SYLLABUS


PREREQUISITES: MA351 (Theory of Probability)

CALCULATOR. The only calculators permitted in this course are the ones approved by SOA in their catalog. SOA permits on their exams only the following calculators:

- the battery- or solar-powered Texas Instruments BA-35 model calculator,
- the BA II Plus, the BA II Plus Professional,
- the TI-30Xa or TI-30X II (IIS solar or IIB battery),
- the TI-30XS Multiview or the TI-30XB Multiview.

Candidates may use more than one of the approved calculators during an examination.

For this course you are welcome to use any and all of these calculators. You should know that the “solar” models are actually “dual power,” i.e., they have an internal battery in addition to the solar battery.

My personal recommendation is the TI-30XS Multiview calculator. On the P exam, you will never have to do any “business” or “interest” calculations (like mortgages, IRR, etc), so a business calculator will not be much help. In contrast, the TI-30X Multiview has six-variable memory, can do elementary statistics, and has a four-line screen that lets you enter, recall, and edit formulas. It can also recall previous answers (like the TI-89), and has rudimentary list capabilities.

Do not buy the TI-30Xa though: this one is old, obsolete, and hard to use.

COURSE GOALS and OBJECTIVES. This course builds upon your knowledge from MA351. It helps acquire a firm understanding of the fundamental tools of calculus and probability and to apply these tools to problems involving the quantitative assessment of risk. Applications encountered in actuarial science will be emphasized.

The ultimate goal of this course is to prepare you to take and successfully pass the SOA Exam P.

STUDENT LEARNING OUTCOMES. By the end of the semester you will:

- be able to demonstrate knowledge of the topics of theory of probability and risk management according to the learning objectives described in the Society of Actuaries (SOA) Basic Education Catalog for Preliminary Actuarial Examination in Probability (P);
- become independent learners who can successfully study for and pass actuarial exams.
ASSESSMENT. Your final grade for the course will be based on the degree of mastery of the learning outcomes listed above, as measured by your performance in class, and on tests, quizzes, and the final exam.

ATTENDANCE. You are expected to attend all classes. Excessive absences may result in a lower grade. If you do miss a class, it is your responsibility to obtain from a classmate any notes, assignments, handouts, or anything else you may have missed.

Absence on any occasion of evaluation (tests and exams) will result in a grade of zero for that evaluation. The only exceptions will be prior approval and written documentation. If some unavoidable circumstance comes up that will prevent you from taking an exam or test as scheduled, you must talk to me about this personally (face to face or on the telephone) and in advance.

COURSE SCHEDULE. The course is divided into two very different parts, one followed by the other.

First, we will start with a quick review of the theory, divided roughly into four big topics. After each topic, there will be an in-class test. The following table gives the test dates and topics:

<table>
<thead>
<tr>
<th>Test</th>
<th>Date</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test 1</td>
<td>Tuesday, January 22</td>
<td>General Probability</td>
</tr>
<tr>
<td>Test 2</td>
<td>Thursday, January 31</td>
<td>Univariate Distributions</td>
</tr>
<tr>
<td>Test 3</td>
<td>Thursday, February 14</td>
<td>Multivariate Distributions</td>
</tr>
<tr>
<td>Test 4</td>
<td>Tuesday, February 26</td>
<td>Risk Management</td>
</tr>
</tbody>
</table>

These tests follow the usual format of tests in math courses: each one will have about 7 problems (some with parts). You must write complete solutions and justify your work. The whole solution is graded, not just the answers. Partial credit is possible.

Immediately after that, on February 28, we switch gears and begin an intensive preparation with multiple-choice quizzes. We will have three five-class blocks; during the first, second, and fourth lecture of each block, we will review a practice exam from the text. During the third and fifth classes of the block, you will complete two multiple-choice quizzes on the same practice test (with the numbers changed). Each quiz will have 15 multiple-choice questions. Only the answers are checked, no partial credit is given.

The three blocks are based on Practice Exams 6, 7, and 8 from the manual respectively.

The following is a tentative schedule for the second half of the course:

<table>
<thead>
<tr>
<th>event</th>
<th>block 1</th>
<th>block 2</th>
<th>block 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discussion of Practice Exam</td>
<td>02/28</td>
<td>03/26</td>
<td>04/11</td>
</tr>
<tr>
<td></td>
<td>03/12</td>
<td>03/28</td>
<td>04/23</td>
</tr>
<tr>
<td>Quiz - first half</td>
<td>03/14</td>
<td>04/02</td>
<td>04/25</td>
</tr>
<tr>
<td>Discussion of Practice Exam</td>
<td>03/19</td>
<td>04/04</td>
<td>04/30</td>
</tr>
<tr>
<td>Quiz - second half</td>
<td>03/21</td>
<td>04/09</td>
<td>05/02</td>
</tr>
</tbody>
</table>
There will be a comprehensive final exam (based on Practise Exam 9) on Tuesday, May 7, 7:30 to 10:30am.

All the tests, quizzes, as well as the final are closed-book, in-class exams. No notes, written or electronic, are allowed. You should bring your approved calculator(s) to the tests, quizzes, and the final exam.

