

Ma 488 ~ Applications of Probability

Spring Semester 2019-2020

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Office Hours: MWF 10-10:50 am; T 2:00-2:50 pm; others by appointment
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Course Website: <https://math.bju.edu/ma488/>

Course Description:

A study of the applications of calculus and probability consistent with the SOA/CAS Exam P/1 syllabus.

Prerequisite: Ma 404 – Probability and Statistics I

Course Context: This course supports the following goals of the actuarial program:

- ASM2: The student will progress logically from premises to valid conclusions in a variety of mathematical and applied contexts including analysis, statistics (both theoretical and applied), probability, and finance.
- AMS3: The student will apply mathematics to actuarial problems (such as financial math and probability modeling) in exercising the biblical mandate to have dominion over the earth.

Course Goals:

- CG1: Introduce the student to the content and style of questions presented on the Probability Exam (Exam P/1). ASM2 and ASM3
- CG2: Prepare the student, including speed and accuracy, to pass the Probability Exam (Exam P/1). ASM2 and ASM3

Course Objectives: The student will be able to

1. Compile necessary study notes to be able to thoroughly prepare for a SOA exam. CG2
2. Determine the appropriate approach for solving problems similar to those given on the Probability Exam (Exam P/1). CG1
3. Complete a practice exam during a three hour period with an acceptable percentage of correct answers. CG2

Course Requirements and Evaluation:

1. The grade in this course will be based on the following (and can be estimated using the Study Log Excel file):
 - a. completion of a study plan/budget – 10% (due on the start of the second class)
 - i. when will the study happen during the week
 - ii. when will you learn new material, when will you review
 - iii. when in the semester will you start taking practice exams
 - iv. how do you plan to be efficient in your study – be specific (time limits, goals, start-up costs, self-imposed pressure, etc.)
 - b. completion of your concept map and study notes – 10%,
 - i. one-page map including all Exam P content
 - ii. more detailed notes per large topic (preferably boiled down to the biggest ideas on one page)
 - c. quality time spent in preparation for the Probability Exam (Exam P/1) – 30%,
 - i. time spent in weekly review
 - ii. time spent on new material
 - iii. time spent on practice problems
 - d. number and accuracy of practice problems completed – 25% and 15% respectively,
 - e. scores on practice exams – 10%.

2. Passing the Probability Exam (Exam P/1) at any point during the semester will immediately result in an A in the course (no other work will be required).

General Policies:

1. You are expected to attend class Thursdays in accordance with University policy. See the student handbook for attendance requirements. Note that missing class does not allow you to not meet your weekly study requirements.
2. You will maintain the study log (see the provided Excel spreadsheet) to document your study efforts, and report on your progress **weekly**. Email a copy of the study log to me before class each Thursday.

Put “Exam P Study Log” in the subject line. I set up a rule that puts these emails directly into a folder that I will review periodically. If you need something else, use a different subject, and I will respond when I can.

3. You may find it beneficial to study together. This can be very valuable for several reasons, and it is highly recommended.

General Guidelines for Actuarial Exams:

Excerpt from <http://www.soa.org/library/newsletters/the-future-actuary/2007/summer/how-to-prepare.aspx> (retrieved August 17, 2011)

“There is no substitute for starting early. No matter how well you have done in your math classes, it is best to start at least eight weeks prior to the P/1 exam. Keep in mind that everyone taking this exam has excelled in mathematics. The exams are very rigorous and are designed to test knowledge of the material at a very high level. That is why the pass rate on this exam typically ranges only in the 30 to 40 percent range.”

Note that in 2012 approximately 42 to 50%, in 2015 approximately 46 to 54%, and in 2019 approximately 43 to 53% of the students completing Exam P passed it.

See *Hints on Study and Exam Techniques* from the CAS (Casualty Actuarial Society) from <http://www.casact.org/admissions/syllabus/index.cfm?fa=hints> (retrieved January 2, 2013)

Textbook: There is no required text for this course. However, you may find it beneficial to acquire any of the texts recommended for the exam (listed below – however, you may find your Prob/Stats or El Stats texts sufficient along with a study guide) or one of the study guides available, which include:

- *A First Course in Probability* (Ninth Edition), 2012, by Ross, S.M., Chapters 1–8.
- *Mathematical Statistics with Applications* (Seventh Edition), 2008, by Wackerly, D., Mendenhall III, W., Scheaffer, R., Chapters 1-7.
- *Probability for Risk Management*, (Second Edition), 2006, by Hassett, M. and Stewart, D., Chapters 1–11.
- *Probability and Statistical Inference* (Eighth Edition), 2009, by Hogg, R.V. and Tanis, E.A., Chapters 1–5.
- *Probability and Statistics with Applications: A Problem Solving Text*, 2010, by Asimow, L. and Maxwell, M.
- *Probability: The Science of Uncertainty with Applications to Investments, Insurance and Engineering* 2009, by Bean, M.A., Chapters 1–9
- *ACTEX P/1 Study Manual* by Samuel A. Broverman, Ph.D., ASA
- *ASM Study Manual for Exam P/Exam 1* by Krzysztof M. Ostaszewski, Ph.D., FSA, CFA, CERA, MAAA

Students in the past have found the Adapt exams at Coaching Actuaries a very helpful resource. (see <https://www.coachingactuaries.com>)

Tentative Schedule: Based on the SOA Exam P/1 Syllabus, subject to change

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|---------------------------------------|---------------------------------|
| • Probability: 2 weeks | • General Review: 2-3 weeks |
| • Univariate Distributions: 2 weeks | • Risk and Insurance: 1-2 weeks |
| • Multivariate Distributions: 4 weeks | • Practice Exams: 2 weeks |