TITLE: Actex Online Exam P/1 Prep Course

Instructor: Richard Owens, FSA, MAAA, CFA

Course Dates: **January 4, 2016 - March 29, 2016**

Text for Course: Current Actex P/1 Study Manual by Broverman.

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Live Office Hours via Moodle: Monday 7:00pm Eastern, Thursday 7:00pm Eastern
Individual Office Hours via Skype: by Appointment

Prerequisites:
Students will want to have completed two terms of calculus and a college-level probability course. The SOA syllabus states, "The syllabus for Exam P/1 develops the candidate's knowledge of the fundamental probability tools for quantitatively assessing risk. The application of these tools to problems encountered in actuarial science is emphasized. A thorough command of the supporting calculus is assumed."

Course Description:
While this course does not provide college credits, the course is designed to provide the student an experience similar to a university course and is similar to the one the instructor teaches at a state university. The student is provided with the discipline of a university course including weekly assigned readings, problem solving video lectures, discussion board topics, homework assignments and timed multiple-choice test similar to what may be encountered in Exam P/1. The prior week's test will be reviewed during weekly office hours).

The SOA syllabus states, "A very basic knowledge of insurance and risk management is assumed." The instructor believes a key to successfully working the text problems, and passing Exam P/1, is an understanding of the language of insurance and risk management. As such, language, insurance and risk management terminology, will be emphasized. If you do not understand the language, it is difficult to solve the problems.

The mathematical aspects of the course deal with the review of key concepts from probability. Topics include axioms of probability: random variables, conditional probability, Bayes' theorem, univariate and joint distributions and expectations, loss frequency, loss severity and other risk management concepts. Exam P/1 learning objectives and learning outcomes are emphasized as shown below.

Course Goals:
The goal of the course is to sharpen students' probability and problem-solving skills so that they can answer at least 75% of Exam P/1 questions correctly, which I expect should lead to passing Exam P/1.

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Other Materials for Course:
May 2015 Exam P/1 Probability Sample Exam Questions and Solutions (on Moodle)

Calculators
The SOA exams assume the use of a calculator. Being consistent with the SOA rules for calculator use during an exam, only the following Texas Instrument calculator models, with the memory cleared, should be used for all course tests, and the course exam. This will also allow you to get accustomed to using these calculators under exam-like conditions:

- BA-35 TI-30Xa
- BA II Plus* TI-30XIIS*
- BA II Plus Professional Edition* TI-30XIIB*
- TI-30XS MultiView*
- TI-30XB MultiView*.

Review of Calculator Functions for the Texas Instruments BA-35
http://www.soa.org/files/pdf/FM-22-05.pdf

Review of Calculator Functions for the Texas Instruments BA II Plus
http://www.soa.org/files/pdf/FM-23-05.pdf

TECHNICAL INFORMATION

Become familiar with the class interface before the semester begins and seek help if necessary.

IT Technical Assistance
If you have technical questions, you can contact Actex's Help Desk. The helpdesk can be contacted at: 1-800-282-2839 Ext 14 or email at onlinecourses@actexmadriver.com.

Course Policies

Expectations
As a not-for-credit course, all assignments are voluntary. However, for you to get the most from the course, the expectation is that you will complete the assignments as scheduled.

Participation and Timeliness
Your regular participation and timeliness are important to your exam success. In online courses, this takes the form of participation in discussion via forums, chat, and other electronic means provided.

As this is an online course, it is up to every student to stay on track and not fall behind. You must be self-motivated and disciplined to meet all due dates. Developing a routine is essential. All assignments are expected to be submitted by a specific time and date.

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Communication
Do not hesitate to contact me with any questions or concerns. My office hours are still to be determined. As individual office hours will be done via Skype, please email me your Skype name so that I can add it to my list of recognized contacts. Calls from unrecognized contacts are blocked by my system. I will typically respond to e-mail questions usually within 24/48 hours.

Reading Homework
Students are expected to read the section of the study manual before the listening to the video lectures.