**GRADING POLICY.** Your final grade will be calculated in the following way:
40% of the grade come from the four in-class tests,
30% of the grade come from five of the six quizzes (lowest one is dropped),
30% of the grade come from the Final Exam.

These scores are combined to give a final number of points, between 0 and 100. Point ranges for the final grades are:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Points Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>93-100</td>
</tr>
<tr>
<td>A−</td>
<td>90-92.9</td>
</tr>
<tr>
<td>B+</td>
<td>87-89.9</td>
</tr>
<tr>
<td>B</td>
<td>83-86.9</td>
</tr>
<tr>
<td>B−</td>
<td>80-82.9</td>
</tr>
<tr>
<td>C+</td>
<td>77-79.9</td>
</tr>
<tr>
<td>C</td>
<td>73-76.9</td>
</tr>
<tr>
<td>C−</td>
<td>70-72.9</td>
</tr>
<tr>
<td>D+</td>
<td>67-69.9</td>
</tr>
<tr>
<td>D</td>
<td>63-66.9</td>
</tr>
<tr>
<td>D−</td>
<td>60-62.9</td>
</tr>
<tr>
<td>F</td>
<td>0-59.9</td>
</tr>
</tbody>
</table>

**SCHOOL CLOSURE POLICY.** Occasionally, the college is closed and classes are cancelled due to inclement weather or other emergency situations. To minimize the negative impact of such disruptions on your learning, the following School Closure Policy will be in effect for this course.

In case of school closure, an alternative form of the lecture will be provided (voice-over slides, instructional video, additional assigned reading, or a combination of these), and you will still need to complete the homework assignment. Concrete details will be communicated to you at the time of the closure announcement. In case the closure falls on an exam day, an alternative date and time for the exam will be announced.

**INTEGRITY.** All work you submit for grading must be your own and must comply with the Standards of Integrity set forth in the Elizabethtown College Catalog. In particular, no collaboration on quizzes or exams is allowed.

**DISABILITIES.** Elizabethtown College welcomes otherwise qualified students with disabilities to participate in all of its courses, programs, services, and activities. If you have a documented disability and would like to request accommodations in order to access course material, activities, or requirements, please contact the Director of Disability Services, Lynne Davies, by phone (717-361-1227) or e-mail daviesl@etown.edu.

If your documentation meets the colleges documentation guidelines, you will be given a letter from Disability Services for each of your professors. Students experiencing certain documented temporary conditions, such as post-concussive symptoms, may also qualify for temporary academic accommodations and adjustments.

As early as possible in the semester, set up an appointment to meet with me, the instructor, to discuss the academic adjustments specified in your accommodations letter as they pertain to my class.

**STATEMENT ON RELIGIOUS OBSERVANCES.** The College is willing to accommodate individual religious beliefs and practices. It is your responsibility to meet with the class instructor in advance to request accommodation related to your religious observances that may conflict with this class, and to make appropriate plans to make up any missed work.
SUGGESTED REVIEW PROBLEMS: BTDT manual P/1, 2018 ed

TEST 1.
Section 1: General Probability (pages 1 -- 18), 12 exercises
Practice Exam 11: 3, 4, 7, 9, 15, 16, 17, 19, 28, 29
Practice Exam 12: 16, 22, 23
Practice Exam 13: 5, 6, 7, 10, 11, 17, 23
Practice Exam 14: 10, 16, 29, 30
Practice Exam 15: 3, 4, 22, 25, 26, 27

TEST 2.
Section 2: Random Variables and Distributions (pages 19 -- 53), 16 exercises
Practice Exam 11: 5, 11, 20, 21, 23, 24, 25, 26, 27, 30
Practice Exam 12: 3, 6, 7, 11, 13, 15, 17, 19, 20, 24, 26,
Practice Exam 13: 2, 4, 8, 9, 13, 14, 15, 16, 18, 24, 25, 27, 28, 29, 30
Practice Exam 14: 1, 3, 5, 7, 8, 15, 17, 18, 23, 26, 27
Practice Exam 15: 1, 2, 5, 6, 7, 9, 11, 14, 18, 21, 30

TEST 3.
Section 3: Multivariate Distributions (pages 54 -- 88), 15 exercises
Practice Exam 11: 1, 2, 6, 10, 12, 13, 14, 18, 22,
Practice Exam 12: 1, 2, 4, 5, 8, 9, 10, 12, 14, 18, 21, 25, 27, 28, 29, 30
Practice Exam 13: 3, 12, 19, 20, 21, 22, 26
Practice Exam 14: 2, 4, 6, 11, 12, 13, 16, 21, 22, 24, 25
Practice Exam 15: 8, 10, 12, 13, 15, 16, 17, 19, 20, 23, 24, 28, 29

TEST 4.
Section 4: Risk Management and Insurance (pages 89 -- 102), 10 exercises
Practice Exam 11: 8, 17
Practice Exam 13: 1
Practice Exam 14: 9, 14, 19, 20, 28