

Colorado State University
College of Natural Sciences
Department of Mathematics
MATH 495—Independent Study—Preparation for SOA Exam P

Instructor: Mr. Zach Meier, F.S.A.
Classroom: Live Zoom Link
Class Time: Thursdays 6:00-7:50pm
Office Hours: Thursdays 5:30-6:00pm and 7:50-8:45pm
E-Mail: zachjmeier@yahoo.com

Zoom Link:

Please join the personal Zoom room at the specified class time. The link should be consistent each week, but if not, I will send an email each week with the updated link.

Join Zoom Meeting
<https://zoom.us/j/9172061528>

Meeting ID: 917 206 1528
One tap mobile
+17193594580,,9172061528# US
+13462487799,,9172061528# US (Houston)

Required Text and Sample Problems:

- Meier, Zachariah J. *FCT Manual for Exam P/1, 4th Edition*.
I will email you an electronic copy of the text. Feel free to print it off on your own.

Sample Problems:

- We will extensively use the SOA Sample Problems for Exam P. The ~446 problems and solutions are located near the bottom of Page 7 of the May 2024 syllabus located on the following webpage:

<https://www.soa.org/education/exam-req/edu-exam-p-detail/study/>

I would suggest saving the Sample Questions and Solutions on your home computer and/or flash drive, so that you don't have to get on the internet each time you want to access them.

Required Calculator:

The SOA has approved only the following calculators for their exams: TI BA-35, BA II Plus, BA II Plus Professional Edition, TI-30Xa, TI-30X II (IIS solar or IIB battery), or TI-30XS Multiview (or XB battery). You must have one of these calculators for the quizzes and exams in this MATH 495 class. You may NOT use a graphing calculator in this class or on the actual Exam P. Many of my former students have recommended the TI-30X II and/or TI-30XS Multiview. I used the BA II Plus for all of my exams and you will be required to use the calculator for FIN 300 anyway. You are welcome to use any of the approved calculators in this course and on Exam P, and you may use more than one.

Other Suggested Resources:

Some students may want additional practice problems, which I strongly suggest if you are serious about passing the exam.

Empower, an insurance company in Denver, CO, has donated two phenomenal study manuals (Actex and ASM) to the CSU Actuarial Program. Both manuals are on shelf reserve at the Morgan Library and provide countless examples and problems. I strongly, strongly, strongly recommend that you utilize these resources. Actex is known for its many problems, and ASM is known for its clear explanations and challenging sample exams. Utilizing these two resources will help to increase your chances of passing Exam P.

If you would like to purchase your own study manual or additional sample exams, I would recommend one of the following options, all located at www.actexamdriver.com and www.actuarialbookstore.com:

- [ADAPT Subscription to Online Practice Exams.](#)
- [The Infinite Actuary Online Seminar.](#)
- Boverman, Samuel A. [ACTEX Study Manual for the SOA Exam P and CAS Exam 1.](#)
- Ostaszewski, Krzysztof M. [ASM Study Manual for Exam P/Exam 1.](#)
- [ACTEXonline P/1 Online 5/10/15 Original Practice Exams](#)
- Ramanathan, G.V. [Five \(or Ten\) Online Practice Exams for Exam P/1.](#)

You may also find the following websites beneficial to your studying:

- www.beanactuary.com – general information about the profession; specific information about Exam P; CBT Tutorial

- www.actuarialoutpost.com – Discussion Forum where you can ask questions and view other people’s questions about the exam and profession
- <https://www.soa.org/Education/Resources/Cae/edu-soa-sponsored-study-resources.aspx> – as part of a grant program sponsored by the SOA, the U. of Wisconsin created video solutions for a subset of the SOA sample problems
- <https://etchedactuarial.com/exam-p-free-practice-problems/> - this is a compilation of links to free Exam P practice problems/exams; the website itself also has a variety of useful resources

Course Objective:

The purpose of this course is to prepare the students to successfully complete Exam P of the Society of Actuaries in the May 2024 sitting. Students should already have an elementary understanding of probability through STAT 315 or higher. This MATH 495 course will highlight, review, and emphasize all of the topics for the first Society of Actuaries Examination.

Course Prerequisite:

STAT 315 or higher (e.g. STAT 420/STAT 430). If you desire to take MATH 495 prior to STAT 315, you must first consult the instructor.

Homework:

Each week, homework will be assigned, usually consisting of 12-20 past SOA exam problems and problems from the FCT Manual for Exam P/1 based on the most recent lecture material. Familiarity with these types of problems is essential to passing Exam P. All homework is due to the Instructor **via email no later than 6pm MT** the following week, and NO late homework will be accepted (unless you have an excused absence on the due date). Please scan or take pictures of your homework to email.

For each assigned problem, I ask that you first attempt the problem with only limited use of your resources and formulas. I will not be grading as to whether or not you get this first attempt correct, but rather, I want to see logical thoughts and an honest attempt. Since the SOA and the study manual provide solutions to the problems, it does not seem right to grade on correctness.

Next, below this first attempt for each problem, I want you to write the correct solution from either the SOA or FCT. Some of you may think this is meaningless busy work, but I guarantee that it will help to solidify your understanding of the material and formulas. Many times the solution will take a different approach (sometimes simpler, sometimes not), but it will give you

further insight on quickly solving similar types of problems. If you got the problem correct on your first attempt and your logic was correct, skip the SOA/FCT solution at your own risk.

Finally, below the SOA or FCT solution, write and box what you consider the most important formula(s) for that problem. I will not be grading whether or not you chose the “most important formula,” although it must be a formula used in that problem (i.e. you can’t choose Bayes’ Theorem on a problem asking for the standard deviation of a joint distribution). You will find that this step is extremely beneficial in the final few weeks of review leading up to the actual Exam P sitting.

