ACTS:3110 ACTUARIAL EXAM P PREPARATION

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Fall 2019

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Course description

This short course is designed to aid students in their preparation for Exam P of the Society of Actuaries. For each subject tested on exam P, relevant formulas and problemsolving skills will be briefly introduced after which students will be given selected past exam problems to work on. There are no official prerequisites for this course, but **it is assumed that students have already studied (or are in the process of studying) the subjects tested on Exam P**.

What is Exam P?

Exam P is a 3-hour exam that consists of 30 multiple-choice questions on probability. It tests students' 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 probability topics and the supporting calculus is assumed. Additionally, a very basic knowledge of insurance and risk management is assumed. More information see https://www.soa.org/education/exam-req/edu-exam-p-detail.aspx

Learning Objectives of Exam P

1. General probability:

Set functions, independent and mutually exclusive events, addition and multiplication laws, combinatorial and conditional probability and Bayes' theorem

2. Univariate probability distributions (including binomial, negative binomial, geometric, hypergeometric, Poisson, uniform, exponential, gamma, normal and mixed):

Probability mass function / density function, distribution function, percentiles and moments, mode and median, standard deviation and variance, coefficient of variation, probability / moment generating function, sum of independent random variables (Poisson, and normal), transformation

 Multivariate probability distributions (including the bivariate normal): Joint pmf/pdf, joint distribution, joint mgf, conditional and marginal distribution function, covariance and correlation, variance and moments for conditional and marginal probability distribution, transformation and order statistics, sum of independent random variables, Central Limit Theorem

Textbook

There is no required textbook for the course. Handouts will be posted on my website.

Calculator

Candidates may use the battery- or solar-powered Texas Instruments BA-35 model calculator, the BA II Plus*, the BA II Plus Professional*, the TI-30Xa, TI-30X II (IIS solar or IIB battery)* or TI-30XS MultiView (or XB battery)*. Candidates may use more than one of the approved calculators.

* The memory of TI-30X II (IIS solar or IIB battery), TI-30XS MultiView (or XB battery), BA II Plus and BA II Plus Professional will need to be cleared by the examination supervisor upon the candidates' entrance to the examination room. For the BA II Plus and BA II Plus Professional, clearing will reset the calculator to the factory default settings.

Structure of the Preparation Course

1. Mathematical Review: logarithms, derivatives of exponential and logarithmic functions, integration resulting in exponential and logarithmic functions, integration by parts

- 2. Basics: set functions, addition and multiplication law, conditional probability, Bayes' theorem, simple combinatorial analysis, hypergeometric probability
- 3. Random variables: univariate discrete and continuous, mixed, moments and mgf, etc.
- 4. Risk and insurance: how insurance works, deductible and limit
- 5. Jointly distributed random variables: bivariate, pmf and pdf, conditional and marginal distribution, product moments and covariance, joint distribution of a functions of random variables, order statistics, etc.

Assignments

About 30 homework questions will be assigned each week. Although homework will not be collected, students are expected to work and understand the assigned problems each week. Un-resolved issues can be discussed during the next class meeting.

Assessment

There will be 4 closed-book quizzes. For each quiz, you are required to do 3 questions in approximately 15 to 20 minutes. This course is offered on PASS/FAIL basis. Students who attend at least 10 class meetings and answer at least 50% of the quiz questions correctly will earn a <u>PASS</u>. The exact date of each quiz will be announced in class.

Exam Schedule for Computer-Based Testing (CBT) 2020

The registration deadline for the January exam session is December 10, 2019. The test dates are Jan 13-24, 2020. The fee is \$225.00. An approved SOA calculator is required. More information see https://www.soa.org/education/exam-req/exam-day-info/edu-2020-cbt-test-schedule/

References

Exam P Sample Questions are a good source of questions. Study Note P-21-05 is a required reading for Exam P. They are available on my website or on https://www.soa.org/education/exam-req/edu-exam-p-detail.aspx. If you want to do more exercises, many SOA Exam prep manuals (ASM, ACTEX), including for Exam P, are on reserve at the Main Library for student use thanks to the work of our Actuarial Club. Past students have found Coaching Actuaries study programs to be helpful in preparing for SOA Exams.

The College of Liberal Arts, Teaching Policies & Resources

https://clas.uiowa.edu/faculty/teaching-policies-resources-syllabus-insert

- Absences and Attendance: Students are responsible for attending class and for contributing to the learning environment of a course. Students are also responsible for knowing their course absence policies, which will vary by instructor. All absence policies, however, must uphold the UI policy related to students illness, mandatory religious obligations, including Holy Day obligations, unavoidable circumstances, or University authorized activites (https://clas.uiowa.edu/ students/handbook/attendance-absences). Students may use this absence form to aid communication; the instructor will decide if the absence is excused or unexcused (https://clas.uiowa.edu/sites/default/files/ABSENCE%20EXPLANATION% 20FORM2019.pdf).
- Academic Integrity: All undergraduates enrolled in courses offered by CLAS have, in essence, agreed to the College's Code of Academic Honesty (https://clas.uiowa.edu/students/handbook/academic-fraud-honor-code). Misconduct is reported to the College, resulting in suspension or other sanctions, with sanctions communicated with the student through the UI email address.
- Accommodations for Disabilities: UI is committed to an educational experience that is accessible to all students. A student may request academic accommodations for a disability (such as mental health, attention, learning, vision, and physical or health-related condition) by registering with Student Disability Services (SDS). The student is then responsible for discussingg specific accommodations with the instructor. More information is at http://sds.studentlife.uiowa.edu/.
- Administrative Home of the Course: The College of Liberal Arts and Sciences (CLAS) is the administrative home of this course and governs its add/drop deadlines, the second-grade-only option, and other policies. These policies vary by college (http://clas.uiowa.edu/students/handbook).
- Communication and the Required Use of UI Email: Students are responsible for official correspondences sent to their UI email address (uiowa.edu) and must use this address for all communication within UI (Operations Manual, III.15.2, http:// opsmanual.uiowa.edu/human-resources/professional-ethics-and-academic-responsibility# 15.2).
- *Complaints:* Students with a complaint about an academic issue should first visit with the instructor or course supervisor and then with the Chair of the department or program offering the course; students may next bring the issue to the College of Liberal Arts and Sciences. For more information, see https://clas.uiowa.edu/student-rights-responsibilities.
- *Final Examination Policies:* The final exam schedule is announced around the fifth week of classes; students are responsible for knowing the date, time, and place of a final exam. Students should not make travel plans until knowing this

information. No exams of any kind are allowed the week before finals. Visit https://registrar.uiowa.edu/final-examination-scheduling-policies.

• Nondiscrimination in the Classroom: UI is committed to making the classroom a respectful and inclusive space for all people irrespective of their gender, sexual, racial, religious or other identities. Toward this goal, students are invited to optionally share their preferred names and pronouns with their instructors and classmates. The University of Iowa prohibits discrimination and harassment against individuals on the basis of race, class, gender, sexual orientation, national origin, and other identity categories set forth in the University's Human Rights policy. For more information, contact the Office of Equal Opportunity and Diversity at diversity@uiowa.edu Or

https://diversity.uiowa.edu/office/equal-opportunity-and-diversity.

• Sexual Harassment: Sexual harassment subverts the mission of the University and threatens the well-being of students, faculty, and staff. All members of the UI community must uphold the UI mission and contribute to a safe environment that enhances learning. Incidents of sexual harassment must be reported immediately. For assistance, please see http://osmrc.uiowa.edu/.