Ma 488 ~ Applications of Probability
Spring Semester 2023-2024

Instructor:	Dr. Melissa Gardenghi
Office:	Alumni 38
Office Hours:	Daily by appointment, see https://calendly.com/mgardeng/20min
Preferred Method of Communication:	MS Teams; personal correspondence by personal chat and general course/content related questions in the course general channel
Email:	mgardeng@bju.edu
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

CG3: Help the student develop a variety of professional behaviors that will enable them to distinguish themselves from their peers.

Course Objectives: The student will be able to

1. Plan/manage exam study 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:
   a. Miscellaneous assignments to develop professionalism – 15% (due as assigned)
   b. Quality time spent in preparation for the exam (computed as quality time = time in # of hrs * quality rating/4; where quality rating is given on a scale of 1 to 4) – 30% (10 hrs = A-, 8 hrs = B-, 6 hrs = C-)
   c. Time spent reviewing previous material – 5% (1 hr = A-, 0.88 hr = B-, 0.75 hr = C-)
   d. Number and accuracy of practice problems completed – 30% (35 = A-, 30 = B-, 20 = C-) and 15% (19 = A-, 15 = B-, 10 = C-) respectively,
   e. Scores on practice exams – 5% (80% = A-, 70% = B-, 50% = C-).
2. Passing the Probability Exam (Exam P/1) at any point during the semester will immediately result in a final grade of 100% for each of the exam related course requirements (time spent studying/reviewing, practice problems/exam). Submit a copy or scan/photo of your passing notification to your instructor to receive full credit. Class attendance is still required unless otherwise indicated by the instructor.

Office Hour Appointments:

Office hour appointments can be made using the Calendly site, https://calendly.com/mgardeng/20min (appointments may be made up to two weeks in advance). If there are no available times at which you able to meet, send Dr. Gardenghi a message including some days/times between 7:30am and 3pm when you are available.

General Policies:

1. You are expected to attend class in accordance with University policy. See the student handbook for attendance requirements. Note that missing class does not impact your weekly study requirements.
2. You will maintain the study log (see the provided Excel spreadsheet) to document your study efforts. You will post the Excel file (and keep it updated) in your personal Exam Prep MS Teams channel, so that I can keep track your progress.
3. You are expected to come to class each week with questions and/or problems with which you struggled.
4. You may find it beneficial to study together. This can be very valuable and 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%, in 2019 approximately 43 to 53%, and in 2023 approximately 51 to 56% of the students completing Exam P passed it. See https://www.actuarial-lookup.com/exams/p for additional information on pass rates.

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 (or you may find your Prob/Stats text sufficient along with a study guide) or one of the study guides available. Students in the past have found the Adapt exams at Coaching Actuaries a very helpful resource (see https://www.coachingactuaries.com and your instructor's email). Completion of practice problems on Coaching Actuaries is expected as part of your study. See the email from your instructor for free access to Coaching Actuaries problems and discounted access to other resources.

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

- Probability: 2 weeks
- Univariate Distributions: 2-3 weeks
- Multivariate Distributions: 4-5 weeks
- General Review: 2-3 weeks
- Practice Exams: 2 weeks