A sample solution of what I expect to receive will be provided on the first day of class.

Quizzes and Examinations:

Since the homework is not necessarily graded for correctness, quizzes and exams will be administered for this purpose. All quizzes and exams are closed-book and closed-notes, requiring the student to have memorized the necessary formulas.

Each week will have a timed content quiz administered via Canvas. In general, two questions will be based on the homework due that day and one question will be based on previously covered material. The actual number of questions on the quiz will increase throughout the semester. The timed quiz will help to simulate an actual exam environment.

Two 108-minute, 18-question examinations will be administered during the course of the semester. The problems will be similar in structure and difficulty to SOA exam problems. These exams will help to simulate an actual exam environment with the same time constraints. You will need to email the Instructor with your solution sheets in order to receive partial credit.

Formula Sheets:

When meeting in person, I would typically administer formula quizzes, which is generally one of the most valuable aspects of the course. However, since we will be remote for the semester, I will send blank formula sheets each week with a selection of formulas for you to fill in and email to me before the following class.

Student Evaluation:

This course will be traditional **A/B/C/D/F** grading. Plus/minus grading will not be used. You **must** look beyond the grade of this course and see its true purpose. *This course is not designed to boost or lower your GPA, but rather*

increase your chances of success on the SOA Exam P. Grading is outlined as follows, subject to change as announced in class.

- Homework: Each homework set will be worth 10 points. The grading for this is highly subjective since it is not necessarily graded on correctness. If you complete the homework as instructed above, you should receive full credit.
- Quizzes: Each content quiz will be worth approximately 15 points. You will receive 6 points if you are in the virtual classroom for the entire class period (this is effectively like an attendance grade). Each problem is then worth 3 points.
- Formula Sheets: As a general rule, each formula on the sheet will be worth approximately 0.25 point. If the points per formula change later in the semester, it will be announced in class.
- Exams: Each exam will be worth 108 points. Each problem on the exam is worth 6 points. You will receive 3 points for answering the multiple-choice question correctly (whether the logic is correct or not), and 0 points for answering the multiple-choice question incorrectly. The remaining 3 points will be assigned with partial credit according to your logic in answering the problem. *You will need to email the Instructor with your solution sheets in order to receive partial credit.* The grades will be separate so that you can determine what your score would have been had that been the actual Exam P, where you only get credit for correct answers.

Grades will be calculated as total points earned divided by total points possible.

<u>Grade</u>	<u>Percentage</u>
A	89.5-100%
B	79.5-89.49%
C	69.5-79.49%
D	59.5-69.49%
F	<59.5%

The instructor reserves the right to lower this threshold if necessary.

Exam P Content Changes:

The material for Exam P had been largely unchanged for nearly two decades but was updated in the fall of 2022. The most notable change in content was the **removal** of topics including:

- Transformations (univariate and multivariate)
- Moment Generating Functions (univariate and multivariate)

- Probability Generating Functions
- Chebyshev's Inequality
- Continuous portions of multivariate concepts

You may still come across some problems covering this material in practice problems, exams, and certainly the study manual, and when you do, please just move on and ignore it as it is no longer on the syllabus for Exam P.

General Notes:

I am thrilled to have the opportunity to teach this course, and I am positive that it will be a beneficial experience for you. Exam success is critical to a successful career as an actuary. Although this course will help you in your preparation for Exam P, it by no means guarantees that you will pass the exam. Many actuarial exam candidates suggest spending 100 hours of studying per hour of exam time. Since Exam P is a three hour exam, this would suggest spending 300 hours strictly studying for Exam P. It would be virtually impossible for me to expect that time commitment from you in a 2-credit class. You should, however, expect to spend at least 6 good hours a week preparing for this MATH 495 course. But, to give yourself the greatest opportunity to pass Exam P, be prepared to spend additional time on your own. In college, I absolutely loved concentrating in Actuarial Science. I was able to take all of the math courses a normal math major would, but I also had the opportunity to take otherwise-restricted courses in finance, accounting, economics, statistics, and computer programming. Mathematics has phenomenal business applications, and I hope to share my excitement for this profession with you through this class. Here's to a great semester!!!

Tentative Class Schedule
Subject to change as announced in class

Jan. 18: Introduction to the Course, Background Material

Jan. 25: Set Notation, Properties of Probability, Combinatorial Probability

Feb. 1: Conditional Probability, Bayes' Theorem, Probability Distributions

Feb. 8: Conditional Probability, Moments, Properties of Expected Value and Variance

Feb. 15: Percentiles

Feb. 22: Crucial and Other Distributions, Review for Mid-term Exam

Feb. 29: Mid-term Exam

Mar. 7: Joint, Marginal, and Conditional Probability Distributions

Mar. 14: Spring Break

Mar. 21: Moments for Joint, Marginal, and Conditional Probability Distributions

Mar. 28: Covariance and Correlation Coefficients (expect to be collapsed w/ prior week)

Apr. 4: Central Limit Theorem

----(*Exam P Registration Deadline: April 9, 11pm MT*)----

Apr. 11: Distribution of a Linear Combination

Apr. 18: Review of Joint Distribution Material

Apr. 25: Review and Problems

May 2: Review and Problems

May 9, 8:30pm-10:30pm: Final Exam will be released at the beginning of Finals Week and must be completed by this time

Other Important Dates:

April 9 (11pm MT): Registration deadline for the May sitting of Exam P

May 10-24: Examination dates for the May sitting of Exam P