Problem Solving Homework
Homework problems will be assigned from both the text and the SOA sample problems (on Moodle). If you do not understand a problem, ask a specific question, preferably on the Discussion Board so others can be helped by seeing your question and the responses. As Exam P/1, which is totally problem based, much of the homework involves doing problems. However, it is important to read the text as it provides key insights into the subject matter.

As both the text and the SOA Sample Problems include solutions to the problems, it is important that you give the problem your best effort before you look at the solution. It is too easy to look at the solution and say, "Yea, I understand that". You must think through the problem yourself in order to succeed.

Students must work consistently on the homework in order to succeed in the course.

Individual Feeback on Homework Problems
This course provides the opportunity to receive individual feedback on up to six worked problems per week. It is recommended that the problems be nicely organized with space between problems and include a statement of each problem with its solution. Please show all the steps in the solution of the problems so I can tell where there may be any misunderstanding and provide you with feedback.

Discussion Board
There will be a discussion forum each week in which students may participate. Instructions for discussion postings are an initial posting by midweek and a follow-up response post to a classmate's posting by the end of the week. You are encouraged to post on two separate days at minimum. These are minimum requirements; to discuss a topic you will probably want to post more than two times per discussion. Discussion forums are meant to replicate a face-to-face classroom discussion.

Tests
The course will have 10 tests, one in each week of the course. The first eight tests will consist of 20 multiple-choice questions similar to those that might be expected on Exam P/1 and you will have two hours to complete. Tests in the final two weeks will be 30 questions, the same as Exam P/1, and you will have three hours to complete. The tests will have questions both

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specific to the corresponding sections of the text and a few questions from prior sections of the test.

Tests will be administered on Moodle and must be completed by the end of the week, for this purpose 11:30 pm Eastern time on Sunday. Tests are closed book and closed notes. Please remember the SOA/CAS Candidate Code of Conduct, which is on Moodle, and will apply during Exam P/1.

Weekly Journal

The purpose of the journal is for you to analyze and learn from your mistakes, to make clear to you where your learning needs improvement. The journal should be a tool to help you study for tests, our final exam, and Exam P/1.

For each homework problems and prior week test problem that you initially did incorrectly, write in your journal a description of what you misunderstood, what you did incorrectly, what fact/formula/technique you needed to know in order to correctly solve the problem and what you learned.

For example, “On SOA problem 3, I was stumped by the problem as I did not remember the formula $P(A) = P(A \cap B) + P(A \cap B')$ where B' is not B. With this formula, I was able to get to the correct answer. On SOA problem 1, I subtracted incorrectly. Fixing this mistake leads to the correct answer.”

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Learning Objectives (from March 2016 SOA Exam Syllabus)

Candidates should be able to use and apply the following concepts in a risk management context:

General Probability (10 - 20%)

- Set functions including set notation and basic elements of probability
- Mutually exclusive events
- Addition and multiplication rules
- Independence of events
- Combinatorial probability
- Conditional probability
- Bayes Theorem / Law of total probability

Univariate probability distributions (including binomial, negative binomial, geometric, hypergeometric, Poisson, uniform, exponential, gamma, and normal) (35 - 45%)

- Probability functions and probability density functions
- Cumulative distribution functions
- Mode, median, percentiles, and moments
- Sums of Independent Random Variables (Poisson and normal)
- Variance and measures of dispersion
- Moment generating functions
- Transformations

Multivariate probability distributions (including the bivariate normal) (35 - 45%)

- Joint probability functions and joint probability density functions
- Joint cumulative distribution functions
- Central Limit Theorem
- Conditional and marginal probability distributions
- Moments for joint, conditional, and marginal probability distributions
- Joint moment generating functions
- Variance and measures of dispersion for measures of dispersion for conditional and marginal probability distributions
- Covariance and correlation coefficients
- Transformations and order statistics
- Probabilities and moments for linear combinations of independent random variables

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