.
- **Take time to think through the concepts:** This is a critical step in the learning process. Few people could fully understand all the new material being taught during lectures; some further thinking is always required outside class time.
- **Do your homework:** This is a good chance to check your understanding of the new material and practice. Most students will learn a lot better after they do the homework.
- **Ask whenever you don't understand something!!!**

Overall, you are expected to spend at least **6 hours** outside class time per week on this course.

Classroom protocol

- The class starts on time, so do not be late.
- If you miss a class, you are responsible for finding out what's said/done in that class (such as new announcement, deadline change, etc.) and responding accordingly.
- Please make sure to turn off or mute your cell phone during class.
- Please do not perform irrelevant or distracting activities in class.
- Academic dishonesty at any level is not tolerated and will be surely reported.

University policies

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs' Syllabus Information web page at http://www.sjsu.edu/gup/syllabusinfo/"

Instructor feedback

I strive to teach in the best ways to facilitate your learning. To achieve this goal, it is very helpful for me to receive timely feedback from you. An anonymous midterm survey will be conducted right after the first midterm exam. Meanwhile, you may use this google form: http://goo.gl/forms/f0wUD5aZSK to submit your immediate feedback anonymously.

The instructor reserves the final right to interpret and make changes to the class policies and schedule that are stated in this course syllabus.

MATH 163: Tentative course schedule

Instructor: Guangliang Chen
Fall 2016, San Jose State University

Note: Homework assignments with due dates will be posted in CANVAS.

Calendar days		Notes	Textbook sections	Topics
Aug. 25	R	First class	Introduction	
30	T		1.1 – 1.4	Chapter 1: Combinatorial Analysis
Sept. 1	R		1.5 – 1.6	
6	T	Last day to withdraw without a W grade	2.1 – 2.4	Chapter 2: Axioms of Probability
8	R		2.5	
13	T		3.1 – 3.2	Chapter 3: Conditional Probability & Independence
15	R		3.3	
20	T		3.4	
22	R		*Buffer*	
27	**T**	**Midterm I**	**(1.1 – 3.4)**	
29	R		4.1, 4.2, 4.10	Chapter 4: Discrete Random Variables
Oct. 4	T		4.3 – 4.5, 4.9	
6	R		4.6 – 4.8	
11	T		5.1 – 5.2	Chapter 5: Continuous Random Variables
13	R		5.3 – 5.5	
18	T		5.6 – 5.7	
20	R		6.1	Chapter 6: Joint Distributions
25	T		6.2 – 6.3	
27	R		6.4 – 6.5	
Nov. 1	T		6.6 – 6.7	
3	R		*Buffer*	
8	**T**	**Midterm II**	**(4.1 – 6.7)**	
10	R		7.1 – 7.2	Chapter 7: Properties of Expectation
15	T		7.3 – 7.4	
17	R	Last day to withdraw	7.5 – 7.6	
22	T		7.7 – 7.8	
~~24~~	~~R~~	~~No class~~	~~Thanksgiving Holiday~~	
29	T		8.1 – 8.2	Chapter 8: Limit Theorems
Dec. 1	R		8.3 – 8.4	
6	T		8.5 – 8.6	
8	R	Last class	*Buffer*	
19	**M**	**Final exam**	**9:45am – noon**	

Total: 30 classes, consisting of 28 lectures and 2 midterm exams.